

**PROPOSED ISUNDU 765/400 KV SUB-STATION AND TURN-IN
TRANSMISSION LINES**

DRAFT SCOPING REPORT

DEA EIA REF: 14/12/16/3/3/2/745

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Report prepared for:

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April 2015

SCOPING REPORT DISTRIBUTION

This Scoping Report will be distributed to key stakeholders and will also be left in the following public places in the project area from 29 April 2015 to 9 June 2015.

Area	Venue	Street	Contact Person and Number
Camperdown	Camperdown Public Library	18 Old Main Road Camperdown	031 785 9337
Camperdown	Mkhambathini Local Municipality	18 Old Main Road Camperdown	031 785 9341
Pietermaritzburg	Msunduzi Local Municipality	1 st Floor, City Hall Cnr Chief Albert Luthuli Road Pietermaritzburg	033 392 3000

PREFACE

Between 2009 and 2011, Eskom investigated various options to bring a 765 kV transmission line from the Venus Sub-station, near Estcourt, to a new sub-station (Sigma) in the KZN Midlands, with two 400 kV transmission lines from the new Sigma Sub-station linking into the existing Hector and Ariadne Sub-stations, near Camperdown and Pietermaritzburg, respectively.

The Venus-Sigma-Hector-Ariadne (VSHA) environmental authorisation process resulted in environmental authorisation of the following infrastructure:

- 1 x 765 kV transmission line between the Venus and Sigma Sub- stations.
- 2 x 400 kV transmission lines between the Sigma and Hector Sub-stations.
- 3 x 400 kV feeder bays at the existing Hector Sub-station.
- The new Sigma Sub-station to the west of Wartburg.

The 400 kV transmission line link between the Hector and Ariadne Sub-stations would have been achieved on a spare circuit of the existing double circuit 400 kV transmission line between these two sub-stations.

The authorised Sigma Sub-station site is no longer considered financially feasible. Therefore, the current authorisation process is investigating the proposed Isundu Sub-station site, near Ashburton, as an alternative, more cost effective sub-station site.

EXECUTIVE SUMMARY

Introduction

Eskom Holdings SOC Limited (Eskom) is the largest generator of electricity in South Africa. In order to attain a higher security of supply, Eskom needs to implement a 765 kV transmission line backbone from the power generation sources to the various load centres throughout the country.

The purpose of Eskom's KZN Strengthening Programme is to increase and strengthen the electricity transmission network to the KZN Midlands and southern KZN region. For these reasons Eskom needs to establish new 765 kV and 400 kV transmission lines, linking the main power generation facilities in Mpumalanga to the load centres in KZN.

Since 2009, Eskom has been investigating options to bring a 765 kV transmission line from the Venus Sub-station, near Estcourt, to a new sub-station, Sigma, in the KZN Midlands, with two 400 kV transmission lines from this new Sigma sub-station linking into the existing Hector and Ariadne Sub-stations (the VSHA project).

Between 2009 and 2011, Eskom undertook a comprehensive environmental impact assessment which investigated various alternative transmission line corridors and three potential sub-station sites. The outcome of this investigation was the authorisation of a transmission line corridor and the Sigma Sub-station Site 1, located to the west of Wartburg.

However, since this authorisation, more detailed geotechnical investigations undertaken at the authorized Sigma Sub-station site have shown that earthworks and foundations will be exorbitantly expensive and, considering South Africa's need to optimize expenditure of public funds, is no longer considered financially feasible. Therefore, Eskom needed to identify a new site for the proposed sub-station between Estcourt and Camperdown which still fulfils overall system requirements.

Eskom identified the Isundu Sub-station site, located near Ashburton, as a suitable site that will link to the authorized VSHA corridor and also fulfill the overall system requirements of the KZN Strengthening Programme.

Legal Requirements

The proposed Isundu 765/400 kV Sub-station is a replacement to the Sigma Sub-station previously authorised. In order to obtain environmental authorization for the proposed Isundu Sub-station, Eskom has applied to the National Department of Environmental Affairs for authorisation in terms of the Environmental Impact Assessment Regulations, 2010.

Also, the 765 kV transmission line from the Venus Sub-station authorised up to the Sigma 1 site near Wartburg will now need to continue along the authorised transmission line corridor until the Isundu Sub-station. Thus, an application to amend the project configuration in the previous authorisation has also been submitted. The public participation and assessment process for the proposed Isundu Sub-station, 14/12/16/3/3/2/745, and the amendment application, 12/12/20/1397/3/AM2, are being undertaken together with the outcomes prepared in separate reports.

A Water Use License will also be required from the Department of Water and Sanitation because a water course on the property will be affected.

Need and Desirability

The existing KZN transmission network is constrained and reaching capacity. In order to meet growing demand and to improve service quality and reliability, the network needs to be strengthened. To address this, Eskom needs to establish new 765 kV and 400 kV transmission lines, linking the main power generation facilities in Mpumalanga to the load centres in KwaZulu-Natal.

Sub-stations are needed in the system in order to step-down voltages to allow for distribution, to link different load centres and to de-energise a transmission line or other electrical switchgear for maintenance or construction whilst still keeping the network operational.

The position and location of sub-stations in the network is determined by specific electrical safety limits and, for 765 kV transmission lines, must be between 400 and 450 km apart. Furthermore, sub-stations need to be as close as possible to demand centres in order to optimize the economics of electricity transmission.

Alternatives

Since 2009, Eskom has investigated various alternatives for a 765/400 kV sub-station site in the KZN Midlands. Expanding existing sub-stations was initially considered and then more than 25 new potential sites, some prior to the VSHA environmental assessment process, were investigated, whilst further sites were identified after the authorized Sigma site was found to be financially unfeasible.

The only site currently considered feasible for further consideration is the proposed Isundu Sub-station site, located near Ashburton. In this context, the only site alternatives currently being investigated are the Isundu sub-station on the proposed site or the no-development option. The no-development option will mean that Eskom will need to further delay grid improvements and continue further investigations to try and identify other potential sub-station sites (which is unlikely considering the exhaustive investigations undertaken to date). New sites would need to be further away from the optimum position which is sub-optimal for the transmission network.

Currently, two layout alternatives for the proposed Isundu sub-station on the identified 100 ha site will be assessed.

Technical Description

The proposed Isundu Sub-station is being planned to accommodate the following transmission lines:

- ❑ 1 x 765 kV transmission line (the authorised VSHA transmission line).
- ❑ 2 x 400 kV double-circuit transmission lines from the sub-station to tie into the existing Hector-Ariadne 400 kV double circuit transmission line approximately 4 km away.
- ❑ 2 x 400 kV transmission lines to the proposed Mbewu Sub-station near Empangeni.

In addition, the layout design allows sufficient space to accommodate an additional 765 kV or High Voltage Direct Current (HVDC) transmission line, and three 400 kV transmission lines if required sometime in the future. Other infrastructure will include an access road, a communication mast of between 30 and 50 m in height, oil and fuel storage facilities and an oil bund to contain an accidental transformer oil spill.

Environmental authorisation has been applied for a 100 ha site. If fully developed in the future, the sub-station infrastructure footprint will be approximately 50-60 ha whilst for the initial phase of development, the sub-station is likely to have a footprint in the region of 25 ha. Construction is estimated to take three years.

This environmental application also includes the construction of two double-circuit 400 kV transmission lines from the proposed Isundu Sub-station to the existing Hector-Ariadne 400 kV double circuit transmission line, approximately 4 km to the south.

The amendment application to change Eskom's existing authorisation will potentially affect landowners within the authorised corridor between the proposed Sigma 1 sub-station site and the proposed Isundu Sub-station site. In this section of the corridor there would now be a single 765 kV transmission line rather than the two authorised 400 kV transmission lines. Whilst the servitude required for the transmission line will decrease from approximately 110 m, or 131 m through forestry, to 80 m, the height of the towers will increase from 30-35 m to 50–55 m.

Details of the Public Participation Process

The public participation process has been designed to comply with the requirements of the NEMA EIA Regulations. The process undertaken to date is described in Section 7 and has included a public meeting and various correspondence and meetings with key Interested and Affected Parties.

Issues raised have been considered and incorporated into the impact assessment (as detailed in the Plan of Study for Impact Assessment). The Comments and Responses Report is provided in Appendix 3.

Description of the Environment

The proposed Isundu Sub-station site is situated in the vegetation type KwaZulu-Natal Hinterland Thornveld and is currently used primarily for residential purposes. However, the grass is cut and sold as hay. Various species are reported to occur on the property, notably Oribi, Grass Owls and Rock Python.

There are small seasonal streams on the northern and north-eastern side on the Isundu site. The largest of the farm dams is located in the north-east portion of the site whilst a smaller dam is situated on the northern drainage line.

The site falls within the Mkhambathini Local Municipality and the surrounding environment consists of agriculture, tourism and conservation land-uses.

There are a number of surrounding enterprises situated in close proximity to the proposed Isundu Sub-station. These include the African Bird of Prey Sanctuary and Raptor Rescue, and the developing Mayibuye Game Estate to the south; the Natal Zoological Gardens and Natal Lion Park just over 1 km to the north-east; and chicken breeding houses owned by Rainbow Farms on the adjacent property to the west. In addition, there are other proposed developments, such as the Wild Aloe Aero Estate, which need to take cognizance of the previously authorized VHSA corridor and the proposed transmission lines entering and exiting the sub-station.

Environmental Issues and Potential Impacts

The issues identified during Scoping have been formulated as eight questions, within which potential impacts will be identified and described:

- What are the potential positive and negative economic and socio-economic impacts associated with the construction and operation of the proposed sub-station?
 - What impacts will the construction and operation of Isundu Sub-station have on the natural environment (flora and fauna) of the site?
 - How will the development of the Isundu Sub-station impact on existing and developing tourism land-use plans and other town planning initiatives?
 - How will the construction and operation of the Isundu Sub-station impact upon surrounding enterprises dealing with sensitive animals and birds?
-

- Can the construction and operation of the Isundu Sub-station be detrimental to the health and safety of local communities?
- What effects will the construction of Isundu Sub-station have on cultural and heritage resources?
- How will earthworks during construction, and stormwater during and after construction, affect the surrounding water courses and environment?
- What cumulative effects will the proposed Isundu Sub-station contribute, considered in association with impacts arising from other activities in the region?

The no-development option will be considered and assessed as part of these issues.

Plan of Study for Impact Assessment

The Plan of Study for Impact Assessment contained in Section 10 outlines how these issues and potential impacts will be taken forward for further investigation.

A number of specialist studies will be commissioned. Specialists will be required to interact and discuss aspects in an integrated approach, in order to ensure a comprehensive understanding and assessment of the key issues.

The proposed specialist studies are as follows:

- Avifauna Assessment.
- Vegetation and Wetland Assessment.
- Fauna Assessment.
- Electromagnetic Fields Assessment.
- Noise Impact Assessment.
- Tourism and Economic Development Assessment.
- Visual Impact Assessment.
- Social and Spatial Development Assessment.
- Cultural Heritage Assessment.

Project Schedule

The current project schedule for this authorisation process is as follows:

Activity	Anticipated Dates
Draft Scoping Report Public Review Period	April – June 2015
Submit Final Scoping Report and Plan of Study for Impact Assessment to the Competent Authority	June 2015
Specialist Study Investigations	April – June 2015
Preparation of Draft Environmental Impact Assessment Report	June – July 2015
Draft Environmental Impact Assessment Report and Environmental Management Programme Public Review Period	August – October 2015
Submit Final Environmental Impact Assessment Report and Environmental Management Programme to the Competent Authority	November 2015

Concluding Remarks

The EAP is of the opinion that due environmental process has been followed during the undertaking of this scoping process and associated public participation programme. Following the comment period for the Scoping Report, the issues raised by stakeholders, together with those of technical specialists and the regulatory authorities, will be captured in a Final Scoping Report.

Potentially negative impacts have been identified and the significance of these impacts and possible mitigation measures need to be further investigated during the Impact Assessment phase (as outlined in the Plan of Study for Impact Assessment).

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ABBREVIATIONS AND ACRONYMS

ACER	ACER (Africa) Environmental Consultants
AES	Agricultural Economics Study
Amafa	Amafa AkwaZulu-Natali
BID	Background Information Document
CRR	Comments and Responses Report
DEA	Department Environmental Affairs (national)
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIAR	Environmental Impact Assessment Report
EKZNW	Ezemvelo KwaZulu-Natal Wildlife
EMPr	Environmental Management Programme
Eskom	Eskom Holdings (SOC) Limited
FSR	Final Scoping Report
MOU	Memorandum of Understanding
I&APs	Interested and Affected Parties
KZN	KwaZulu-Natal
PDA	Planning and Development Application
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
NWA	National Water Act
SAHRA	South African Heritage Resources Association

AUTHORS

The author of this Scoping Report is Mr Paul Scherzer. An internal review was undertaken by Dr R-D Heinsohn (ACER (Africa) Environmental Consultants).

ENVIRONMENTAL APPLICATION: 14/12/16/3/3/2/745**Adherence to Regulatory Requirements, Regulation No R. 385 published in terms of the National Environmental Management Act, 1998 (Act 107 of 1998)**

Contents of a Scoping Report as stipulated in R. 385 (Chapter 3, Part 3, Section 28)		Covered in Scoping Report
1	Information necessary for proper understanding of the nature of issues identified during scoping and must include:	
a	Details and expertise of the EAP who prepared the report and carried out the scoping process	Chapter 1.2
b	Description of the proposed activity	Chapter 5
c	Description of any feasible and reasonable alternatives that have been identified	Chapter 4
d	Description of the property on which the activity is to be undertaken and the location of the activity on the property	Chapters 5 & 7
e	Description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity	Chapter 7
f	Identification of all legislation and guidelines that have been considered in the preparation of the Scoping Report	Chapter 2
g	Description of all environmental issues and potential impacts, including cumulative impacts that have been identified.	Chapter 8
h	Details of the public participation process conducted in terms of regulation 28(a)	Chapter 6
i	Description of the need and desirability of the proposed activity	Chapter 3
j	Description of the potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity	Chapters 4 and 8
k-m	Copies of any comments received from interested and affected parties; minutes of any meetings; and responses by the EAP to those representations and comments and views;	Appendix 2
n	Plan of study for impact assessment which sets out the proposed approach of the EIA, which includes (i) a description of tasks of the IA (including specialist studies) and the manner in which such tasks will be undertaken, (ii) an indication of the stages at which the authority will be consulted, (iii) a description of the method of assessing the issues/alternatives, (iv) particulars of the PPP	Chapter 9
o	any specific information required by the competent authority	N/a to date
p	any other matters required in terms of sections 24(4)(a) and (b) of the Act.	N/a to date

Public Participation Process (PPP) (Chapter 6, Sections 54-57)		Undertaken during Scoping
54.2	The PPP must take into account any guidelines applicable to the PPP and give notice to all I&APs by:	
a	Fixing a notice board at a place conspicuous to the public at the (i) site and (ii) alternative sites	Chapter 6 and Appendix 2
b	Giving written notice to (i) owners and occupiers of land adjacent to the site or alternative sites (ii) owners or occupiers of land within 100 metres of the site or alternative sites (iii) municipal ward councillor of the site or alternative sites (iv) municipality (v) organ of state having jurisdiction	Chapter 6 and Appendix 2
c	Placing an advertisement in (i) one local newspaper or (ii) official gazette that is published for the purpose of providing public notice	Chapter 6 and Appendix 2
d	Placing an advertisement in at least one provincial newspaper or national newspaper (if activity impacts extend beyond boundaries of metro or local municipality)	Chapter 6 and Appendix 2
3	A notice, notice board or advertisement referred to above must:	Chapter 6 and Appendix 2
a	Give details of application which is subject to PPP	Chapter 6 and Appendix 2
b	State (i) application has been or is to be submitted to authority in terms of these Regs (ii) whether basic assessment or scoping being applied (iii) nature and location of activity (iv) where further info can be obtained (v) manner in which and person to whom representations can be made	Chapter 6 and Appendix 2
4	A notice board must be (a) 60 cm by 42 cm (b) display the required info in lettering and format determined by authority	Chapter 6 and Appendix 2
5	If application is for linear or ocean activity, compliance with (2) is inappropriate and must be agreed with authority	Not applicable
6	Person conducting PPP must ensure that (a) information containing all relevant facts in respect of the application is made available to I&APs (b) participation by I&APs is facilitated to provide all with a reasonable opportunity to comment	Chapter 6 and Appendix 2
7	Unless justified by exceptional circumstances, as agreed to by the competent authority, the applicant and EAP managing the environmental assessment process must refrain from conducting any public participation process during the period of 15 December to 2 January.	Undertaken during Scoping.
55.1	The Applicant or EAP must open and maintain a register with details of:	
a	Persons who have submitted written comment or attended meetings	Undertaken during Scoping.
b	Persons who have requested to be registered as I&APs	Undertaken during Scoping.
c	All organs of state which have jurisdiction	Undertaken during Scoping.
2	EAP must give access to the register to any persons who requests this in writing	No written requests were submitted

Public Participation Process (PPP) (Chapter 6, Sections 56-59)		Undertaken during Scoping
56.1	A registered I&AP is entitled to comment in writing in all written submissions made to authority and raise issues, provided that:	
a	Comments submitted within (1) timeframes that have been approved or set by authority (ii) extension of a timeframe agreed to	Undertaken during Scoping.
b	Copy of comments submitted directly to authority is served to applicant or EAP	Undertaken during Scoping.
c	I&AP discloses direct business, financial, personal or other interest in approval/refusal of application	Undertaken during Scoping.
2	Before EAP submits report, the EAP must give registered I&APs access to and an opportunity to comment in writing	Undertaken during Scoping.
3	Reports include: (c) SR (d) SR amended and resubmitted (e) (f) EIRs (g) EMPs	The Scoping Report is Applicable.
4	Written comment must accompany the report when submitted to authority	Undertaken during Scoping.
5	A registered I&AP may comment on final reports submitted report when submitted to authority	Not applicable
57	EAP must ensure that comments of I&APs are recorded in reports submitted to authority: provided that comments may be attached to the report without recording in report itself	Appendix 3

1. INTRODUCTION

1.1 Background

Eskom Holdings SOC Limited (Eskom) is the largest generator of electricity in South Africa. It also transmits electricity countrywide via a network of high-voltage sub-stations and inter-connecting transmission lines (765, 400 and 275 kV). From the transmission sub-stations, the electricity is distributed to end users through a network of smaller sub-stations and power lines (132, 88, 66 33, 22 and 11 kV) (Eskom, 2013).

Eskom's KwaZulu-Natal (KZN) Strengthening Programme aims to increase and strengthen the electricity transmission network to the KZN Midlands and southern KZN region. This programme involves strengthening the transmission network by constructing a number of new transmission lines, linking the main generating facilities in Mpumalanga with demand centres in KZN. This requires the construction of transmission lines from the Alpha Sub-station near the Tutuka Power Station in Mpumalanga, to the Eros Sub-station near Harding in southern KZN.

Since 2009, Eskom has been investigating options to bring a 765 kV transmission line from the Venus Sub-station, near Estcourt, to a new sub-station (Sigma) in the KZN Midlands, with two 400 kV transmission lines from the new Sigma Sub-station linking into the existing Hector and Ariadne Sub-stations. This infrastructure forms a key component of the overall KZN Strengthening Programme.

Following extensive environmental investigations between 2009 and 2011, the Sigma 1 sub-station site, north-west of Wartburg, was identified as the preferred sub-station site. Also, a preferred transmission line corridor for both the 765 kV and 2 x 400 kV transmission lines was identified. The Department of Environmental Affairs (DEA) issued Environmental Authorisation on 11 June 2012 for the Venus-Sigma-Hector-(Ariadne) 765/400 kV Transmission Lines (EIA: 12/12/20/1397/1, EIA: 12/12/20/1397/3) and the new Sigma Sub-station (765 kV) (EIA: 12/12/20/1397/2).

Both Environmental Authorisations were appealed, subject to the concluding of a Memorandum of Understanding (MOU) between Eskom and the South African Sugar Association concerning the cultivation of sugarcane in 765 kV and 400 kV transmission line servitudes, inclusive of the burning of sugar cane immediately prior to its harvest. This MOU has since been signed and the appeals were withdrawn.

In the interim, more detailed geotechnical investigations undertaken at the Sigma Sub-station site have shown that earthworks and foundations will be exorbitantly expensive. Thus, Eskom initiated further investigations to identify if alternative, more cost-effective sub-station sites were available without needing to significantly alter the authorised VSHA transmission line corridor. Sixteen alternative sites were investigated, all of which proved unsuitable except for the proposed Isundu site, located at S29° 39' 50.77"; E30° 30' 48.37" to the east of Ashburton (Figure 1).

The proposed Isundu 765/400 kV Sub-station is a replacement to the Sigma Sub-station previously authorised. If the Isundu Sub-station is authorised, the 765 kV transmission line from the Venus Sub-station will need to continue along the authorised transmission line corridor until the Isundu Sub-station. By implication, a single 765 kV transmission line rather than 2 x 400 kV transmission lines will be constructed in the corridor between the Sigma and Isundu sites.

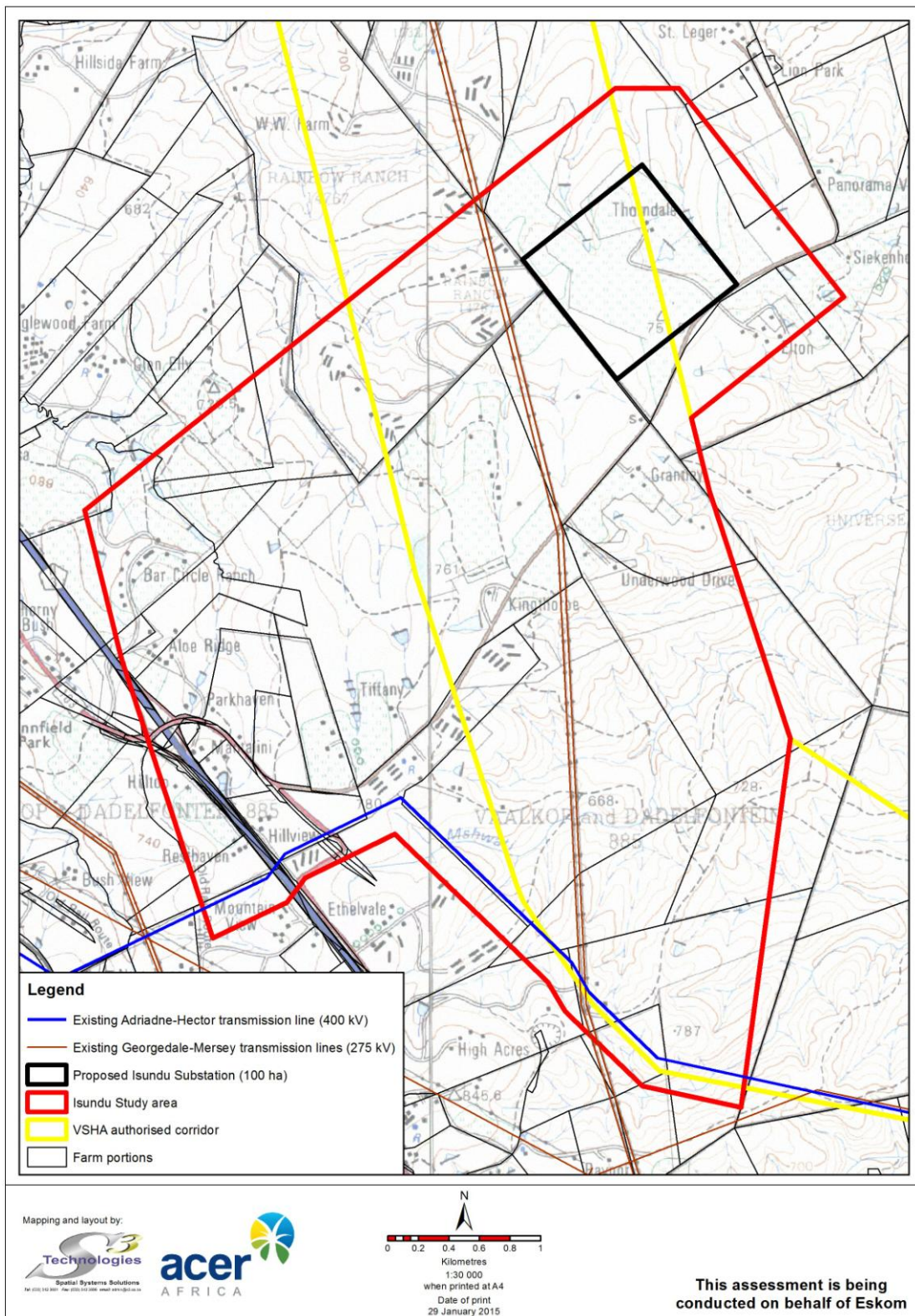


Figure 1 Location of the proposed Isundu Sub-station, near Ashburton, KwaZulu-Natal

Eskom has appointed ACER (Africa) Environmental Consultants (ACER) as the independent Environmental Assessment Practitioner (EAP) to manage and undertake the environmental impact assessment process required in order to obtain environmental authorisation for the proposed Isundu Sub-station. Alongside the application for environmental authorisation, ACER is also applying to the Department of Water and Sanitation (DWS) for a water use licence.

1.2 Qualifications and experience of the Environmental Assessment Practitioner

ACER (Africa) Environmental Consultants (ACER) is a well-established company with wide ranging expertise in environmental management and assessment processes. ACER has twice won the IAIAAsa National Premium Award for excellence in environmental management and assessment. The qualifications and experience of the primary assessors and report compilers are outlined below.

Dr Dieter Heinsohn (Project Director)

Dr Heinsohn has more than 25 years experience in South Africa and SADC countries (Lesotho, Botswana, Swaziland, Zimbabwe and Mozambique). He has undertaken numerous environmental assessments across a range of sectors (agriculture, including irrigation), bulk water, industry, transport, ports, energy, residential, tourism, and protected areas management.

Dieter Heinsohn contributed to the review of the International Finance Corporation's Handbook for Preparing a Resettlement Plan and, more recently, he was contributing author to the UNEP: Dams and Development Project: Compendium of Relevant Practice, covering Social Impact Assessment and also contributing to drafting the Compendium itself. Dieter Heinsohn has been Project Manager of five award-winning projects: Thukela Water Project (x 2), Hillside Aluminium Expansion Project, and the Sasol Natural Gas Project (Resettlement Aspects in Mozambique) (x 2).

He is registered with the South African Council for Natural Scientific Professions in the field of environmental science (Registration No. 400442/04) and is a certified Environmental Assessment Practitioner with the Interim Certification Board.

Paul Scherzer (Environmental Assessment Practitioner)

Mr Scherzer has a BSc (Agriculture) and is a registered Professional Natural Scientist (Registration No. 400030/05) and is a certified Environmental Assessment Practitioner with the Interim Certification Board (Registration No. 0072/05). He has 18 years experience across a range of Southern African countries (South Africa, Malawi, Mozambique, Botswana, Uganda, Tanzania, Swaziland and the Republic of Sao Tomé and Príncipe).

He has been involved in numerous development projects and has led large, complex environmental impact assessment projects requiring the input and integration of a range of scientific disciplines. His work has been recognised by the Southern African Institute for Environmental Assessment which included a project he managed as one of its twenty case studies from Southern Africa illustrating examples of best practice for the purposes of training and capacity building in environmental management.

1.3 Environmental assessment requirements and process

In terms of the Environmental Impact Assessment Regulations, 2010, published in Government Notices R 543, R 544, R 545 and R 546 of 18 June 2010 under Section 24 of the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), the proposed Isundu Sub-station and associated turn-in transmission lines trigger activities that may significantly affect the environment. Thus, this project is subject to a full Environmental Impact Assessment (EIA) requiring Scoping and an Impact Assessment.

The main phases of the environmental impact assessment process are shown in Figure 2.

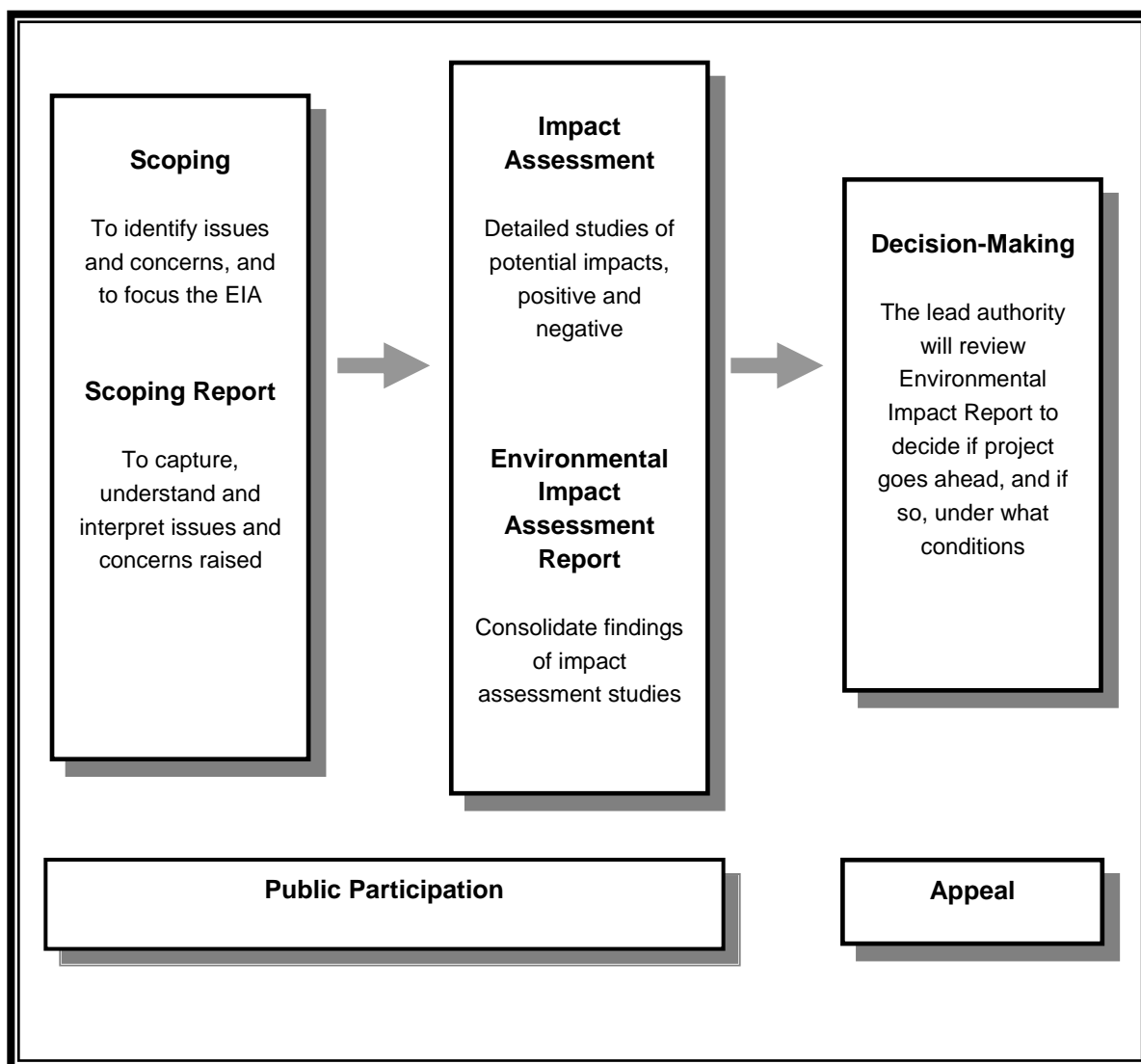


Figure 2 The four main phases of an environmental impact assessment

Eskom requires environmental authorisation from the lead authority, viz. the National Department of Environmental Affairs (DEA)¹. In this regard, Eskom has submitted an application for authorisation for the activities listed in Table 1.

The EIA Regulations 2010 were repealed by the EIA Regulations 2014 contained in GN R 982, which came into effect on 8 December 2014. Section 53(1) of the EIA Regulations 2014 dealing with transitional arrangements states that pending applications must despite the appeal of the 2010 regulations be dispensed with in terms the 2010 regulations as if they were not repealed.

Importantly, Section 53(3) of the EIA Regulations 2014 states that: 'Where an application submitted in terms of the previous NEMA regulations, is pending in relation to an activity of which a component of the same activity was not identified under the previous NEMA notices, but is now identified in terms of section 24(2) of the Act, the competent authority must dispense of such applications in terms of the previous NEMA regulations and may authorise the activity identified in terms of section 24(2) as if it was applied for, on condition that all impacts of the newly identified activity and requirements of these Regulations have also been considered and adequately assessed.

The majority of the listed activities for which Eskom has applied are contained in both the 2010 and 2014 regulations. Two 2010 listed activities are no longer listed and, thus, now do not need to be authorised. However, there is one listed activity under the 2014 regulations which will be triggered which was not included the 2010 regulations. This activity is however going to be assessed and, thus, should be authorised even though not contained in Eskom's initial application based on the 2010 regulations. Neither the 2010 activities which now falls away nor the new 2014 listed activity to be considered make any material difference to this assessment as they all relate to the size and use of the land and vegetation to be cleared.

The 2014 listed activity references have been added into Table 1 as well as the additional 2014 listed activity to be assessed.

In addition, two other applications are being undertaken concurrently with this environmental authorisation process.

- ❑ An amendment to an existing authorisation for 2x400 kV transmission lines from the proposed Sigma Sub-station site to the existing Hector Sub-station (12/12/20/1397/3/AM2). If the Isundu Sub-station is authorised then this line would need to change to a single 765 kV transmission line running from the proposed Sigma Sub-station site to the new Isundu Sub-station.

The Department of Environmental Affairs considers this amendment to be substantial and, thus, requires further public participation and the preparation of a report on the potential impacts. Given that the two applications are closely linked, this amendment application process has been incorporated into the Isundu public participation and reporting process. However, the findings from both applications have been prepared as separate reports. The report on the amendment application will be prepared and distributed for comment in parallel with the Draft Impact Assessment Report.

- ❑ Eskom is also required to obtain a Water Use Licence in terms of the National Water Act (Act No. 36 of 1998). The public participation process for this is being undertaken concurrently with this environmental authorisation process. The specialist investigations will cover both environmental applications and the water use licence application where applicable.

1 In cases where an applicant is an organ of state or a parastatal, DEA is the lead authority, considering the application in close consultation with its provincial counterparts.

Table 1 Listed activities for which Eskom is seeking environmental authorisation

Relevant 2010 notice and listed activity	Relevant 2014 notice and listed activity	Activity Description
GN R. 544, 18 June 2010, 11(xi)	GN R.983, 4 December 2014 LN1 (12xii)	The project entails the construction of a sub-station and power line infrastructure including towers and access roads in excess of 50 m ² in size potentially within watercourses or within 32 m from watercourses
GN R. 544, 18 June 2010, 13	GN R.983, 4 December 2014 LN1 (4)	The project entails the construction of a new sub-station, including storage facilities for oil. Based on initial concept designs, storage facilities will have a capacity of $\geq 80 \text{ m}^3$ but not exceeding 500 m^3
GN R. 544, 18 June 2010, 18(i)	GN R.983, 4 December 2014 LN1 (19i)	During construction, the work will involve the disturbance of watercourses by the dredging and removal of soil and rock material of more 5 m^3 from a watercourse. The work will also involve infilling and stabilisation
GN R. 544, 18 June 2010, 22	GN R.983, 4 December 2014 LN1 (24)	A tarred access road with a total width, shoulder to shoulder, of approximately 9 m. The length is estimated to be approximately 750 m. Tracks across the veld will be required to access the transmission line towers
GN R. 545, 18 June 2010, 8	GN R.984, 4 December 2014 LN2 (9)	The project entails the construction of a new sub-station, outside an urban area, with a capacity of 765 kV. The project also entails the construction of 2 x 400 kV double circuit transmission lines
GN R. 545, 18 June 2010, 15	GN R.984, 4 December 2014 LN2 (15)	The project entails the construction of a new sub-station with a site footprint of approximately 100 ha and a sub-station footprint of approximately 50-60 ha
GN R. 546, 18 June 2010, 3 (a)(ii)(gg)	GN R.985, 4 December 2014 LN3 (3)(d)(xii)(aa)	The project entails the construction of a new sub-station, including a telecommunications tower, where (i) the mast will be placed on a site not previously used for telecommunications purposes and (ii) the height of the mast is expected to exceed 15 m, and will be within 5 kilometres of a protected area
GN R. 546, 18 June 2010, 4 (a)(ii)(gg)	GN R.985, 4 December 2014 LN3 (4)(d)(xii)(aa)	The project entails the construction of a 765/400 kV sub-station and 2 x 400 kV double circuit transmission lines. Eskom will require an access road for construction and operation. It is anticipated that the access road will be wider than 4 m and will be within 5 kilometres of a protected area
GN R. 546, 18 June 2010, 10	GN R.985, 4 December 2014 LN3 (10)(d)(xii)(cc)	The project entails the construction of a new sub-station, including storage facilities for oil. Based on initial concept designs, storage facilities may have a capacity of $\geq 30 \text{ m}^3$ but $\leq 80 \text{ m}^3$
GN R. 546, 18 June 2010, 12(a)	GN R.985, 4 December 2014 LN3 (12)(b)(v)	The project entails the removal of indigenous vegetation for the sub-station site and transmission line servitudes. Based on initial concept designs, 300 m ² or more of indigenous vegetation will be removed

Relevant 2010 notice and listed activity	Relevant 2014 notice and listed activity	Activity Description
GN R. 546, 18 June 2010, 13 (c) (ii) (ff)	No longer a listed activity	The project entails the removal of indigenous vegetation for the sub-station site and transmission line servitudes. Based on initial concept designs, 1 ha or more of indigenous vegetation will be removed
GN R. 546, 18 June 2010, 16(iv) (ii) (hh)	GN R.985, 4 December 2014 LN3 (14)(d)(vii)	The project entails the construction of a sub-station and power line infrastructure including towers and access roads in excess of 10 m ² in size, potentially within watercourses or within 32 m from watercourses and will be within 5 kilometres of a protected area
GN R. 546, 18 June 2010, 14(a)	No longer a listed activity	The project entails the removal of indigenous vegetation for the sub-station site and transmission line servitudes. Based on initial concept designs, 5 ha or more of indigenous vegetation will be removed
Additional 2014 listed activity to be assessed		
	GN R.983, 4 December 2014 LN1 (28)	This project will develop an area larger than 1 hectare for institutional use on land that has previously being used for agriculture.

1.4 Scoping methodology

Scoping is a process designed to define the assessment framework and the limits of the assessment in order to focus the impact assessment. Input is elicited from Interested and Affected Parties (I&APs) to ensure that the assessment correctly focuses and understands the key issues and associated impacts to be investigated.

The framework within which environmental aspects are considered is based on the concept of sustainability, which considers the inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions. This is underpinned by a system of sound governance through the legal/statutory requirements of South Africa (in particular, NEMA).

Issues and impacts were identified by interlinking the technical and public participation processes. Information gathering focused on gaining an understanding of the interactions between the different dimensions of the environment in order to identify potentially significant issues and impacts.

This process included site visits, reference to existing documentation and maps, liaison with the project proponent and technical team, as well as consideration and incorporation of the issues raised during the public participation process. Information was collated, integrated and evaluated, and potentially significant issues and impacts were identified. This enabled the EAP to focus and tailor the scope of work for the specialist studies and other detailed investigations to be taken forward to the Impact Assessment Phase.

1.5 Scoping Report

The information supplied in a Scoping Report must comply with the legal requirements of Section 28 of Regulation 543. To meet these requirements, the Scoping Report has been structured to provide the following information:

- ❑ A broad perspective of the legal environment within which the project will take place (including the legal framework that governs this assessment).
- ❑ An outline of the approach to the EIA process, including the important elements of the public participation process (as required by the Regulations).
- ❑ A detailed description of the proposed project, including an understanding of the purpose, need and desirability of the proposed project.
- ❑ A discussion of the feasible and reasonable alternatives that have been identified.
- ❑ A description of the receiving environment.
- ❑ A description of environmental issues and potential impacts, including cumulative impacts, and a presentation of the overarching scope of specialist studies to be commissioned during the Impact Assessment.
- ❑ A Plan of Study for the EIA and a description of the assessment process that will be used.

The Scoping Report also contains appendices that present the following information:

- ❑ Appendix 1: Application for environmental authorisation and response from DEA.
- ❑ Appendix 2: Public Participation Process.
 - Advertisements.
 - Minutes of Meetings.
 - Attendance Registers.
 - Correspondence to Interested and Affected Parties (I&APs).
 - Correspondence from I&APs.
 - Stakeholder Database.
- ❑ Appendix 3: Comments and Responses Report:

This Scoping Report is made available to Interested and Affected Parties (I&APs) who will be provided 40 calendar days to review it and to respond and provide comments. Following the period of public review, the Draft Scoping Report will be updated and a Final Scoping Report will be submitted to DEA. DEA will consider the Final Scoping Report, where after the department will indicate whether or not the EIA can proceed to the Impact Assessment Phase.

2 LEGAL ASPECTS

2.1 Applicable legislation

There are a host of legal requirements (national, provincial and local government spheres) to which the project proponent must adhere for the construction of the proposed Isundu Sub-station. Fundamentally, the proponent is required to include and integrate environmental principles and values into all planning and implementation procedures taken for development purposes.

Underlying the above reasoning is the constitutional right that people have to environmental protection as set out in the Bill of Rights in the Constitution (Section 24). These rights have been interpreted and included into NEMA, which, together with other national and provincial legislation, governs the way environmental principles are incorporated into any form of development.

Some of the key legislation that is applicable to this project is provided hereunder.

2.2 Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996) (as amended)

The Constitution is the supreme law of South Africa, against which all other laws are measured. It sets out a number of fundamental environmental rights.

2.2.1 The Environmental Clause

Section 24 of the Constitution outlines the basic framework for all environmental policy and legislation: It states:

“Everyone has the right –

- a) to an environment that is not harmful to their health or well-being; and*
- b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –*
 - i) prevent pollution and ecological degradation;*
 - ii) promote conservation; and*
 - iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development”.*

2.2.2 Access to Information

Section 32 of the Constitution provides that everyone has the right of access to any information held by the State or another juristic person, which is required for the exercise or protection of any rights.

2.2.3 Fair Administrative Action

Section 33 of the Constitution provides the right to lawful, reasonable and procedurally fair administrative action.

2.2.4 Enforcement of Rights and Administrative Review

Section 38 of the Constitution guarantees the right to approach a court of law and to seek legal relief in the case where any of the rights that are entrenched in the Bill of Rights are infringed or threatened.

2.3 National Environmental Management Act, 1998 (Act 107 of 1998) and Regulations (as amended)

NEMA is South Africa's overarching environmental legislation. It provides the legislative framework for Integrated Environmental Management in South Africa. The Act gives meaning to the right to an environment that is not harmful to health or well-being, entrenched in Section 24 of the Constitution. In addition, NEMA provides for: equitable access to natural resources, environmental protection and the formulation of environmental management frameworks. The Act is underpinned by the global concept of sustainable development. Section 2 of NEMA provides a set of principles that apply to the actions of all organs of state that may significantly affect the environment.

The interpretation, administration and application of NEMA are guided by fundamental principles of sustainable development, provided in Chapter 1 of the Act. "Development must be socially, environmentally and economically sustainable" (s 2(3)) and requires the consideration of all relevant factors, which are elaborated by eight sub-principles, including:

- The sustainability principle.
- The life-cycle, cradle-to-grave principle.
- The 'polluter pays' principle.
- The precautionary principle.
- The duty of care principle.
- Fair and transparent public consultation.

The concept of sustainability underpinning this assessment considers three inter-related dimensions of the environment, viz. the social, economic and biophysical dimensions. For an option or project to be sustainable, it needs to demonstrate economic growth, social acceptability and soundness, and ecological integrity within a framework of good governance.

2.4 The Environmental Impact Assessment Regulations, 2010 (as amended)

The EIA Regulations contained in Government Notices R 543, R 544, R 545 and R 546 of 18 June 2010, published in terms of Section 24 of the NEMA, regulate environmental management in South Africa.

Activities that require authorisation from the competent authority prior to their commencement are listed in Government Notices R 544, R 545 and R 546. The procedures dealing with the EIA Regulations are contained in GN R 543.

The EIA Regulations 2010 were repealed by the EIA Regulations 2014 contained in GN R 982, which came in to effect on 8 December 2014. However, as Eskom's applications were submitted under the 2010 EIA Regulations, these regulations are still applicable in terms of the transitional arrangements contained in Section 53 of the EIA Regulations 2014.

2.5 National Water Act, 1998 (Act 36 of 1998)

The National Water Act, 1998 (Act 36 of 1998) (NWA) has various sections of relevance to the proposed project. The Department of Water and Sanitation (DWS) is the responsible authority with regard to matters affecting water resource management, including water quality. Added to this, certain provincial and local authority powers influence the regulation of water resources, including agriculture, the environment, health services, nature conservation, pollution control, regional planning and development, soil conservation, and water and sanitation services.

The development or modification of water courses or wetlands in any form are governed by conditions provided in Chapter 4, Part 1 of the Act, which sets out general principles for regulating water use.

In general, water use must be licensed unless:

- It is listed in Schedule 1 of the Act.
- Is an existing lawful water use.
- It is permissible under a general authorisation.
- A responsible authority waives the need for a licence.

As development or modifications of watercourses or wetlands are not included in Schedule 1, a licence is required to carry out any activity involving modifications to watercourses or wetlands. This is relevant due to the fact that the sub-station construction will fill in and level a farm dam affecting the watercourse.

2.6 National Heritage Resources Act, 1999 (Act 25 of 1999) and KwaZulu-Natal Heritage Act, 2008 (Act 4 of 2008)

The National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA) aims to promote an integrated system for the identification, assessment and management of the heritage resources of South Africa. Furthermore, it established the South African Heritage Resources Agency (SAHRA) to implement the Act.

KwaZulu-Natal has promulgated its own legislation, the KwaZulu-Natal Heritage Act, 2008 (Act 4 of 2008) which contains similar provisions to those of the NHRA, although it establishes a provincial body, Amafa aKwaZulu-Natali (Amafa) as the relevant heritage authority for the protection and management of heritage resources in KwaZulu-Natal. By means of a Memorandum of Understanding, Amafa acts as the agent for the national agency (SAHRA) in the province.

The primary objective of the KZN Heritage Act is the care, maintenance, repair and management, as well as the protection, of all forms of historically and culturally important sites, including, for example, public monuments and archaeological sites, important cultural objects and traditional burial sites.

The proposed sub-station requires authorisation from Amafa due to the fact that it will alter an area larger than 5,000 m² and the transmission lines will exceed 300 m in length.

2.7 National Forest Act, 1998 (Act 84 of 1998)

2.7.1 Protected trees (national protection)

In terms of the National Forests Act, 1998 (Act 84 of 1998), trees in natural forests or protected tree species (as listed in Government Gazette Notice 716 of 7 September 2012) 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 Department of Agriculture, Fisheries and Forestry. Each application is evaluated on merit before a decision is taken whether or not to issue a licence (with or without conditions). Such decisions must be in line with national policy and guidelines.

The proposed project may affect some tree species which are protected, this will be investigated by the specialists.

2.7.2 Protected trees (provincial protection)

Certain indigenous plant and animal species in KwaZulu-Natal are provided with special protection under the KwaZulu-Natal Nature Conservation Ordinance and permits are required from Ezemvelo KZN Wildlife (EKZNW) for their removal, destruction or translocation.

The proposed project may affect some indigenous species which are protected, this will be investigated by the specialists.

2.8 KwaZulu-Natal Planning and Development Act, 2008 (Act 6 of 2008)

In terms of the KwaZulu-Natal Planning and Development Act, 2008, Eskom will need to submit a Planning and Development Application (PDA) to the Local Municipality. This application will need to meet all the requirements of legislation. Important aspects will include planning considerations, compliance with the municipality's Integrated Development Plan and Spatial Development Framework.

2.9 Applicable National and Provincial Legislation

Other legislation which may be applicable to this project and which will need to be considered if found to be relevant are the following:

- National Environmental Management: Waste Act, 2008 (Act 59 of 2008).
- Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- National Environmental Management: Biodiversity Act, 2005 (Act 10 of 2004).
- Promotion of Administrative Justice Act, 2000 (Act 3 of 2000).
- KwaZulu-Natal Nature Conservation Management Act, 1997 (Act No. 9 of 1997).

2.10 Summary

In summary, Eskom has a number of legal obligations in terms of legislation, the pertinent obligations being:

- An obligation to supply electricity to the citizens of South Africa.
 - An obligation to undertake an EIA for activities that fall within the scope of Government Notices R 543, R 544, R 545 and R 546 of 2010.
 - An obligation to obtain permits in terms of other relevant environmental legislation (for example, heritage, water and biodiversity).
 - Adherence to the principles of sustainability.
-

3 NEED AND DESIRABILITY

All Eskom's recent audits indicate the need for expansion of the transmission network to attain a higher security of supply. This needs to be achieved through the implementation of a 765 kV backbone through the centre of the country.

The existing KZN transmission network is constrained and reaching capacity. In order to meet growing demand and to improve service quality and reliability, the network needs to be strengthened. For these reasons Eskom needs to establish new 765 kV and 400 kV transmission lines, linking the main power generation facilities in Mpumalanga to the load centres in KZN.

Sub-stations are needed in order to step-down voltages to allow for distribution. By having sub-stations in the transmission network, it also makes it possible for Eskom to de-energise a transmission line or other electrical switchgear for maintenance or construction whilst still keeping the whole network supply system running. This is important as faults can develop in transmission lines or in the associated switchgear; or a line may be hit by lightning and develop an arc or, in extreme cases, a tower may be blown down by high winds.

The purpose of a new sub-station in the network between Estcourt and Camperdown is to:

- ❑ Strengthen electricity supply to the greater Pietermaritzburg load area.
- ❑ Strengthen electricity supply to the KZN South Coast area via the Ariadne-Eros section of the overall KZN Strengthening Programme.
- ❑ Be able to establish transmission line linkages with load areas on the KZN North Coast, in particular the Empangeni/Richards Bay area.

These linkages are illustrated in Figure 3.

The position of sub-stations in the network, as well as the distance between sub-stations, is determined by the peculiarities of electricity transmission at extra high voltage. In order to comply with the known and laid down safety limits, sub-stations must be about 400 km apart with an absolute maximum distance of 450 km. This is because on long transmission lines the voltage increases along the line because of capacitance in the line (known as the Ferranti Effect). Compensation is done at the sub-station where reactors are installed to neutralize inductive reactance in the long transmission lines. If the voltage is allowed to become too high it will burn out equipment. Thus, it is not possible to have endless transmission lines without sub-stations.

Added to this, load centres and demands change, for example, Newcastle and surrounds (mines and steel factories) used to be a load centre, whilst now places like Richards Bay require additional electricity. Therefore, to get the electricity to the demand centres requires new infrastructure in different locations.

Aspects such as these constrain planners as to where sub-stations need to be located within the grid (it is not simply a matter of moving to a different area if suitable sub-station sites are difficult to find).

The Sigma 1 Sub-station site which was previously identified and authorised as the preferred sub-station site to meet these requirements is not considered a financially feasible option to develop. Hence, the need for Eskom to identify a new site for the proposed sub-station between Estcourt and Camperdown which still fulfils overall system requirements.

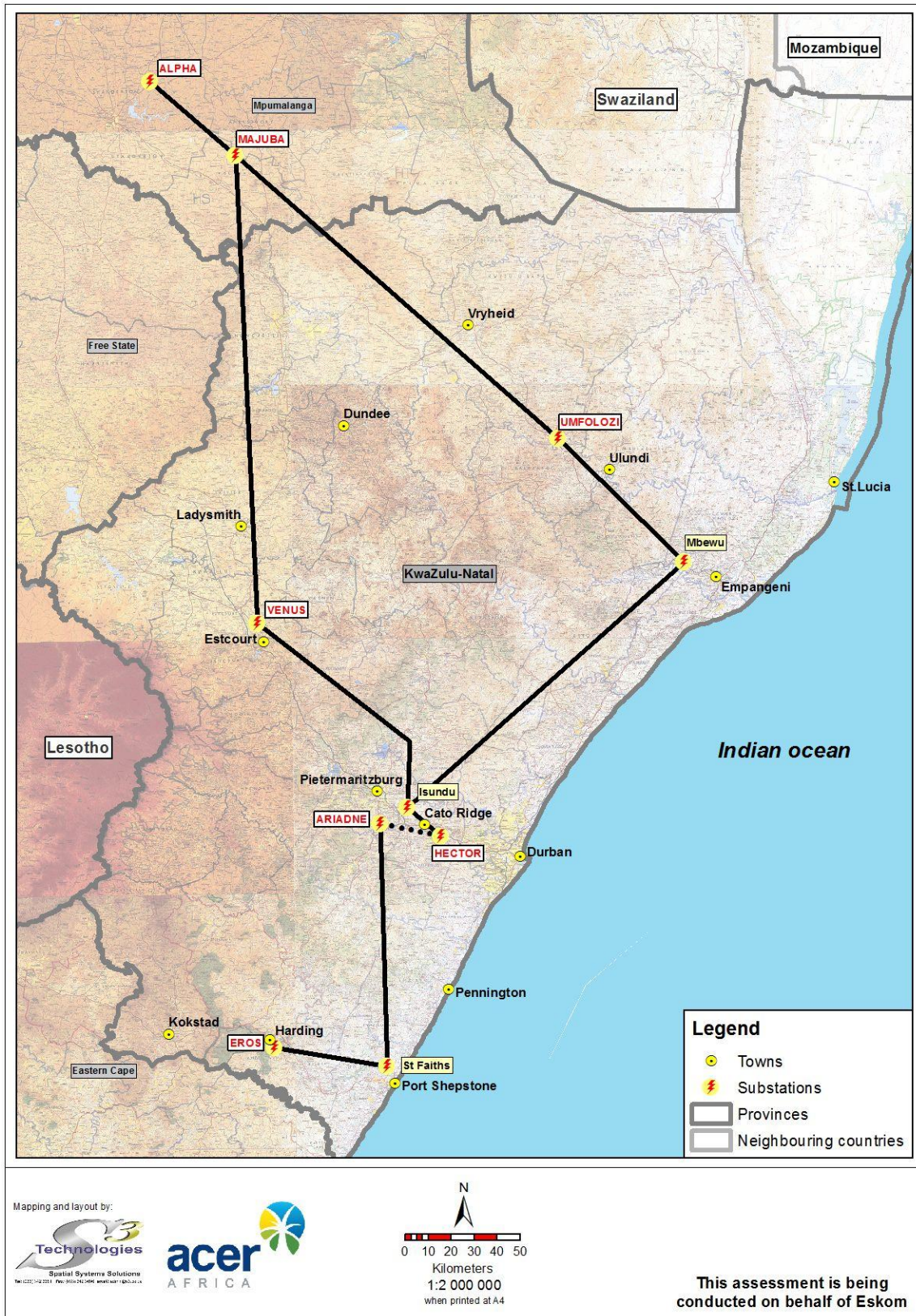


Figure 3 KZN Strengthening Programme

4 ALTERNATIVES

Since the start of project planning in late 2008, Eskom has considered the expansion of existing sub-stations and over 25 potential new sites in order to achieve the overall project objective of having a suitable 765/400 kV sub-station between Estcourt and Camperdown.

4.1 Expansion of existing substations

The expansion of existing sub-stations in the area was initially considered.

The Mersey Sub-station has only 400 kV capacity and would require upgrading. Eskom's Grid Planning team did investigate the option of upgrading Mersey at the beginning of the project, but it was found that the topography around the existing sub-station did not lend itself to such an upgrade. There is insufficient level ground because the area falls away steeply towards the east and significant earthworks would be required to establish a sufficiently large area to accommodate a 765 kV sub-station. The high cost of earthworks during site preparation foreclosed the further consideration of this option.

The Ariadne Sub-station, with a capacity of 400 kV would also require upgrading. However, is congested by existing transmission lines, developments and settlements surrounding the sub-station. This makes expansion and entering the sub-station with a 765 kV transmission line almost impossible. Future linkages towards the North Coast would also be virtually impossible due to the existing congestion.

Similarly, the area around the existing Hector Sub-station is developing and congested, and there is insufficient space to expand the sub-station to incorporate a new 765 kV transmission line as well as the required 400 kV linkages with the south coast and to the proposed Mbewu Sub-station on the north coast.

4.2 New sub-station site alternatives

During project planning in late 2008, Eskom Grid Planning identified five potential sub-station site alternatives. In early 2009, for technical reasons, Eskom reduced the initial five sub-station sites to three.

The three site alternatives were all located within the uMshwati Local Municipality area, north-east and east of the existing Mersey Sub-station near Albert Falls Dam. These three sites were numbered Sigma 1, Sigma 2 and Sigma 3. The reason for the positioning of the three site alternatives in this general area of KwaZulu-Natal is due to the future requirement to link the Sigma Sub-station with the proposed Mbewu Sub-station close to Empangeni on the North Coast of the province.

Three 2 km wide corridors were identified (viz. the Western, Central and Eastern Corridors) which would connect the Venus Sub-station to the Sigma Sub-station, and, in turn, the Sigma Sub-station to the Hector Sub-station.

In March 2009, as part of Environmental Scoping, a Key Stakeholder Workshop (KSW) was held with potentially affected landowners and associated stakeholders from the agricultural sector in the uMshwati Municipality. These landowners and industries would potentially have been the most significantly affected by the three Sigma Sub-station site alternatives initially identified.

Issues and concerns raised during this meeting, particularly relating to the potential impact of a sub-station and associated transmission lines on the agricultural and local economy of the area, led to the decision to appoint an agricultural economist to conduct an Agricultural Economics Study (AES) during Scoping (the three sub-station sites were located within an agricultural area comprising fairly dense timber plantations and sugarcane cultivation).

The AES found that the three sub-station sites, together with the associated transmission lines, in the context of other constraints within the agricultural sector, could potentially significantly affect the agricultural economy of the study area. This led to two key recommendations being made by the specialist:

- To investigate additional Sigma Sub-station site alternatives further to the south, i.e. effectively moving out of the area with high-density timber and sugarcane farming.
- To reconsider the Eskom policy of sugarcane free servitudes, subject to formal agreement with individual landowners.

Based on the findings of the AES, Sigma 1, together with the Western Corridor for the transmission line, was the preferred site and alignment at the time (from an agricultural economics perspective).

Based on the findings and recommendations of the AES, Eskom Grid Planning investigated a number of additional sub-station sites (Sigma 4 – 7), further to the south and closer to the Hector Sub-station. After both desk-top and in-field investigations, it was determined that two of the additional sites for the Sigma Sub-station (Sigma 6 and Sigma 7) were technically feasible, while still fulfilling the future requirement of a linkage with the Mbewu Sub-station. A decision was taken to eliminate two of the three initial sub-station sites, Sigma 2 and Sigma 3, which were both located within the dense timber growing areas (Figure 4).

Therefore, for the Venus-Sigma-Hector-Ariadne (VSHA) environmental authorisation process, three sub-station sites were investigated, viz. Sigma 1, Sigma 6 and Sigma 7. This led to the consideration of another transmission line corridor, viz. the Southern Corridor, or the 'Blue Route' as it became known, around the western side of Albert Falls dam (Figure 5).

In the VSHA EIA, the two most feasible sub-station sites further south, Sigma 6 and 7, were not recommended, and Sigma 1 was recommended as the preferred site on condition that Eskom allows the burning of sugar cane under the transmission lines. A MOU between Eskom and the South African Sugar Association to this effect was signed by both parties in October 2013.

4.3 Sigma 1 technical constraints

Since the authorisation of the Sigma 1 Sub-station site, further, more detailed geotechnical investigations were undertaken which showed that earthworks and foundations alone will be in the order of R 500 to R 800 million more than typically incurred during sub-station construction. Due to the current financial status of Eskom and Government's need to optimise the expenditure of taxpayers' money, the Sigma 1 Sub-station site is no longer considered financially feasible.

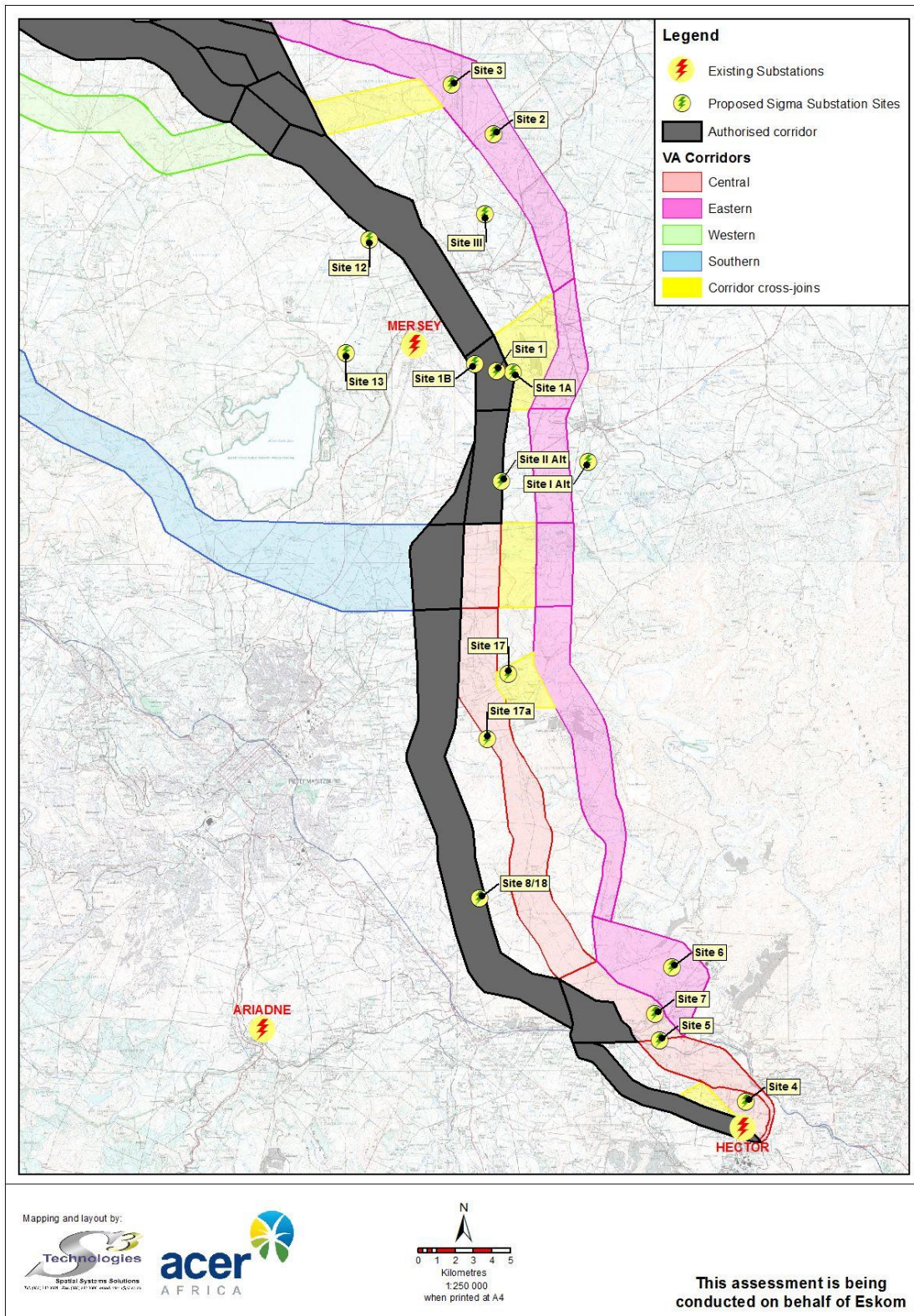


Figure 4 Sigma sites considered to date

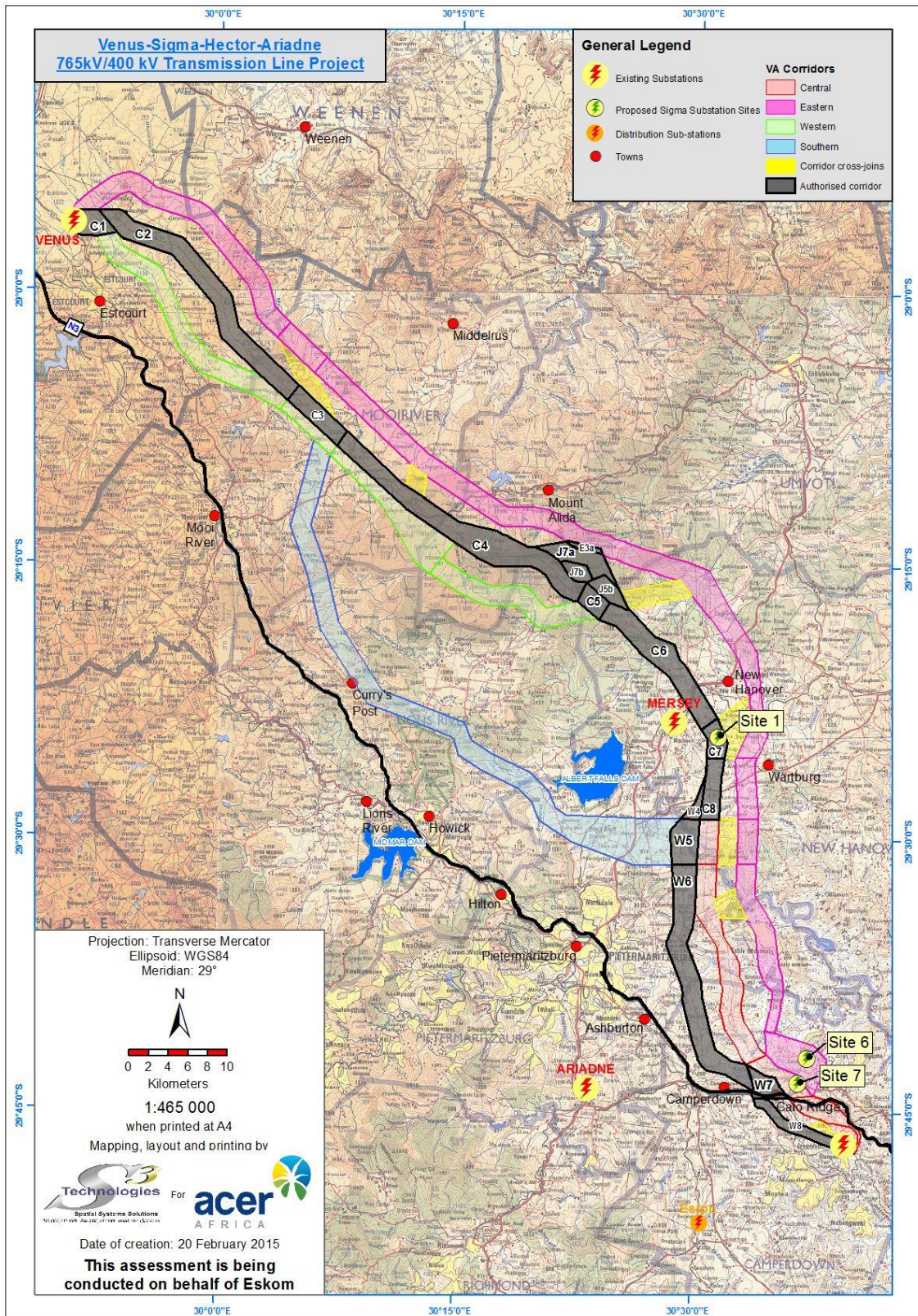


Figure 5 VSHA EIS Sub-station sites and recommended corridor

In addition, Eskom, as a public utility is bound by the Public Finances Management Act in which costs need to be declared and justified. All additional costs have to be recovered in some way either by a general increase in tariffs which, if not acceptable, will need to occur through an increase in national debt.

The terrace and equipment costs for various design options and configurations are provided in Table 2.

Table 2 Sigma versus Isundu costs

Design Option	Terrace costs (R)	Equipment Costs (R)	Total (R)
Sigma 1 Site			
Live Tank with HVDC	1,363,189,800	193,166,358	1,556,356,158
Live Tank*	785,981,100	193,166,358	979,147,458
Dead Tank with HVDC**	1,315,034,400	225,071,466	1,540,105,866
Dead Tank*	724,579,050	225,071,466	949,650,516
Isundu Site			
Live Tank with HVDC	514,873,800	193,166,358	708,040,158
Live Tank	264,427,200	193,166,358	457,593,558
Dead Tank with HVDC	505,305,000	225,071,466	730,376,466
Dead Tank	240,827,400	225,071,466	465,898,866

* A circuit breaker is an automatically operated electrical switch designed to protect an electrical circuit from damage caused by overload or short circuit. Its basic function is to detect a fault condition and interrupt current flow. In addition, circuit breakers are utilised for power system configurations by opening and closing circuits. Live Tank and Dead Tank circuit breakers are the two different design types.

** HVDC refers to a High Voltage Direct Current transmission line. This system requires converter and inverter stations at the remote ends of the transmission line to convert between Alternating Current and Direct Current.

It is the nature of project planning that some alternatives will immediately present significant constraints, from either an environmental, technical or financial perspective, at a pre-feasibility stage of investigation. However, other constraints may only be identified at the feasibility stage or, in rarer cases, only during construction or the operational phase, with hindsight, making the project site less desirable.

There are various reasons as to why the technical limitations of the Sigma 1 site were not identified earlier in the planning process or at least prior to the VSHA EIA process. One of the main reasons is that geotechnical investigations cost in the region of R 500,000 per site and, thus, such investigations cannot be undertaken for all potential sites identified.

During the planning process, initial desktop geotechnical investigations confirmed that the Sigma 1, 6 and 7 sites were all feasible. These sites were then taken through the environmental authorisation process. During this period, no further technical investigations were undertaken, to avoid further expenditure, until the environmental feasibility of one of the sites had been confirmed by obtaining authorisation from DEA.

It was only after further technical investigations were undertaken on this authorised site that the full geotechnical constraints became apparent.

4.4 Further site investigations

Given that the authorised Sigma site is no longer considered financially feasible, Eskom made the decision to identify and assess further alternatives to Sigma 1.

To this end, Eskom commissioned Geopractica Consulting Engineers to do a comparative geotechnical investigation on a further two sites (Sites 12 and 8/18). From a geotechnical perspective, Site 8/18 (the Isundu site) was preferred.

Thereafter, during 2013, ACER conducted a Feasibility Study which reconsidered the findings of previous studies, considered the environmental aspects of Sites 12 and 8/18 and identified further sub-station sites that could potentially work as an alternative to Sigma 1 (Figure 5).

Acknowledging the considerable investigative work, including comprehensive stakeholder participation that has been undertaken to identify the optimum VSHA corridor alignment, the study area for new sites was confined to that which would allow the proposed Isundu Sub-station to feasibly fit in with the authorised VSHA corridor. The site also needed to meet Eskom's future electrical transmission requirements for central, southern and northern KwaZulu-Natal.

Using GIS, ACER undertook a search for all areas within a defined zone with suitable (flattish) gradient that were potentially large enough to accommodate a sub-station. After ruling out areas of incompatible land use, 12 potential sites (60 ha in size) were identified. These 12 sites (named Sites B, C, D, E, F, G, H, I, J, K, M and N) as well as Sites 12 and 8/18, were comparatively assessed (Figure 6). Of these, only site 8/18, the proposed Isundu site, was found to merit further consideration.

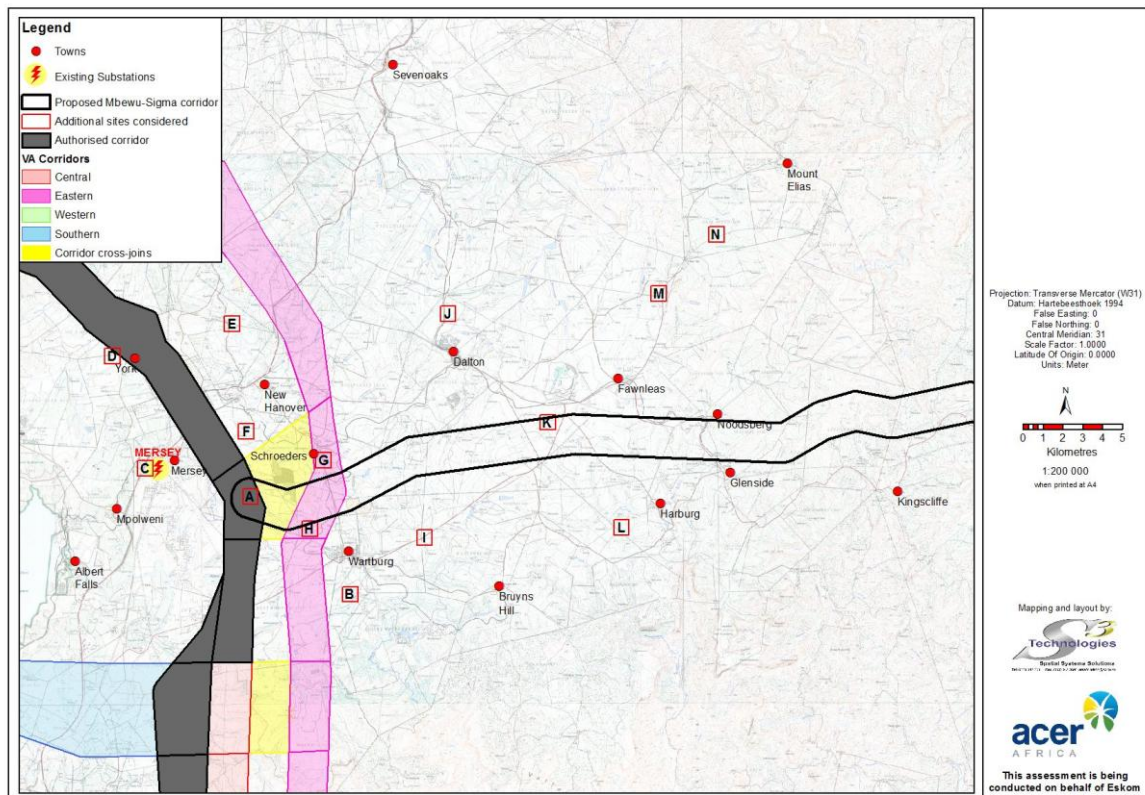


Figure 6 Additional new sites identified for consideration

4.5 Layout alternatives

Layout alternatives for the Isundu sub-station on the proposed 100 ha area will be considered during this assessment. Layout options are limited by needing to optimise the position of the infrastructure on the site to minimise the earthworks required, whilst also needing to ensure that the layout will be able to accommodate the required transmission lines (taking note of the direction of the transmission lines entering and exiting the sub-station).

Currently, two sub-station layout alternatives have been proposed, as show in Figures 7 and 8.



Figure 7 Layout 1: 400 kV yard facing the road and space for future lines on the west

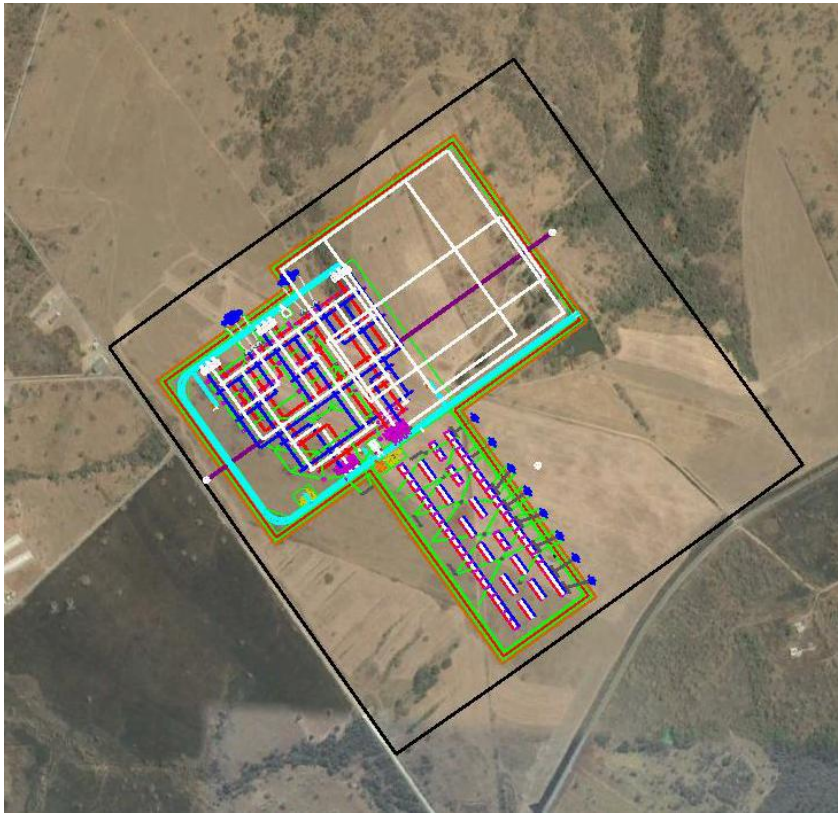


Figure 8 Layout 2: 400 kV yard parallel to the road and space for future lines on the north-east

4.6 No development alternative

Eskom has investigated numerous alternatives since 2008 in order to meet future demands and improve the reliability of electricity supply to the KZN Midlands and Southern regions. None of these other alternative sites have proved suitable and the previously authorised Sigma 1 site is now no longer considered a feasible alternative.

Thus, currently, the only two site alternatives under consideration are either to construct the Isundu sub-station on the site proposed or the no-development option. The no-development option will mean that Eskom will need to further delay grid improvements and continue further investigations to try and identify other potential sub-station sites. Any sites would need to be further away as all options near the VSHA corridors have been exhausted. This would then also result in a significant rerouting of the authorised transmission line corridor. Apart from this, due to the Ferranti Effect and the location of the load centres as discussed in Section 3, it will become increasingly difficult to identify a suitable site that still meets the overall objectives of the KZN Strengthening Programme.

The no-development option will be assessed. However, it will mean that Eskom's distribution system will come under increasing pressure to reliably supply electricity to the KZN Midlands and Southern regions, whilst further investigations are undertaken.

This is not an attractive option. Over recent years, electricity supply nationwide has been under pressure, with rolling blackouts and load shedding, as a direct result of the lack of generational capacity in the country. The new Medupi and Kusile coal fired power stations, the first to be built for 20 years, will address this lack of generation capacity.

However, if significant delays occur in increasing and strengthening the electricity transmission network and infrastructure, the additional available power generated will not be able to benefit those currently affected by load shedding.

Thus, without the required sub-station in the KZN Midlands, a key component of the KZN Strengthening Programme, as demand grows relative to the available transmission capacity, the risk of load-shedding and blackouts will continue and will possibly increase.

5 PROJECT DESCRIPTION

5.1 General sub-station infrastructure

A sub-station is an important element of an electricity generation, transmission and distribution system. Its function is mainly to transform voltages from high to low or the reverse, using transformers and other heavy-duty electrical switchgear. Sub-stations are generally designed to accomplish the following functions:

- Stepping up or stepping down voltage.
- Regulating voltages to compensate for system voltage changes.
- Switching transmission and distribution circuits into and out of the grid system.
- Measuring the electric power qualities flowing in the circuits.
- Connecting communication signals to the circuits.
- Control of electrical surges, including from lightning.
- Connecting electric generation plants to the system.
- Facilitating interconnections between the electric systems of more than one utility.
- Control reactive kilovolt-amperes supplied to, and the flow of reactive kilovolt-amperes in the circuits.

Table 3 lists the typical components of a sub-station and their functions.

Table 3 Sub-station components and their functions

Equipment	Function
Transformers	To step-down or step-up voltage and transfer power from one current to another. The windings of such large transformers are immersed in transformer oil, which is a highly refined mineral oil that is stable at high temperatures and has excellent electrical insulating properties. Its functions are to insulate, suppress corona and arcing, and to serve as a coolant for transformers
Circuit breakers	Automatic switching during normal or abnormal conditions
Feeder bay	Steelwork housing for circuits
Reactors	Equipment for the efficient operation of long transmission power lines as they compensate the voltage on power lines to avoid uncontrolled voltage rise, especially on lightly loaded lines
Isolators	Equipment for de-energising a circuit for maintenance and repair
Busbars	Incoming and outgoing circuits of the same voltage tie into a common node called a busbar, which consists of a number of tubular conductors made of aluminium
Oil holding dams	For containment of accidental oil spills from transformers
Wave trapper	Equipment for trapping communication signals sent via the transmission lines rather than the telephone network
Loop-in lines	Incoming power lines (connected to busbars)
Loop-out lines	Outgoing power lines (connected to busbars)
Telecommunication mast	Equipment used for remote communication with the sub-station
Buildings	Administrative office, control room, ablution blocks, equipment and storage areas
Lighting	For safety and security as well as for night-time emergency operations and maintenance



Plate 1 **Sub-station busbars**



Plate 2 **Transformers**



Plate 3 **Transformer showing oil storage and fans for cooling**



Plate 4 **Sub-station and communication tower**



Plate 5 **Oil holding dam**

5.2 Proposed Isundu Sub-station infrastructure

5.2.1 Electrical infrastructure

The proposed Isundu Sub-station is being planned to accommodate the following transmission lines:

- ❑ 1 x 765 kV transmission line (the authorised VSHA transmission line).
- ❑ 2 x 400 kV double-circuit transmission lines from the sub-station to tie into the existing Hector-Ariadne 400 kV double-circuit transmission lines approximately 4 km away.
- ❑ 2 x 400 kV lines from the proposed Mbewu Sub-station near Empangeni.

In addition, the site and layout design allows sufficient space to accommodate additional transmission lines if required at some point into the future. The space allowed will potentially accommodate the following additional transmission lines:

- ❑ 1 x 765 kV or High Voltage Direct Current (HVDC) transmission line.
- ❑ 3 x 400 kV transmission lines.

The proposed sub-station will include the standard electrical components required such as transformers, reactors, busbars, isolators etc. as listed in Table 3.

Environmental authorisation has been applied for a 100 ha site. If fully developed into the future, the sub-station infrastructure footprint will be approximately 50-60 ha, whilst for the initial phase of development the sub-station is likely to have a footprint in the region of 25 ha.

5.2.2 Other infrastructural components

Other infrastructure included in this application includes:

- ❑ A tarred access road to the sub-station with a total width, shoulder to shoulder, of approximately 9 m. The length is estimated to be approximately 750 m.
- ❑ Access to the towers will be via tracks across the veld from within the corridor, wherever possible.
- ❑ A microwave radio communication mast with a height of between 30 and 50 m.
- ❑ Oil and fuel storage facilities and an oil bund to contain any transformer oil spills with a capacity of $\geq 30 \text{ m}^3$ but $\leq 80 \text{ m}^3$.

5.3 Proposed transmission lines

This environmental application also includes the construction of two double-circuit 400 kV transmission lines from the proposed Isundu Sub-station to the existing Hector-Ariadne 400 kV double-circuit transmission line.

The reason for proposing a double-circuit transmission line is that it will allow Eskom in the future to increase capacity at the sub-station without needing to secure an additional servitude to the immediate south of the sub-station, an area which is rapidly developing.

Thus, the long-term planning advantage of constructing these towers now outweighs the financial disadvantage of constructing these more expensive towers over this short distance of approximately 4 km.

The required servitude for these 400 kV double circuit lines is 55 m for a single line and 110 m where the lines run in parallel (except if they go through forestry, which they do not in this area, where the servitude then increases to 131 m for a double-circuit transmission line).

The standard process for the construction of transmission lines is described in Section 5.5.

Plate 6 shows the existing Hector-Ariadne 400 kV double circuit transmission line towers which are 35.98 m high.



Plate 6	Double-circuit	400	kV
	transmission line		

5.4 Sub-station construction

Construction of the sub-station is estimated to take three years. This entire time will not necessarily consist of the civil works which are traditionally when the main noise, dust and transport impacts occur.

Construction will commence with the clearing of vegetation and the levelling and terracing of the ground surface in those areas where heavy electrical transformers and other switchgear will stand. Once levelled and terraced, the concrete works and construction of foundations for the supporting steelwork, transformers and other switchgear will commence. This will also include the construction of storm water drainage pipes, slabs, bund walls, a control room, small buildings and storage areas that are needed.

All open areas between the transformer plinths and other switchgear foundations will be covered with about a 100 mm layer of 25 – 38 mm crushed stone. Before laying the crushed stone, the ground surface is intensively treated to strict specification with insecticide and herbicide to prevent insect activity and the growth of weeds and other plants in the high voltage yard.

The steelwork will then be erected. The transformers, circuit breakers, reactors and other high voltage equipment will be delivered to site, erected and then commissioned. The sub-station will be built in phases. As the demand for power increases, so the number of incoming and outgoing transmission lines with their electrical switchgear will be increased.

The sub-station will be served by a tarred access road which will probably run on a similar route to the existing farm access road. Around the site there will be internal gravelled traffic areas for access to the electrical equipment.

All equipment, commissioning and operational procedures and protocols are subject to strict specifications which Eskom has had in place for many years.

During construction when the civil works are being carried out (foundations, storm water drainage, buildings, etc), there should not be more than approximately 80 people present on the site at any one time. Depending on the level and nature of construction activity taking place, there will be varying numbers of people housed on site within a construction camp.

No people will be housed on site on a permanent basis during the operational life of the sub-station. However, there will be ongoing monitoring and control of operations as well as planned and other maintenance work done on an *ad hoc* basis.

5.5 Construction and operation of a transmission line

Typical steps followed by Eskom in the construction and operation of transmission lines are outlined below.

With respect to construction:

- Aerial survey of the route.
- Determine technically feasible alignments within the authorised corridor.
- Walk down by environmental specialists to assess specific tower locations.
- Negotiation of a final servitude alignment within the authorised corridor with landowners.
- Selection of best-suited structures and foundations.
- Final design of line and placement of towers.
- Establishment of construction camps and construction of access roads, where necessary.
- Vegetation clearance and gate erection.
- Centre line track establishment.
- Construction of foundations.
- Assembly and erection of towers.
- Stringing of conductors.
- Rehabilitation of working areas and protection of areas susceptible to erosion.
- Testing and commissioning.

With respect to operation:

- Ongoing maintenance via aerial inspections, vehicle patrols, live-line maintenance by helicopters, periodic clearing and pruning of vegetation, and periodic clearing of the centre line track.

Different tower designs, such as Guyed-V suspension or Cross-roped Suspension are used whilst Self-supporting strain towers will be required for bends greater than 3° and/or when crossing difficult terrain. Figure 9 and Plate 7 illustrate these different designs.

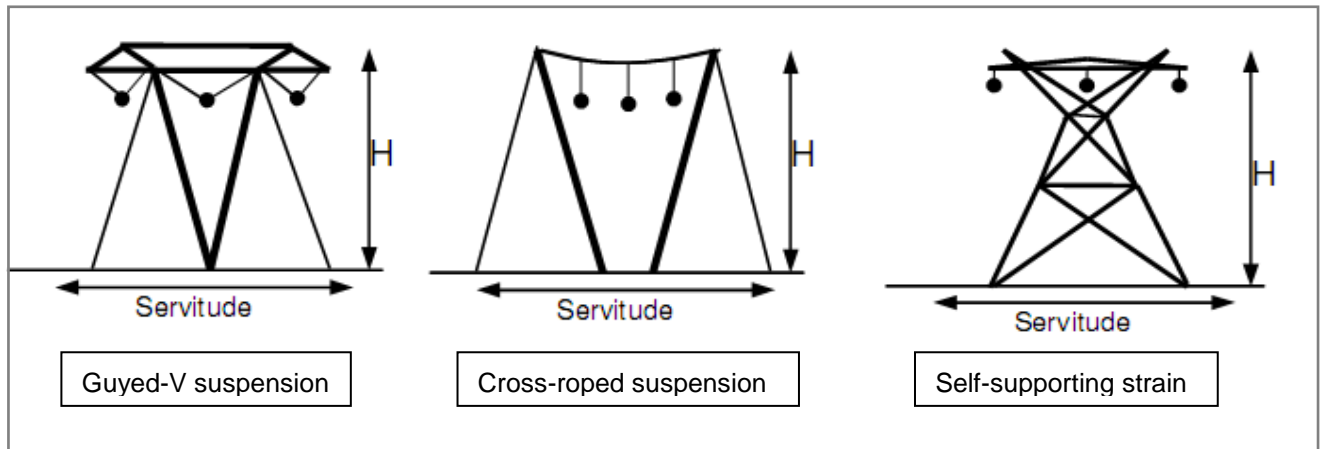


Figure 9 Typical tower types



Plate 7 Two tower types on existing parallel transmission lines

5.6 Servitude negotiations and registration

Before construction commences, Eskom needs to purchase the land for the sub-station and also secure servitude rights for the transmission lines by negotiating with affected landowners. A servitude provides Eskom certain defined rights over the use of the specific area of land but not ownership thereof. These rights include:

- ❑ Access to erect a power line along a specific agreed route.
- ❑ Reasonable access to operate and maintain the power line inside the servitude area.
- ❑ The removal of trees and vegetation that will interfere with the operation of the power line.

The registration of servitudes can be a lengthy process requiring contractual negotiations with each affected landowner. Once this is complete, an application for registration of the servitude is lodged with the Provincial Deeds Office against the property title deed.

The actual location of the towers on which the conductors will be strung is determined by a number of different factors, including:

- ❑ The outcome of Eskom negotiations with landowners.
- ❑ Environmental features and technical requirements.

As a result of these factors, it is not possible to predict the exact position of the towers during the environmental authorisation process as these positions are only determined after authorisation, with site-specific input from specialists.

5.7 Use of services and resources during construction

5.7.1 Water

Water will be required for potable use and in the construction of the foundations for the sub-station. This is likely to be obtained from boreholes or the dams on the site, or from a municipal supply.

5.7.2 Sewage

Sewage during construction will be negligible and will be managed on site through the construction of suitable on-site toilets and soak-away systems, or the use of portable toilets. During operation, sewage flows will be minimal and on-site toilets and soak-away systems are envisaged.

5.7.3 Roads

The existing road to the site will be used during construction and operation. The flow of traffic to the site during the construction period will be relatively light and during operations there will be virtually no traffic.

During construction, it is envisaged that trucks will probably be running from 07:00 to 19:00 spoiling or delivering material for the platform, or ready mix concrete for foundations. Thereafter, steel work deliveries will take place. It is estimated that there will be potentially an average of two trucks per hour for a period of about two years.

The use of roads on private property for construction of the transmission line towers is subject to the provisions of an Environmental Management Programme (EMPr) that will be prepared for the project (with individual landowner specifications being determined during discussions with landowners during the negotiation process).

5.7.4 Storm water

Storm water infrastructure will be carefully designed and managed during the construction of the sub-station terrace and internal road. Storm water will be diverted into the surrounding fields at low energy levels to make sure that erosion is avoided in and around the site. A Storm Water Management Plan will need to be provided in the EMPr and also included in the Water Use Licence Application.

Storm water will be managed according to the Eskom Guidelines for Erosion Control and Vegetation Management as well as the provisions of the EMPr.

5.7.5 Solid waste disposal

All solid waste will be collected at a central location on the construction site and will be stored temporarily until removal to waste disposal facilities licensed to accept particular waste streams. Recycling of recyclable substances will be done where possible.

5.7.6 Electricity

Electricity will be required during construction and it is envisaged that a 22 or 33 kV power line will be constructed from the outset of the construction process, if the current supply to the property is insufficient. Prior to this, diesel generators will be utilised for the provision of electricity.

5.8 Decommissioning

The decommissioning of the sub-station is not envisaged at any point. Should this be required into the future the following are assumed:

- ❑ The physical removal of the sub-station infrastructure and rehabilitation of the site would be required, unless alternative land-uses are authorised.
- ❑ Removal of the transmission towers and rehabilitation of the sites would need to be agreed upon with the landowners before being implemented.
- ❑ The disposal of materials from the decommissioned sub-station would be at waste disposal facilities licensed to accept particular waste streams. Alternatively, recycling opportunities could be investigated and implemented.

All of the afore-mentioned would be subject to legislative requirements at the time.

6 PUBLIC PARTICIPATION PROCESS

The public participation process has been designed to comply with the requirements of the EIA Regulations (Sections 54 to 57 of Regulation 543 are applicable) and NEMA. . The important elements relating to the public participation process that are required by the Regulations are the following:

- The manner in which potential I&APs were notified of the application for environmental authorisation, and that a public participation process was mandatory. This includes on-site notice boards, giving written notice to landowners, letters, background information documents and advertisements in the media (Section 54).
- Opening and maintaining a register, which contains the names and addresses of I&APs. These include all persons who have submitted comments, attended meetings, are organs of State who have jurisdiction in the assessment process, and all those who have requested that they be placed on the register as registered I&APs (Section 55).
- Registered I&APs are entitled to comment, in writing, on all written submissions made to the competent authority by the applicant or the Environmental Assessment Practitioner managing the application, and to bring to the attention of the competent authority any issues, which that party believes may be of significance when the application is considered for authorisation (Section 56).
- The comments of registered I&APs must be recorded and included in the reports submitted to the competent authority (Section 57).

The objectives of public participation in an EIA are to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

- During the Scoping Phase.
 - Identify issues of concern, and provide suggestions for enhanced benefits and alternatives.
 - Contribute local knowledge and experience.
 - Verify that their issues have been considered.
- During the Impact Assessment.
 - Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
 - Comment on the findings of the Environmental Impact Assessment Report (EIAR), including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation during Scoping is to assist to define the scope of the technical specialist studies to be undertaken during the Impact Assessment.

Sections 6.1 to 6.9 outline the process followed to date.

6.1 Notification of the application

The application for environmental authorisation and amendment application were submitted to DEA on 17 September 2014. Correspondence with DEA was held prior to and after submitting the applications to clarify various aspects.

Stakeholders were informed of these applications in the Background Information Document (BID), media advertisement and on-site notice board. The applications were posted on ACER's website for stakeholder review.

Consultation with the landowner was entered into prior to the application being submitted to DEA.

Copies of the Applications and DEA's response are provided in Appendix 1.

6.2 Identification and registration of Interested and Affected Parties (I&APs)

Due to the history of the project and that it is closely related to the previous VHSA EIA, all stakeholders previously registered on the VSHA database were sent the BID. These stakeholders were informed of the new proposed sub-station site and of the transmission line amendment within the authorised corridor. Not all previous stakeholders, particularly those on other VSHA transmission line corridor alternatives or those north of Wartburg, are affected by these changes. Thus, all VSHA stakeholders interested in participating further in the Isundu Sub-station and transmission line amendment applications were required to re-register on a new database.

A land-deeds search was undertaken to confirm that all landowners were identified for all the land portions within the proposed Isundu Sub-station study area.

The direct mailing list for this EIA consists of 294 individuals and organisations from both within the project area and beyond its boundaries. A copy of the stakeholder database is provided in Appendix 2. Table 4 shows that these I&APs represent a broad spectrum of sectors of society.

While consultation has taken place with representatives of different sectors of society, special efforts have been made to obtain the contributions of all people who may be directly affected by the proposed project. These efforts will be on-going for the duration of the EIA.

6.3 Project announcement

The opportunity to participate in the EIA was announced in November 2014 as follows:

- ❑ Advertisements in local and provincial newspapers:
 - Witness (10 November 2014).
 - Ilanga (13 November 2014).
 - Greytown Gazette (14 November 2014).
- ❑ A Background Information Document was emailed to all I&APs and hard copies were posted to all government departments and other authorities, such as Ezemvelo KZN Wildlife.
- ❑ Notifications by telephone.
- ❑ Placement of an on-site notice board on 05 November 2014 at the roadside on the boundary of the proposed Isundu Sub-station site.

6.4 Obtaining and dealing with comments from I&APs

The following opportunities were provided to I&APs during Scoping to contribute comments:

- Completing and returning Registration and Comment Sheets.
- Providing comments telephonically or by email.
- Specific individual stakeholder meetings were held with:
 - Africa Bird of Prey Centre/Raptor Rescue (EAP on 5 November, and EAP and Eskom on 26 November 2014).
 - Mayibuye Game Farm (5 November 2014).
 - Natal Lion Park (5 November 2014).
 - Proposed Wild Aloe Aero Estate (5 November 2014).
- A public meeting was held on 3 December 2014. The minutes are provided in Appendix 2.

During these meetings, I&APs raised environmental, technical and public participation issues. Those relevant to the project have been captured and used to define the key issues to address and carry forward into the impact assessment phase.

Public participation documentation is provided in Appendix 2.

Table 4 Sectors of society represented by I&APs on the direct mailing list

Government (National, Provincial and Local)
Parastatals (Telkom, Transnet)
Traditional Authorities
Representative Associations:
<input type="checkbox"/> Farmers' Association
<input type="checkbox"/> Conservation Organisations
<input type="checkbox"/> Tourism Organisations
Non-Governmental Organisations
Landowners and Local Residents
Conservation Authorities and Conservation Groups
Commercial Agriculture
Business and Industry

6.5 Comments and Responses Report

Issues and concerns raised by I&APs have been captured in a Comments and Responses Report (CRR), which is appended to this report (Appendix 2). This report will be updated to include any additional inputs from I&APs that may be received as the EIA process proceeds, and as the findings of the EIA become available.

6.6 Draft Scoping Report

The purpose of the DSR is to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted. At the end of Scoping, the issues identified by I&APs and the EAP will be used to define the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment. The DSR is available for public review for a period of 40 calendar days (29 April 2015 – 9 June 2015).

6.7 Final Scoping Report

The Final Scoping Report (FSR) will be prepared after the public review period for the DSR. The FSR will contain any additional issues and concerns raised by I&APs during the comment period. It will be submitted to DEA. The FSR will be made available on the website and all I&APs will be notified of the availability of the report via personalised letters and emails.

Once DEA has accepted the FSR, the Impact Assessment phase of the EIA will commence. This will comprise various specialist studies to assess the significance of the potential positive and negative impacts of the proposed project, and to recommend appropriate measures to avoid or minimise negative impacts and to enhance positive ones. I&APs will be kept informed of progress with these studies.

7 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The following section describes relevant characteristics of the receiving environment that may affect or be affected by the proposed sub-station and turn-in transmission lines.

7.1 Biophysical environment

7.1.1 Topography and geology

The proposed Isundu Sub-station site is situated near Ashburton, KwaZulu-Natal. The topography of the site is undulating with local high points along the south-east and north-west borders. From here, the ground slopes down with gradients of between 1:50 and 1:15.

The site is underlain at a relatively shallow depth by Diamictite sedimentary rock layers and boulder shales belonging to the Dwyka Formation within the Karoo Sequence. These occur as a very soft to soft rock tillite, which is overlain by a horizon of medium dense to dense residual soil. A thin colluvial horizon, on average 0.7 m thick, covers the entire site (Geopractica, 2012).

7.1.2 Fauna and flora

The Isundu Sub-station is situated within the vegetation type described by Mucina & Rutherford (2006) as KwaZulu-Natal Hinterland Thornveld.

This vegetation unit falls within the Savannah Biome and occurs in KwaZulu-Natal in patches scattered immediately above Eastern Valley Bushveld, at altitudes 450-900 m. This vegetation type mainly occurs in the Mpisi, Mvoti, Umgeni, Mlazi, Lufafa and Mtungwane Catchments. The climate is summer rainfall with some winter rain with infrequent frost. The vegetation is characterized by open thornveld dominated by *Acacia* spp. on undulating plains found on upper margins of river valleys. None of this type is conserved in statutory conservation areas. 22% has been transformed for cultivation and urban development (Mucina & Rutherford, 2006).

The farm is currently used for residential purposes (Plates 8-11) (albeit the occupier does mow the grass for the sale of hay). Wild game species do occur on the property, notably Oribi and Rock Python, along with various antelope species.



Plate 8 Isundu site – southern views



Plate 9 Isundu site – southern views



Plate 10 Isundu site – northern views



Plate 11 Isundu site – northern views

7.1.3 Hydrology

The annual rainfall in this area is approximately 860 mm, mainly occurring over the summer rainfall period between October and March.

There are small seasonal streams on the north and north-east side on the Isundu site. The largest of the farm dams is located in the north-east portion of the Isundu site whilst a smaller dam is situated on the northern drainage line.

7.2 Socio-economic environment

The proposed Isundu Sub-station site falls within the Mkhambathini Local Municipality. Camperdown to the south is largely regarded as the main growth and economic centre in the municipality.

Agriculture is an important contributor to the economy and the region has the second highest concentration of poultry producers in the world, supported by a network of service providers. Pig, beef and vegetable farming are also undertaken (Mkhambathini IDP, 2013/14).

Tourism is a sector which has been identified as a potential area of economic growth and the area surrounding the proposed sub-station site consists of a mixture of agricultural and tourism-related enterprises. Future development plans focus on tourism and eco-residential estates. Large tracts of land surrounding the sub-station site, and the site itself, are subject to land-claims and, thus, new developments are being undertaken in conjunction with the surrounding communities.

7.2.1 Surrounding land-use and enterprises

There are a number of important land-uses and surrounding enterprises situated in close proximity to the proposed Isundu Sub-station.

The African Bird of Prey Sanctuary and Raptor Rescue is situated across the road to the south of the sub-station site within approximately 800 m. This sanctuary aims to protect and promote the conservation of raptors.

The Natal Zoological Gardens and Natal Lion Park are just over 1 km to the north-east of the sub-station site. These are centres where visitors can view a range of local and exotic wild animals.

To the west and north-west of the site, Rainbow Farms has a number of chicken breeding houses (some within 500 m of the site) which are important to their overall commercial chicken rearing operations.

Also south and directly across the road from the proposed sub-station site is the developing Mayibuye Game Estate. This 4,600 ha portion of land is the result of a successful land claim by the Mayibuye Community Trust. The intention is to develop the property as a luxury residential estate, wild life rehabilitation area and Big-5 game reserve.

The initial construction phase commenced in late 2014 and the plans show, amongst others, one hectare individual plots, a lifestyle village, frail care centre, lodge, restaurant, conference centre, craft centre, nursery and garden centre, animal rehabilitation centre and the game reserve.

The main Mayibuye entrance gate, garden centre, nursery, tea room and lifestyle village will be approximately 500 m away from the sub-station on the opposite side of the road.

Further to the south-west of the sub-station site are farms with plans currently being drawn up for the authorisation of the proposed Wild Aloe Estate. This estate will have an airstrip and hangers for people who own their own planes, some retirement sites, an eco-estate with equestrian facilities as well as a housing section for labour tenants and subsidized state housing.

Whilst the Wild Aloe Estate will not be affected by the proposed Isundu Sub-station, the 2 x 400 kV double circuit transmission lines are likely to cross the area being demarcated for labour tenants and subsidized state housing. However, this area is where the previously authorised VSHA transmission line was planned in consultation with these surrounding stakeholders.

The location of a sub-station will invariably result in future transmission lines needing to reach the sub-station. These transmission lines which are not part of this application, such as the planned Mbewu-Isundu 2 x 400 kV transmission lines, can have an indirect impact on enterprises or resources in the wider region of the sub-station. These potential indirect and cumulative impacts as a result of the proposed sub-station location will be considered as part of this application.

7.3 Existing infrastructure and services

Existing infrastructure and services to note within the Isundu study area include the N3 national highway and the existing Lion Park road which runs past the sub-station site.

Transnet has an existing pipeline within the Isundu study area running to the south-east of the proposed sub-station. This pipeline would need to be crossed by the 2 x 400 kV transmission lines in order to connect into the existing Hector-Ariadne 400 kV double circuit line.

Umgeni Water is in the process of registering a 6 m servitude for a 350 mm diameter water pipeline along the Lion Park road on the same side as the proposed Isundu Sub-station. This will need to be taken into consideration, particularly during access road construction activities. It will also need to be crossed by the 2 x 400 kV transmission lines in order to connect into the existing Hector-Ariadne 400 kV double circuit line.

8 ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

The information-gathering phase during scoping included obtaining input from the project proponent, the technical team and I&APs. Information gathering focused on gaining an understanding of the environmental context and status in order to:

- Identify the key issues of concern.
- Focus and tailor the scope of work for specialist studies, to address each issue of concern identified during Scoping.

The issues identified during Scoping have been formulated as eight questions, within which potential impacts are identified and described:

- What are the potential economic and socio-economic impacts associated with the construction and operation of the proposed sub-station?
- What impacts will the construction and operation of Isundu Sub-station have on the natural environment (flora and fauna) of the site?
- How will the development of the Isundu Sub-station impact on existing and developing tourism land-use plans and other town planning initiatives?
- How will the construction and operation of the Isundu Sub-station impact upon surrounding enterprises dealing with sensitive animals and birds?
- Can the construction and operation of the Isundu Sub-station be detrimental to the health and safety of local communities?
- What effects will the construction of Isundu Sub-station have on cultural and heritage resources?
- How will earthworks during construction, and stormwater during and after construction, affect the surrounding water courses and environment?
- What cumulative effects will the proposed Isundu Sub-station contribute, considered in association with impacts arising from other activities in the region?

It is important to note that although these aspects have been raised as issues, it is not a given that potential impacts will actually occur. However, these issues do need to be considered and investigated to inform decision-making and to enable the relevant parties to proactively address any impacts, if they do occur. The no-development option will be considered and assessed as part of these issues.

These key issues are elaborated hereunder.

8.1 What are the potential positive and negative economic and socio-economic impacts associated with the construction and operation of the proposed sub-station?

8.1.1 Reliability and quality of electricity supply

The provision of electricity has significant positive benefits from an economic, socio-economic and ecological perspective (taking note that an improved bulk supply of electricity will enable expanded distribution to consumers). This leads to a number of social benefits for organs of state, and individuals and communities, viz.

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- For organs of state.
 - Electrification of business, industry, hospitals and health facilities, schools and other education facilities.
 - Electrification of safety and security facilities (street lighting, police stations, court houses and the like).
 - Electrification for the provision of essential services (water supply pumps and the like).

 - For individuals and communities.
 - Electrification of homes (for cooking, heating and lighting of homes).
 - Encourages the development of small and medium enterprises, and as a result, contributes to a rise in income and the upliftment of individuals and communities.
 - Enables cost-effective irrigation and agro-processing.

From an ecological perspective, the availability of electricity can lead to a decrease in the harvesting of firewood with resultant benefits for biodiversity.

From a human health perspective, this also leads to a decrease in respiratory disease due to a reduction of biomass burning. The relative efficiency of using electricity will reduce overall air emissions and can lead to an improved quality of life.

The economic multipliers associated with electricity can vary depending on where the electricity is to be used. However, as the key purpose of this sub-station and associated transmission lines is to strengthen the supply to the Pietermaritzburg, Ethekeeni and south coast regions of KZN, the economic benefits in terms of Gross Domestic Production increase and employment sustained or created is significant.

A modern economy cannot grow without the availability of a reliable electricity supply. During 2004/2005 Conningarth Economists calculated a detailed set of electricity multipliers based on the activity split and structure in the National Social Accounting Matrix (SAM). The following macroeconomic indicators flow from the multiplier model at full use of the available electricity (Imani Development, 2010):

- Gross Domestic Product contribution = R29,081 million.
- Employment sustained = 216,000 jobs.
- Payment to households = R13,920 million.

The above results show that the availability of the electricity can make a large contribution to the future growth of the area of consumption.

It is also important to keep in mind that South Africa's current electricity load-shedding difficulties are due to a lack of spare generation capacity. However, even when the new coal-fired power stations have started to generate electricity, if no improvement and expansion of the national transmission network occurs, then load-shedding will continue to be a reality in many parts of South Africa as soon as demand exceeds the transmission capacity.

8.1.2 Temporary employment opportunities

The construction of the sub-station will take approximately three years. However, during this period there will be a period of more intense activity lasting approximately 18 months.

The construction of a sub-station, and associated transmission lines, is a specialised task and there are only a few contracting teams available in South Africa. There will be opportunities for local people to be employed on a temporary basis during construction, undertaking unskilled and semi-skilled labour such as bricklaying and building, access road construction and earthworks, gate installations, and the erection of fences. However, this employment will be limited in number and of relatively short duration. By implication, sustained benefits to the immediate surroundings and businesses will most likely not be significant, but the regional macro-economic benefits over the long-term will be significant.

8.1.3 Economic impacts on surrounding enterprises

There are a number of existing and proposed developments surrounding the sub-station site, which may be economically impacted by the construction and operation of the sub-station.

Rainbow Farms has a number of layer farms in close proximity to the sub-station site. Rainbow Farms have raised concerns that the effect of EMFs, light pollution, traffic and other noise, dust pollution and biosecurity risks related to disease transmission, could have a significant negative impact on their breeding chickens. This would have downstream impacts on their broiler enterprises.

Similarly, various developing estates may have their economic potential significantly curtailed by visual or other impacts, arising from the sub-station.

These risks are outlined in more detail in Sections 8.3, 8.4, 8.5 and 8.8. However, each impact carries associated economic consequences which will need to be assessed.

8.2 What impacts will the construction and operation of Isundu Sub-station have on the natural environment (flora and fauna) of the site?

The construction of the sub-station will directly impact upon approximately 60 hectares of the farm when fully developed. This area currently consists mainly of natural thornveld and grasslands which are regularly cut. The farm is reported to sustain an Oribi population and also to provide a habitat for other important wildlife, such as African Grass Owls which apparently nest on the farm.

The EKZMW database identifies this area as a Priority Area for conservation (R2) because there are no other localities where EKZN Wildlife has been able to identify alternates to try to meet the conservation target for the various feature(s) on the site. The key features listed are various millipede and molluscs species. Importantly, the distribution of these features is not always applicable to the entire extent of the area indicated in the database although, if associated with grassland vegetation, this may be the case for the proposed site.

The conservation value of this farm and vegetation in terms of its vegetation type and species, in the context of the surrounding region needs to be investigated.

8.3 How will the development of the Isundu Sub-station impact on existing and developing tourism land-use plans and other town planning initiatives?

This area falls within a portion of the Mkhambathini Local Municipality which is being targeted for agric-tourism development. There are various tourism-related initiatives surrounding the proposed sub-station site, viz. the Natal Lion Park, the Natal Zoological Gardens and the Africa Bird of Prey Centre. The Mayibuye Game Reserve is a conservation and tourism development which is currently commencing with the initial construction phase on the opposite side of the road to the proposed sub-station. This is a tourism and game development being done in conjunction with land claimants, which aims to develop a 4,600 hectare area into a game reserve with a combination of residential units, game lodges and a wildlife rehabilitation centre.

Proposed developments like the aero-estate to the south-west of the sub-station site are also being considered although currently at an initial concept stage.

The proposed sub-station will not directly impact upon these initiatives. However, there may be potentially negative indirect visual impacts, either during the day and possibly at night, on the sense of place and visual quality of the area, which could indirectly impact upon the success of these initiatives. In addition, there may be direct or cumulative impacts as a result of the transmission lines planned to the sub-station.

These aspects require investigation and assessment.

8.4 How will the construction and operation of the Isundu Sub-station impact upon surrounding enterprises dealing with sensitive animals and birds?

There are three existing enterprises surrounding the proposed sub-station which have raised concerns regarding the impact that light, noise and Electro-magnetic Fields (EMFs) from the sub-station may have on their existing operations.

8.4.1 African Bird of Prey Sanctuary and Raptor Rescue

The African Bird of Prey Sanctuary is a facility aiming to protect and promote the conservation of raptors. The Centre, which is also in partnership with the Mayibuye community who own the land, has approximately 180 different birds of prey of 50 different species, and hosts thousands of visitors per year (tourists as well as learners from various schools). The key highlight of the demonstrations are the flying displays.

Linked to the Centre is Raptor Rescue, a specialist bird of prey rehabilitation unit which treats and releases injured wild raptors.

There are a number of key areas in which the proposed sub-station may impact on the viability of the Bird of Prey Sanctuary. Although the sub-station is unlikely to significantly impact upon the flying displays, the associated transmission lines, along with future lines, will increase the risk of collisions. A large proportion of birds which come to the centre are those which have either been injured through collisions with electrical transmission lines or have been poisoned.

Apart from collision risk, the birds which are released to fly, either during the show or as part of training and rehabilitation, are fitted with radio transmitters. When these birds get lost or go to ground somewhere outside the centre's boundary, the tracking device is essential to retrieve the bird, especially for those that will not be able to survive in the wild on their own.

The Sanctuary claims that electrical interference from transmission lines makes it impossible to interpret the tracking signal. The Sanctuary is concerned that their risk of losing birds will increase with the electrical interference from the sub-station and additional transmission lines.

To date, 13 species of raptor have been bred at the Centre, including the African Grass Owl (vulnerable), Taita Falcon (near threatened) and White-headed Vulture (vulnerable). Currently, the Centre is embarking on a 20-year Bearded Vulture Recovery Programme, in partnership with EKZNW and Birdlife South Africa. The Sanctuary currently houses the only Bearded Vulture of this sub-species in captivity.

There are an estimated 320 pairs of Bearded Vultures remaining in the Drakensberg Mountains and the intention of the Recovery Programme is to harvest eggs from the wild and rear the birds in large flight enclosures. Once these birds have started breeding, some of the young will be released back into the Drakensberg. The key issues raised are that the captive breeding of these vulnerable birds is already difficult and all potential disturbances or negative environmental changes must be minimised. There may be a risk that EMFs, noise or light from the sub-station may affect the breeding success of the birds. However, this could take many years to determine potentially wasting time and finances. The Sanctuary has stated that due to these uncertainties, it may have to reconsider setting up a Recovery Centre at its current venue, if the sub-station is to be located across the road.

This uncertainty may also delay the start of the programme as the intention is to source funds and start the construction of the first enclosure by June 2015, with the first eggs being collected from the wild in August 2015.

Similarly, considering the link between transmission lines and raptor injuries or deaths, the Sanctuary is concerned that the presence of the sub-station and transmission lines across the road will negatively impact upon their long-term ability to raise funds from donors who may feel that their site is no longer a suitable site for raptor breeding and conservation programmes. Without continued donor support the Sanctuary and its programmes will not be able to continue.

8.4.2 Natal Zoological Gardens and Rainbow Farms

The Natal Zoological Gardens is approximately 1.5 km north-east of the proposed sub-station site and contains a variety of local and exotic animals. There are also valuable parrots which breed at the centre.

Rainbow Farms is situated on the adjacent property to the west and north-west of the proposed sub-station with this farm being one of their key breeding farms. The chickens are stimulated to breed using light and food, whilst sudden noises can stress the animals and dust can affect their respiratory functions.

Both of these stakeholders have raised similar concerns with regard to the impact that aspects such as EMFs, noise or light from the sub-station could have on bird breeding and their operations. These issues will be investigated as part of the suite of specialist studies to be undertaken as part of the Impact Assessment.

8.5 Can the construction and operation of the Isundu Sub-station be detrimental to the health and safety of local communities?

8.5.1 Construction related influx

With all large construction projects there is the increased risk of disease transmission, in particular, HIV/AIDS, as a consequence of incoming contracting teams and transporters. In addition, there may be increased pedestrian access and traffic alongside or across private property. This can result in an increase in criminal activities to residents as well as construction workers, and also creates opportunities for theft and poaching. Poaching is already a problem in the area and there is risk of increased poaching of vulnerable species.

If the construction of the sub-station overlaps with the construction of key phases of the Mayibuye project, then some of these negative impacts could be exacerbated. Illegal encroachment or settlement onto unused or vacant portions of land surrounding the sub-station site, as can occur with any major construction project, is another construction related risk that needs to be considered.

8.5.2 Electromagnetic fields

EMFs are electric and magnetic fields that occur when transmission lines carry voltages and currents. High voltages between the phase conductors and the ground cause an electric field or voltage gradient near the power line. Electric fields are measured in kV/m and the magnitude of the field diminishes with distance from the line. The current flowing in the conductors is responsible for a magnetic field. The unit of measurement of a magnetic field is the tesla (T) or microtesla (μT - gauss in the USA: 10 000 gauss = 1 tesla).

Power line electric and magnetic fields are classified as non-ionizing fields for the reason that they, unlike X-rays or gamma rays, normally do not cause ionization of atoms or molecules.

EMFs are produced both by domestic appliances such as hair dryers, electric shavers, ovens etc. as well as naturally in nature, for example from lightning.

Eskom is guided by exposure guidelines for electric and magnetic fields, as given by the South African Occupational Health and Safety Act and the International Commission on Non-Ionising Radiation Protection. The height of transmission towers and the width of the servitude are guided by this legislation and determined by the EMF risk; hence, no permanent residences are permitted in servitudes. Furthermore, sub-stations are designed in accordance with standards of the International Radioactive Protection Agency. Nevertheless, concerns are often raised with regard to negative impacts of exposure upon humans and now also with regard to the wild and commercial bird species being reared on the surrounding properties.

In order to address these concerns, the EAP will appoint a specialist to specifically review current research into these issues and investigate any potential risks associated with the proposed sub-station and various alternatives.

8.6 What effects will the construction of Isundu Sub-station have on cultural and heritage resources?

In terms of the National Heritage Act it is necessary to appoint a heritage practitioner to determine if any cultural heritage resources occur on the proposed sub-station site or if there are any in the vicinity which may need to be avoided by transmission lines.

If any heritage resources are identified on site, including buildings over 60 years of age, suitable mitigation measures acceptable to Amafa will need to be identified and implemented.

8.7 How will earthworks during construction, and stormwater during and after construction, affect the surrounding water courses and environment?

The proposed Isundu Sub-station, when fully developed, will have an infrastructure footprint of approximately 50-60 ha whilst for the initial phase of development the sub-station is likely to have a footprint in the region of 25 ha.

At the start of construction, the footprint area will be cleared and will then be covered with solid concrete slabs or gravel stone.

Thus, a fair amount of earthworks will take place which could affect drainage lines and dams on the property. Depending on the layout option or location of the infrastructure on the site, initially only the small dam on the northern portion of the property may be affected. However, during further phases, earthworks more towards the east of the site are likely to result in the larger farm dam on the east of the site being filled.

During construction, storm water run-off from such a large cleared area could potentially contain high levels of sediment, silt, and washed away construction spillages such as oil and diesel, which could contaminate and/or affect surrounding drainage lines and water courses.

During the operational phase, stormwater or wastewater generated on site will need to be effectively managed to ensure surrounding water courses are not polluted and that erosion is prevented.

8.8 What cumulative effects will the proposed Isundu Sub-station contribute, considered in association with impacts arising from other activities in the region?

The Isundu Sub-station will not operate in isolation. Various transmission lines will, as part of current and future planning, be coming and going out of the sub-station.

The alignment of the incoming VSHA 765 kV line will be from the north in the previously authorised VSHA corridor. The routes for the 2 x 400 kV double-circuit lines that will connect to the existing Hector-Ariadne 400 kV transmission lines will be within the proposed Isundu study area being considered. These are likely to run parallel to the existing Georgedale-Mersey 275 kV transmission lines.

The potential alignment of the 2 x 400 kV lines from the proposed Mbewu Sub-station (near Empangeni) to Isundu Sub-station will be the subject of a separate environmental authorisation process. However, potential alignments and the influence that the sub-station site location has on them will need to be considered as part of overall decision-making regarding this proposed sub-station site.

Similarly, the potential of another 765 kV or HVDC line and additional 400 kV transmission lines entering and leaving the sub-station into the future and the potential impact they may have on regional land-uses will also need to be considered. All specialists will be tasked to consider these potential cumulative impacts of the sub-station as part of their respective specialist studies.

9 PLAN OF STUDY FOR IMPACT ASSESSMENT

This section outlines the Plan of Study for the EIA for the proposed Isundu Sub-station and turn in transmission lines.

Potential impacts and issues of concern, as described in Section 8, need to be taken forward for further investigation. During the impact assessment phase, the significance of these potential impacts will be investigated and assessed in detail, by way of specialist studies and further input by other project team members, as required.

The specialists will provide scientifically sound information in regard to the various issues raised and will not work in isolation but will be required to interact and discuss aspects during their investigations. An integrated approach will be adopted to consider direct, secondary and cumulative impacts wherever possible. Thereafter, the findings will be integrated by the EAP to provide a comprehensive understanding of the issues and associated potential impacts.

The technical and public participation processes will continue to interact at important stages to ensure that both processes build towards a comprehensive investigation of the issues identified. The integrated findings will be presented in an Environmental Impact Assessment Report (EIAR).

9.1 Key tasks to be undertaken

The main activities to be undertaken during this phase are in line with NEMA requirements and the EIA Regulations of 2010, and are as follows:

- ❑ Take into consideration any comments from DEA with respect to the Final Scoping Report and Plan of Study for EIA.
- ❑ Commission and undertake focused studies on the potentially significant issues identified during Scoping.
- ❑ Maintain communication and interaction with stakeholders for the duration of the Impact Assessment phase.
- ❑ Integrate the findings of the detailed studies into a comprehensive and objective EIAR, inclusive of mitigation measures to ameliorate the affects of negative impacts and to optimise positive ones.
- ❑ Prepare an Environmental Management Programme (EMPr).
- ❑ Distribute the draft EIAR and EMPr to registered stakeholders for review.
- ❑ Process and consider stakeholder review comments.
- ❑ Amend and finalise the draft EIAR and EMPr as required, incorporating review comments, into a Final Comments and Responses Report.
- ❑ Submit the final EIAR and EMPr to DEA for consideration and decision-making.
- ❑ Notify registered stakeholders of the decision on the application for environmental authorisation and of their right to appeal.

9.2 Proposed specialist studies

Terms of reference for the specialist studies are outlined below. They will be undertaken by independent professionals regarded as specialists in their specific disciplines. The requirements for specialist reports stipulated in the EIA Regulations 2010 will be complied with.

9.2.1 *Avi-faunal Specialist Study*

This specialist study will address the following key aspects:

- ❑ The vegetation and habitat of the proposed Isundu Sub-station site and immediate surrounds, outlining important characteristics and components thereof, including species-specific habitats.
- ❑ Identify the range and type of the birds this site supports in the context of surrounding habitats and avi-faunal biodiversity considerations. The following birds have been reported to occur on the property and should be considered, amongst others:
 - African Grass Owl.
 - Blue Crane.
 - Crowned Cranes.
 - Secretary Birds.
- ❑ Particular attention must be paid to any wetland areas (requiring close interaction with the wetland specialist) and any associated avi-faunal impacts.
- ❑ To assess the potential impact of the construction and operation of the sub-station and associated lines in this region on surrounding birds, particularly those more vulnerable to collisions and electrocution.
- ❑ How the operation of the sub-station, particularly in the context of the additional transmission lines as well as noise, light and electro-magnetic fields could impact upon specific activities and/or the future viability of the African Bird of Prey Sanctuary, particularly considering the following:
 - Increased risk of transmission line collisions when flying birds.
 - Difficulty in tracking lost birds due to increased electrical interference.
 - Risk of increased EMF, light or noise affecting breeding programmes, particularly of vulnerable species such as the Bearded Vulture which is commencing.
 - The current value of the sub-station site as a controlled release site for Raptor Rescue.
- ❑ How the operation of the sub-station, particularly in the context of the additional transmission lines as well as noise, light and electro-magnetic fields could impact upon the bird species located at the Natal Zoological Gardens.
- ❑ How the operation of the sub-station, particularly in the context of the additional transmission lines as well as noise, light and electro-magnetic fields could impact upon the chickens and chicks at the nearby Rainbow Farms.
- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites, and discuss if any new positive or negative issues will arise as a result of the change from two lines to one with a smaller servitude but larger towers.
- ❑ In addition, the specialist is required to identify any other additional aspects related to the avi-faunal situation in the study area that should be incorporated within this EIA.
- ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.2.2 *Vegetation and Wetland Specialist Study*

This specialist study will address the following key aspects:

- ❑ Describe the current state of the flora and habitat of the proposed Isundu Sub-station site and the wider Isundu study area.
- ❑ Describe the wetlands and water courses in the wider Isundu study area.
- ❑ Map all sensitive features (including wetlands, dams, drainage lines, habitats for threatened species and other areas of conservation significance) within the proposed Isundu Sub-station site.
- ❑ Identify and categorise Red Data species potentially affected by the proposed project.
- ❑ Identify the presence, approximate location and number of any protected plant or tree species on the sub-station site.
- ❑ Discuss the conservation value of the sub-station site and vegetation in terms of similar surrounding habitats and relevant conservation and biodiversity targets.
- ❑ Delineate all wetlands on the sub-station site and describe their functionality.
- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites, and discuss if any new positive or negative issues will arise as a result of the smaller servitude but larger towers of the 765 kV transmission line.
- ❑ Identify potential impacts (positive or negative, including cumulative impacts, if relevant) of the proposed sub-station and turn-in transmission lines on flora and wetlands during construction and operation. This aspect of the study must identify sensitive and “no go” areas and should also include an analysis of construction constraints associated with wetlands.
- ❑ Identify any other additional aspects related to vegetation or wetlands in the project area that should be incorporated within this EIA.
- ❑ Evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.2.3 *Faunal Specialist Study*

This specialist study will address the following key aspects:

- ❑ The vegetation and habitat of the proposed Isundu Sub-station site and immediate surrounds, outlining important characteristics and components thereof, including species-specific habitats.
- ❑ Identify the range and type of fauna this site supports in the context of surrounding habitats and faunal biodiversity considerations. The following species have been reported to occur on the property and should be considered, amongst others:
 - Oribi.
 - Rock Python.
 - Various millipedes and molluscs.
- ❑ Particular attention must be paid to any wetland areas (requiring close interaction with the wetland specialist) and any associated impacts.
- ❑ Determine how the operation of the sub-station, particularly in the context of the additional transmission lines as well as noise, light and electro-magnetic fields could impact upon the fauna species located at the Natal Zoological Gardens and Natal Lion Park.

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- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites and discuss if any new positive or negative issues will arise as a result of the smaller servitude but larger towers of the 765 kV transmission line.
 - ❑ In addition, the specialist is required to identify any other aspects related to the faunal situation in the study area that should be incorporated within this EIA.
 - ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.2.4 Electromagnetic Fields Specialist Study

This specialist study will address the following key aspects:

- ❑ Undertake a literature review of previous EMF work undertaken by Eskom, other organisations and internationally, and health related research. Provide comment on the validity, balance and conclusions of the various researches undertaken.
- ❑ Highlight the difference between EMFs and other fields, i.e. ionizing and non-ionizing radiation.
- ❑ Highlight the typical EMFs or related fields emitted from large sub-stations, 765 and 400 kV transmission lines, and HVDC lines and how these fields diminish or change with distance from the source, obstructions such as buildings, trees etc.
- ❑ Highlight typical EMF fields emitted from other common household appliances.
- ❑ Explain the difference and relevance of Direct Current versus Alternating Current in terms of electricity distribution through transmission lines and the levels of EMFs generated.
- ❑ Provide estimates of distances from the sub-station by where the EMF levels will have reduced to negligible levels.
- ❑ Undertake a literature review on the impact of EMFs on bird species, particularly wild raptors and breeding chickens, and determine if there is any likelihood that the proposed sub-station may impact upon the surrounding developments.
- ❑ In addition, the specialist is required to identify any other additional aspects related to the EMF or health environment in the study area that should be incorporated within this EIA.
- ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, recommend mitigation measures and also evaluate the “no development” option where the project does not proceed.

9.2.5 Noise Impact Specialist Study

This specialist study will address the following key aspects:

- ❑ Provide a brief overview of the type and levels of noise emitted by sub-stations and transmission lines. If possible, noise levels should be linked to the size of the transformer and/or line, i.e. 132 kV, 400 kV or 765 kV, especially where noise levels may differ.
- ❑ Describe and take measurements of the ambient noise levels in the area surrounding the sub-station.
- ❑ Determine how these noise levels may change depending on the weather, if it is night or day, or the age and maintenance of the equipment.
- ❑ Undertake a literature search and review to determine if there is any evidence that raptors or chickens have been or may be disturbed by noise emitted from sub-stations or other sources of similar noise.
- ❑ Determine the likelihood of sensitive raptors, such as bearded vultures, owls etc. or breeding chickens being able to hear constant or relatively constant noise from the sub-station and, in the context of surrounding noise levels, if this is likely to be a disturbance.

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- ❑ Consider the levels of potential noise disturbance on the operations of surrounding enterprise, particularly the African Bird of Prey Sanctuary, Natal Zoological Gardens and Rainbow Chickens, during construction of the Isundu sub-station in relation to current noise levels and that anticipated from the construction of the Mayibuye Estate.
 - ❑ Consider the levels of operational noise disturbance from the sub-station on the operations of surrounding enterprises, particularly the African Bird of Prey Sanctuary, Natal Zoological Gardens and Rainbow Chickens and how this may affect specific aspects such as bird breeding programmes.
 - ❑ Identify possible mitigation measures that may reduce noise impacts.
 - ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.2.6 Tourism and Economic Development Specialist Study

This specialist study will address the following key aspects:

- ❑ Describe the current tourism and socio-economic environment within the Isundu Study area.
- ❑ Identify and discuss potential impacts (positive and negative, local and regional, including cumulative impacts) of the proposed project on tourism enterprises and socio-economic environment during construction.
- ❑ The identification, description and mapping of all relevant existing and future planned tourism and economic activities (estates, farms etc.) within the Isundu Study area in relation to Municipal IDPs and planning initiatives, and assess how the location of the Isundu sub-station could impact upon them.
- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites and discuss if any new positive or negative tourism or economic issues will arise as a result of the change from two lines to one with a smaller servitude but larger towers.
- ❑ Review how the location of the sub-station and/or change in transmission lines proposed between Sigma and Isundu, could impact directly, indirectly or cumulatively, upon existing and future planned tourism developments within the VHSA study area.
- ❑ Identify mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed project).

9.2.7 Visual Impact Specialist Study

This specialist study will address the following key aspects:

- ❑ Describe the visual landscape of the area surrounding the sub-station and turn-in transmission lines, and sense of place.
- ❑ Describe the key areas from which the proposed sub-station and turn-in transmission lines will be seen (the view shed) as well as the viewing distance and the topographical features that offer impact mitigation opportunities and constraints. This must specifically consider the following aspects:
 - Visual impact upon the developing Mayibuye Estate and other surrounding developments.
 - Visual impact of the transmission line tie-in location in relation to the ridge and skyline.
 - Light pollution and visual impacts at night, on surrounding enterprises as well as on sensitive birds or commercial chicken enterprises.

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- ❑ An assessment of the visual absorption capacity of the landscape (i.e. the capacity of the landscape to visually absorb structures and forms placed upon it).
 - ❑ The identification of potential impacts (positive and negative, including cumulative impacts if relevant) of the proposal on the visual landscape during construction and operation.
 - ❑ Recommendations on location, route or lighting alternatives should they be identified, to avoid negative impacts.
 - ❑ The identification of mitigation measures for enhancing benefits and avoiding, reducing or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed project).
 - ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites and discuss if any new positive or negative issues will arise as a result of the change from two lines to one with a smaller servitude but larger towers.
 - ❑ In addition, the specialist is required to identify any other additional aspects related to the visual environment in the study area that should be incorporated within this EIA.
 - ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.2.8 Social and Spatial Development Specialist Study

This specialist study will address the following key aspects:

- ❑ Describe the current social environment within the Isundu study area.
- ❑ Identify and discuss potential impacts (positive and negative, local and regional, including cumulative impacts) of the proposed project on the social environment during construction, specifically considering:
 - Potential impacts on existing infrastructure, in particular, homesteads (and the need for resettlement).
 - Possible traffic impacts during construction.
 - Employment and population influx.
 - Nuisance, the transmission of diseases, in particular, HIV/AIDS, and health and safety impacts during construction.
 - Potential impacts from an increase in crime, including poaching and stock theft, during construction.
- ❑ The identification and mapping of land claims and land reform initiatives in the Isundu study area.
- ❑ The identification, description and mapping of all relevant existing and future planned developments (estates, farms etc.) and infrastructure (pipelines etc.) within the Isundu study area in relation to Municipal IDPs and how the location of the Isundu sub-station could impact upon them.
- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites and discuss if any new positive or negative social or planning issues will arise as a result of the change from two lines to one with a smaller servitude but larger towers.
- ❑ Review how the location of the sub-station and/or change in transmission lines proposed between Sigma and Isundu, could impact directly, indirectly or cumulatively, upon existing and future planned developments within the VHSA study area.
- ❑ The identification of mitigation measures for enhancing benefits and avoiding or mitigating negative impacts and risks (to be implemented during design, construction and operation of the proposed project).

9.2.9 Cultural Heritage Specialist Study

This specialist study will address the following key aspects:

- ❑ The identification and assessment of potential impacts on cultural heritage resources, including historical sites on the site where the sub-station is proposed.
- ❑ The identification and assessment of potential impacts on cultural heritage resources, including historical sites that could be impacted upon by the turn-in transmission lines.
- ❑ Identify any cumulative impacts on heritage or historical resources potentially arising from transmission line corridors due to the location of the proposed sub-station.
- ❑ Review and update previous findings with regard to the authorised transmission line corridor between the Sigma and Isundu sites and discuss if any new positive or negative issues will arise as a result of the smaller servitude but larger towers of the 765 kV transmission line.
- ❑ In addition, the specialist is required to identify any other additional aspects related to the heritage situation in the study area that should be incorporated within this EIA.
- ❑ The specialist must evaluate the implications of each of the project configuration options on potential issues, and also evaluate the “no development” option where the project does not proceed.

9.3 Integration and Impact Assessment

Once the specialist investigations and integration of findings have been undertaken, an EIAR will be prepared in accordance with Section 31 of GN R. 543 to cover the following:

- ❑ Details and expertise of the EAP who conducted the EIA and compiled the report.
- ❑ A detailed description of the proposed activity.
- ❑ A description of the proposed project (sub-station and transmission lines and their locality).
- ❑ A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.
- ❑ Details of the public participation process conducted.
- ❑ A description of the need and desirability of the proposed activity and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.
- ❑ An indication of the methodology used in determining significance of potential environmental impacts. In this regard, Table 5 provides a list of conventions that will be used by specialists when undertaking their discipline-specific assessments. The EAP will also use these conventions for purposes of the integrated assessment of potential impacts, and the determination of impact significance.

Table 5 Conventions that will be applied to the impact assessment

Notation	Description
Nature	An impact is either positive or negative. Importantly, even after mitigation, few negative impacts become positive. Most negative impacts will remain as negative impacts. However, after mitigation, significance should reduce.
Extent	Describes the spatial scale of the impact: <ul style="list-style-type: none"> <input type="checkbox"/> Local – limited to the immediate area(s) around the project site. <input type="checkbox"/> Regional – extends over a larger area that would include a major portion of an area or province. <input type="checkbox"/> National/International – an even wider area that would have national or international implications.
Duration	Provides a prediction of whether the duration of the impact would be: <ul style="list-style-type: none"> <input type="checkbox"/> Short-term (0 to 3 years) – or confined to the construction period. <input type="checkbox"/> Medium-term (3 to 10 years). <input type="checkbox"/> Long-term (> 10 years). <input type="checkbox"/> Permanent (beyond the anticipated lifetime of the project).
Intensity	This provides an order of magnitude of whether or not the intensity (magnitude/size/frequency) of the impact would be high, medium, low or negligible (no impact).
Frequency	This provides a description of any repetitive, continuous or time-linked characteristics of the impact(s) as: <ul style="list-style-type: none"> <input type="checkbox"/> Continuous (i.e. without interruption). <input type="checkbox"/> Intermittent (occurring from time to time, without specific periodicity). <input type="checkbox"/> Periodic (occurring at more or less regular intervals).
Probability	This provides a description of the probability of the impact actually occurring as: <ul style="list-style-type: none"> <input type="checkbox"/> Improbable (very low to low likelihood). <input type="checkbox"/> Probable (distinct possibility). <input type="checkbox"/> Highly probable (most likely). <input type="checkbox"/> Definite (the impact would occur regardless of prevention or mitigation measures).
Reversibility	This describes the ability of the impacted environment to return to its pre-impacted state once the cause of the impact has been removed as: <ul style="list-style-type: none"> <input type="checkbox"/> Low (impacted natural, cultural or social functions and processes will never return to their pre-impacted state). <input type="checkbox"/> Medium (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the medium to long term). <input type="checkbox"/> High (impacted natural, cultural or social functions and processes will return to their pre-impacted state within the short-term).
Irreplaceable Loss of Resources	This describes whether an irreplaceable resource is impacted upon or not: <ul style="list-style-type: none"> <input type="checkbox"/> Yes. <input type="checkbox"/> No.
Significance	The significance of the identified impacts on components of the affected environment (and where relevant, with respect to potential legal infringement) will be described as: <ul style="list-style-type: none"> <input type="checkbox"/> Low, where the impact will not have a significant influence on the environment, and, thus, will not be required to be significantly accommodated in the project design. <input type="checkbox"/> Medium, where it could have an adverse influence on the environment, which would require modification of the project design or alternative mitigation actions. <input type="checkbox"/> High, where it could block the project regardless of any possible mitigation.
Confidence	Provides a measure of confidence in the assessment expressed as low, medium or high.

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- ❑ A description and comparative assessment of all alternatives identified during the EIA process.
 - ❑ A summary of the findings and recommendations of any specialist report or report on a specialised process.
 - ❑ A description of all environmental issues that were identified during the EIA process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.
 - ❑ An assessment of each identified potentially significant impact including:
 - Cumulative impacts.
 - The nature of the impact.
 - The extent and duration of the impact.
 - The probability of the impact occurring.
 - The degree to which the impact can be reversed.
 - The degree to which the impact may cause irreplaceable loss of resources.
 - The degree to which the impact can be mitigated.
 - ❑ A description of any assumptions, uncertainties and gaps in knowledge.
 - ❑ An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.
 - ❑ An environmental impact assessment statement.
 - ❑ A draft EMPr.
 - ❑ Copies of any specialist reports and reports on specialised processes.

An EMPr will be incorporated into the EIAR. The EMPr will be prepared in accordance with Section 33 of GN R. 543 to cover the following:

- ❑ Details and expertise of the person who prepared the EMPr.
- ❑ Information on any proposed management or mitigation measures that will be taken to address the environmental impacts that have been identified in the EIAR, including environmental impacts or objectives in respect of planning and design, pre-construction and construction activities, operation or undertaking of the activity, rehabilitation of the environment, and closure (where relevant).
- ❑ A detailed description of the aspects of the activity that are covered by the draft EMPr.
- ❑ An identification of the persons who will be responsible for the implementation of the measures.
- ❑ Proposed mechanisms for monitoring compliance with the EMPr and reporting thereon.
- ❑ As far as reasonably practical, measures to rehabilitate the environment affected.
- ❑ A description of the manner in which activities, pollution, or migration will be managed stopped or remedied to comply with relevant limits and legislated provisions.
- ❑ Where appropriate, time periods within which the measures contemplated in the draft EMPr must be implemented.
- ❑ A description of an environmental awareness plan to ensure employees are aware of environmental risks and how pollution and environmental degradation are to be avoided or addressed.

9.4 Public participation during the impact assessment

The EAP will continue to interact with I&APs during the course of the Impact Assessment. The database will be updated on an ongoing basis. All queries and comments will be responded to and recorded in the Comments and Responses Report.

The Comments and Responses Report, listing all issues raised, together with an indication of how they were considered and/or addressed, will be appended to the Draft EIAR. This will enable I&APs to verify that the issues raised during Scoping have been considered and see how they have been addressed.

In addition to ongoing contact with I&APs, the EAP will meet with key authorities of local, provincial and national government as necessary throughout the process to facilitate discussion and understanding.

Registered I&APs will be timeously notified by means of advertisements, faxes, mail or electronic mail of the availability of the draft EIAR for public review.

The draft EIR will be made available for review by lodging copies at appropriate and accessible local venues and placing documentation on ACER's website. CD copies will be provided to I&APs on request.

There will be a 40-day public review period and a public meeting held (if required), after which the draft EIAR will be amended as necessary according to comments received, and finalised along with the Final Comments and Responses Report. The final EIAR will be submitted to DEA for consideration and decision-making.

Once the competent authority has issued an environmental authorisation on the proposed project, registered I&APs will be notified via fax, post, or email of the decision, including details on the appeal procedure.

Key activities and anticipated time frames for the EIA are shown in Table 6.

Table 6 Key activities and anticipated time frames

Activity	Anticipated Dates
Draft Scoping Report Public Review Period	April – June 2015
Submit Final Scoping Report and Plan of Study for Impact Assessment to the Competent Authority	June 2015
Specialist Study Investigations	April – June 2015
Preparation of Draft Environmental Impact Assessment Report and Environmental Management Programme	June – July 2015
Draft Environmental Impact Assessment Report and Environmental Management Programme Public Review Period	August 2015 – October 2015
Submit Final Environmental Impact Assessment Report and Environmental Management Programme to the Competent Authority	November 2015

10 CONCLUDING REMARKS

The EAP is of the opinion that due environmental process has been followed during the undertaking of this scoping process and associated public participation programme.

Potentially negative impacts have been identified and the significance of these impacts and possible mitigation measures need to be further investigated.

Following the comment period for the Scoping Report, the issues raised by stakeholders, together with those of technical specialists and the regulatory authorities, will be captured in a Final Scoping Report. This report will be submitted to DEA, for consideration and acceptance. Thereafter, the Impact Assessment phase will be undertaken.

11 REFERENCES

Geopractica. 2012. *Preliminary comparative geotechnical report*. Geopractica Consulting Engineers.

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Mucina, L. & Rutherford, M. (eds) 2006. *The vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19.

APPENDIX 1: APPLICATION FOR AUTHORISATION

APPENDIX 2: PUBLIC PARTICIPATION DOCUMENTATION

APPENDIX 3: COMMENTS AND RESPONSES REPORT