

**DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE PROPOSED CONSTRUCTION
OF ±250km 400kV-POWER LINE FROM BORUTHO S/S IN MOKOPANE TO
BOKMAKIERIE S/S IN NZHELELE AND ASSOCIATED SUBSTATION WORKS TO
ACCOMMODATE THE POWERLINE IN LIMPOPO PROVINCE.**

NEAS REFERENCE: DEA/EIA/0001049/2012

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TITLE:	ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONSTRUCTION OF ±250km 400kV-POWERLINE FROM BORUTHO S/S IN MOKOPANE TO BOKMAKIERIE S/S IN NZHELELE AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN LIMPOPO PROVINCE.		
PURPOSE OF SCOPE:			
The purpose of this Draft Environmental Impact Assessment Report/ document is to describe the environmental values and factors that may be impacted on by the proposed construction of a +- 250km 400kV power line project in Limpopo Province. The report is part of EIA study being conducted in compliance with the National Environmental Management Act (Act 107 of 1998) and Government Notices No. R. 544, R545 and R546 of June 2010. The EIA process is required in order to get approval for the project from a competent authority. As such, an application was lodged with the Department of Environmental Affairs (DEA) for the proposed construction of 400kv +- 250 km was assigned a reference number NEAS Reference DEA/EIA/0001049/2012 DEA Reference 14/12/16/3/3/2/287.			
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Nzumbululo RAICE terms

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	SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN LIMPOPO PROVINCE.
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Caveat

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONSTRUCTION OF THE ±250km 400kV-POWERLINE FROM BORUTHO S/S IN MOKOPANE TO BOKMAKIERIE S/S IN NZHELELE AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN LIMPOPO PROVINCE.

Authorship: This Report has been prepared for Eskom Holdings Limited ~~SOC(Transmission)~~, by Nzumbululo Heritage Solutions.

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Geographic Co-ordinate Information: Geographic co-ordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps: Maps included in this report use data extracted from the NTS Map and data from Google Earth Pro were also utilised.

Disclaimer: Nzumbululo Heritage Solutions is not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

Signed by Principle EAP:

H Mlotshwa
OCTOBER 2012

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DEFINITIONS

“**Air pollution** means any change in the composition of the air, caused by smoke, soot, dust (including fly ash), cinders and solid particles of any kind, gases, fumes, aerosols and odorous substances” (Air Quality Act, 2004).

“**Alternative**” means a different means of meeting the general purpose and need of a proposed activity.” (National Environmental Management Act, 1998 (Act No. 107 of 1998), Guideline 5, June 2006).

“**Construction** means the building, erection or expansion of a facility, structure or infrastructure that is necessary for the undertaking of an activity, but excludes any modification, alteration or upgrading of such facility, structure or infrastructure that does not result in a change to the nature of the activity being undertaken or an increase in the production, storage or transportation capacity of that facility, structure or infrastructure;” (National Environmental Management Act, 1998 (Act No. 107 of 1998), Regulation 386 of 2006).

“**Interested and affected party**”- refers to:

- (a) Any person, group of persons or organization interested in or affected by an activity; and
- (b) Any organ of state that may have jurisdiction over any aspect of the activity;” (R385, 2006).

“**linear activity**- means an activity that is undertaken across several properties and which affects the environment or any aspect of the environment along the course of the activity in different ways, and includes a road, railway line, power line, pipeline or canal” (National Environmental Management Act, 1998 (Act No. 107 of 1998) Regulation 385 of 2006).

“**Public participation process**- means a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.”(R385, 2006).

“**Plan of study for environmental impact assessment**- means a document contemplated in regulation 28(1)(i) which forms part of a ENVIRONMENTAL IMPACT ASSESSMENT report and sets out how an environmental impact assessment must be conducted;”(R543, 2010).

“**Significant impact**- means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.”(R385, 2006).

ABBREVIATIONS

DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Electrical and magnetic field
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
HeSSA	Nzumbululo Heritage Solutions South Africa
IAPs	Interested and Affected Parties
ICNIRP	International Commission for Non- ionising Radiation Protection
MW	Megawatt
NEMA	National Environmental Management Act (Act No: 107 of 1998)
PPP	Public Participation Process
PSP	Public Service Provider
TRFR's	Transformers
NIRP2	National Integrated Resource Plan

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE PROPOSED CONSTRUCTION OF ±250km 400kV POWERLINE FROM BORUTHO S/S IN MOKOPANE TO BOKMAKIERIE S/S IN NZHELELE AND ASSOCIATED SUBSTATION WORKS TO ACCOMMODATE THE POWERLINE IN LIMPOPO PROVINCE.

4. 1. EXECUTIVE SUMMARY

Introduction

In order to address the existing network constraints in the Polokwane North network, Eskom Holdings Limited proposes **to construct a ±250km 400kV transmission power line from the new Borutho Substation near Mokopane to new Nzhelele (Bokmakierie) Substation near Musina in Limpopo Province.** » **Associated infrastructure** to integrate the new transmission power line into the Transmission grid (such as access roads, relocation of existing lines, etc) and accommodate the new line into the substations (such as the construction of new feeder bays). The proposed power line would be associated with construction works of the Borutho and Bokmakierie Substations, which have already received environmental authorizations (Authorisation Reference Number DEA 12/12/20/1187 and 12/12/20/2084).

Motivation for the Development

Eskom Holdings Ltd SOC is responsible for the provision of reliable and affordable power to its consumers in South Africa. Electricity cannot be stored and therefore must be used as it is generated. Electricity is generated in accordance with supply-demand requirements. In South Africa, thousands of kilometers of high voltage transmission lines (i.e. 765kV, ~~or~~ 400kV or 275kV transmission lines) transmit this power, which is mainly generated at the power stations located within Mpumalanga and Limpopo Provinces, to Eskom's Major Transmission sSubstations. At these major substations, the voltage is reduced, and distributed to smaller substations all over the country through distribution lines (i.e. 132kV, 88kV or 66kV distribution power lines). Here the voltage is reduced and distributed to local substations, which distribute the power via numerous small lines (i.e. 22kV and 11kV distribution power lines) to local users. The power generated by Eskom can only be utilised from those points of supply, which transform the power into a usable voltage.

If Eskom Transmission is to meet its mandate and commitment to supply the ever-increasing needs of end-users, it has to plan, establish and expand its infrastructure of transmission power lines on an on-going basis, in support of the generation processes. It is therefore vital that transmission capacity keeps up with both electricity generation capacity and electricity demand.

The Northern region is experiencing exponential increasing in energy demand from various socio-economic development and land use activities such as mining, agriculture and local users in the region. The proposed powerline is therefore necessary to:

- Avoiding current and future possible voltage collapse;
- Contributing towards a more flexible electrical network;
- Improvement in the overall reliability of the electrical systems, which would benefit electricity users in the region; and
- To sustain economic growth in the region.

1.4 Alternative Transmission Line Corridors

Technically feasible alternative transmission line corridors have been identified for investigation within the EIA process. These alternatives were selected on the basis of the local topography, as well on technical criteria. Through the EIA process, a preferred transmission power line corridor will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs (DEA), as competent authority for this project. Should the proposed project be authorised by the DEA, Eskom will enter into a negotiation process with each affected landowners. The negotiation process is independent of the EIA process, and will be undertaken directly by Eskom [Holdings Limited SoC, Transmission](#).

Three alternative power line corridors have been identified for this project, each planning and environmental studies corridors of 3000m in width. The final servitude would be a corridor required to accommodate 55m constructions of the 400kV power line transmission towers. The receiving environment for the proposed transmission power line consists of rural village settlements; traditional authority lands, game reserves, towns and commercial farmlands distributed between [the proposed](#) Borutho and Nzhelele (Bokmakierie) Substations. The power line would traverse across two districts, Capricorn and Vhembe in Western and Eastern regions of the Limpopo province respectively. (Refer to map attached appendix 2) [Please describe each alternative.eg Corridor 1 starts at Borutho s/s then goes eastwards towards Bochum then North towards Vivo, then runs below Soutpansberg mountains, crosses N1 the in to Bokmakierie S/S just an example.](#)

Legislative requirements

The construction of the 400kV transmission powerline, including associated infrastructures, is an activity identified in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), in respect of the Environmental Impact Assessment (EIA) Regulations No. R543 of 2010, which stipulates that such developments, may not commence without Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA).

The National Department of Environmental Affairs (DEA) is the competent authority for this project. An application for authorisation has been acknowledged by DEA (under Application Reference number 14/12/16/3/3/2/287). Through the decision-making process, DEA will be supported by the Limpopo Department of Economic Development, Environment and Tourism (LEDET).

The EIA process

It The EIA study and the EIR outcome are planning and decision-making processes and tools respectively undertaken in terms of Section 24 (5) of the National Environmental Management Act (NEMA), Act No. 107 of 1998. The EIA has parallel and integrated processes namely: a technical assessment process and public participation process (PPP). The technical process investigates “hard” information: facts based on scientific and technical study, statistics or technical data. It identifies the potential negative and positive consequences of a proposed project or development at an early stage, and recommends ways to enhance positive impacts and to avoid or reduce or mitigate negative impacts. The PPP exercise engages the public and I&AP’s on the issues relating to the proposed development including identifying community concerns and gather inputs from other relevant parties. Figure 2 below illustrates the EIA process. The findings of an EIA also guide the technical and financial investigations relating to the viability of the proposed development. The EIA regulations also require that an EMP be developed to guide the planning, development and subsequent operation of the development. The provisions of the EMP will be legally binding on Eskom Holdings SOC and on its contractors to ensure a sustainable development subject to DEA issuing the Environmental Authorisation that clears the proposed development to proceed. Figure 1 below provides the EIA process in its entirety.

Figure 1: Standardised Process flow diagram of the EIA process.

ASSUMPTIONS AND LIMITATIONS

During the undertaking of the EIA process, the Environmental Assessment Practitioner (EAP) utilised information that was available at the time of the study including specialist inputs, field survey data, PPP inputs and other primary and secondary material review. This report is based on the assessment of the potential environmental impacts associated with and limited to the receptor project area of the proposed development. All specialists who undertook the specialist studies for this EIA were qualified and independent to undertake the necessary investigations required. It is not always possible to involve every Interested and / or Affected Parties (I&AP's) individually. However, every effort has been made to involve as many interested parties as possible. It is also assumed that individuals representing various associations or parties convey the necessary information to

these association/ parties. Nonetheless, the project has been advertised and notices issued through several multi media forums such as print media and individual mail contacts.

Approach to EIA Phase

This section provides brief description of the EIA process. This Environmental Impact report aims at highlighting issues that have been identified during Scoping phase in order to assess the likely significance of the various impacts on the receiving environment and to propose mitigation measures(where Possible) to lower the significance of these impacts. As part of the EIR, a comparative assessment of the alternative routes put forward during the Scoping phase has undertaken in order to highlight the route alignment with least significant impact on the receiving environment. Comments received during the detailed public participation process have been incorporated into this report and must be considered during the decision making process

Assumptions and Limitations

The following assumptions and limitations apply to this report

- it is assumed that all information provided by the applicant and the technical team which informed the environmental consultants as well as which is contained within this report is reliable, accurate and up-to-date.
- All specialists who undertook specialist studies for the Environmental Impact Assessment were qualified and had the necessary experience to undertake the necessary investigations required
- It is assumed that all information and reports obtained from the specialist have taken into consideration all relevant information pertaining to their specialisation
- The final pylon positions are not yet known. A selection of pylon positions (when known) which are deemed to be more environmentally sensitive locations will be investigated by the ecologist and the archaeologist to ensure that no sensitive features are impacted upon.

-Scoping phase

The scoping phase of the process was structured in order to ensure that it guided the EIA phase of the environmental authorisation process. The scoping phase aligns the terms of reference for the EIA, identifying all environmental issues, which requiring further investigation. The Scoping phase fulfilled the following objectives:

- Effectively identify and notify all I&APs of Eskom Holdings SOC limited intention to construct a 400kv Powerline;
- Ensure that all concerns and issues of I&APs are taken into account during the EIA stage of the process;

CONCLUDING REMARK

The EIA Report expands on the key issues and concerns identified during the Scoping phase and incorporate the authorities' comments on the Scoping Report. Specialist investigations were conducted and included in the EIA Report. The specialist studies assisted with the assessment of

anticipated impacts as identified in the Scoping Phase and highlighted the key areas of concern as well as necessary mitigation measures. Mitigation measures were provided for each impact.

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2 INTRODUCTION

Nzumbululo Heritage Solutions South Africa (HeSSA) was appointed by Eskom SOC Limited (Transmission) to conduct an Environmental Impact Assessment (EIA) study for the proposed construction of a ±250-km-long 400kV transmission power_line and associated substation infrastructure. The powerline will traverse from the west of the Capricorn District to Vhembe District in Limpopo Province. The proposed line will start at Borutho substation in Mokopane to Bokmakierie substation in Nzhelele Limpopo Province.

The proposed powerline and associated substation works are listed activities as defined by GNR 545 (Listing Notice 1) Of 18 June 2010 of the National Environmental: Activity 8 (I): *“The construction of facilities or infrastructure, for the transmission and distribution of electricity with a capacity of 275 keilovolts or more, outside an urban area or industrial complex.”*

List other activities that are on the application form as well

The above mentioned activities requires a full Environmental Impact Assessment (EIA) study, in line with the 2006 Regulations in order to acquire the environmental authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The application for environmental authorisation was made on 02nd February 2012. The lead environmental authority for this application is the Department of Environmental Affairs (DEA). As such an EIA application was lodged with DEA (Application Reference 14/12/16/3/3/2/287) and NEAS: DEA/EA/0001049/2012.

Acknowledgement letter is attached ~~asin~~ Appendix 1. ~~t~~The scoping report was submitted to DEA on 20 August 2012 and was accepted and approved on 08 October 2012.

3. EXPERTISE OF THE ENVIRONMENTAL ASSESSEMENT PRACTITIONERS

Introduction

The Environmental regulation specifically requires practitioners involved in the EIA process to list their qualifications and expertise in the report. An Environmental Assessment Practitioner (EAP) appointed in terms of regulation 17 (1) is required to:

- Be independent
- Have expertise in conducting environmental impact assessments including knowledge of the Act, these regulations and any guidelines that have relevance to the proposed activity
- Perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- Comply with the Act, these regulations and all other applicable legislation
- Take into account, to the extent possible, the matters listed in regulation 13 when preparing the application and
- Disclose to the applicant and the competent authority all material information in the possession of the EAP that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority in terms of these regulations or the objectivity of any report, plan or document to be prepared by the EAP in terms of these regulations for submission to the competent authority.

Nzumbululo Heritage Solution, the independent consultants and the designated project EAP have met the above directives. The table below lists the EAP study team involved in this project. These will work with other independent scientists and specialists until and an Environmental Authorisation is issued by the DEA.

Details of the EAP

Table 1a: Details of EAP (H. Mlotshwa)

Name	Hellen S. Mlotshwa
Company	Nzumbululo Heritage Solutions
Physical Address	4 Berger Road, Vorna Valley Midrand
Postal Address	P. O. BOX 4106; HALFWAY HOUSE 1685
Telephone Number	011 021 4937
Fax Number	086 544 2177
E-mail	mloshwah@nzumbululo.com
Role in Project	Environmental Consultant/Practitioner

Hellen Mlotshwa is a qualified and experienced environmental practitioner with almost 10 years of experience on various environmental impact assessment studies authorisation projects (For further details see attached curriculum vitae (CV) in Appendix 7).

Given the significance of this project, Nzumbululo has seconded a second EAP. H. S. Mlotshwa will be assisted by a second EAP for this project, Ms K. Mogajane.

Table 2: Details of Assistant EAP (K. Mogajane).

Name	Kelebogile Mogajane
Company	Nzumbululo Heritage Solutions for South Africa
Physical Address	4 Berger Road Vorna Valley Midrand
Postal Address	P. O. BOX 4106; HALFWAY HOUSE, 1685
Telephone Number	011 021 4937
Fax Number	086 544 2177
E-mail	mogajaneK@nzumbululo.com
Role in Project	Environmental Consultant/Practitioner

Kelebogile Mogajane initiated the EIA study process for this project and was responsible for preparing and submitting the project EIA Application to the DEA. She has nearly a decade of environmental management experience in linear and powerline development projects authorisation (refer to CV is included in Appendix 7).

Detail of Applicant

Table 3: Details of the Proponent.

Name	Henry Nawa (Representative of Proponent)
Company	ESKOM Holdings Limited
Postal Address	P.O. Box 1091, Megawatt Park Maxwell Drive Sunninghill Johannesburg 2000
Telephone number	011 800 8111
Fax number	011 800 2122
Email	nawah@eskom.co.za
Role in Project	Project Manager

4 DESCRIPTION OF THE PROPOSED PROJECT

4.1 Introduction

The proposed project will include the construction of a new $\pm 250\text{km}$ -long 400kv powerline from Borutho Substation near Mokopane on Farm Noord Braaband to proposed Nzhelele Substation on Farm Bokmakierie in the Limpopo Province.

4.2 Project Location

The affected project area is located in the Capricorn and Vhembe Districts of Limpopo Province.-The powerline preferred and alternative routes will traverse through the following farms. I think description by District municipalities is not enough

Table 4: List of individual farms affected by the proposed powerline development.

FARMNAME	SG_CODE	FARM_NO	MAJ_REGION	MUNICNAME	NM_NUM_DIV
PYLKOP	TOMS0000000005930000	593	MS	Makhado	PYLKOP593MS
KONIGGRATZ	TOLS0000000001350000	135	LS	Molemole	KONIGGRATZ135LS
KONIGGRATZ	TOLS0000000001350000	135	LS	Molemole	KONIGGRATZ135LS
BOOMZIEN	TOLS0000000001640000	164	LS	Molemole	BOOMZIEN164LS
INDERHIKEN	TOLS0000000001650000	165	LS	Molemole	INDERHIKEN165LS
	TOLS0000000002600000	26	LS	Makhado	26LS
LA PUCELLA	TOLR0000000006930000	693	LR	Mogalakwena	LA PUCELLA693LR
LUXEBURG	TOLR0000000007720000	772	LR	Mogalakwena	LUXEBURG772LR
ZUID HOLLAND	TOLR0000000007730000	773	LR	Mogalakwena	ZUID HOLLAND773LR
NOORD BRABAND	TOLR0000000007740000	774	LR	Mogalakwena	NOORD BRABAND774LR
HARTEBEESTPAN	TOLS0000000002200000	22	LS	Makhado	HARTEBEESTPAN22LS
BARROW	TOMS0000000006220000	622	MS	Makhado	BARROW622MS
KAMEEKOP	TOMS0000000006230000	623	MS	Makhado	KAMEEKOP623MS
SANDSLOOT	TOMS0000000006260000	626	MS	Makhado	SANDSLOOT626MS
LANGDRAAI	TOMS0000000006270000	627	MS	Makhado	LANGDRAAI627MS
OVERDYK	TOLS0000000001470000	147	LS	Molemole	OVERDYK147LS
BADBURG	TOLS0000000001680000	168	LS	Molemole	BADBURG168LS
WELVAREND	TOLS0000000001670000	167	LS	Blouberg	WELVAREND167LS
HOOGLAND	TOLS0000000004300000	43	LS	Blouberg	HOOGLAND43LS
SOLINGEN	TOLS0000000000860000	86	LS	Blouberg	SOLINGEN86LS
LUTON	TOLS0000000000870000	87	LS	Blouberg	LUTON87LS
WITTEN	TOLS0000000000910000	91	LS	Blouberg	WITTEN91LS
WESTPHALIA	TOLS0000000001390000	139	LS	Molemole	WESTPHALIA139LS
WELTEVREDEN	TOLS0000000001620000	162	LS	Molemole	WELTEVREDEN162LS
POTSDAM	TOLS0000000001280000	128	LS	Molemole	POTSDAM128LS
GROOTHOEK	TOLS0000000001290000	129	LS	Molemole	GROOTHOEK129LS
MEANDERTHAL	TOLS0000000001880000	188	LS	Molemole	MEANDERTHAL188LS
STETTIN	TOLS0000000001330000	133	LS	Molemole	STETTIN133LS
TRIEST	TOLS0000000001920000	192	LS	Molemole	TRIEST192LS
BRILLIANT	TOLS0000000001550000	155	LS	Molemole	BRILLIANT155LS
LISSA	TOLS0000000001610000	161	LS	Molemole	LISSA161LS
MARINASPRUIT	TOLS0000000000750000	75	LS	Blouberg	MARINASPRUIT75LS

FARMNAME	SG_CODE	FARM_NO	MAJ_REGION	MUNICNAME	NM_NUM_DIV
PURASPAN	T0LS0000000008200000	82	LS	Blouberg	PURASPAN82LS
WUPPERTOE	T0LS0000000008300000	83	LS	Blouberg	WUPPERTOE83LS
SCHROELEN	T0LS0000000008400000	84	LS	Blouberg	SCHROELEN84LS
DONSANNA	T0LS0000000001410000	141	LS	Blouberg	DONSANNA141LS
BOCHEM	T0LS0000000001450000	145	LS	Blouberg	BOCHEM145LS
FRAAIHOLT	T0LS0000000001480000	148	LS	Blouberg	FRAAIHOLT148LS
JOSLAND	T0LS0000000001300000	13	LS	Blouberg	JOSLAND13LS
MUNT	T0LS0000000001370000	137	LS	Blouberg	MUNT137LS
DE RUIGTE	T0LS0000000002700000	27	LS	Makhado	DE RUIGTE27LS
JAKHALSDRAAI	T0LS0000000001020000	102	LS	Makhado	JAKHALSDRAAI102LS
REDHILL	T0LS0000000001030000	103	LS	Makhado	REDHILL103LS
CLAUDIUS HOOP	T0LS0000000001060000	106	LS	Makhado	CLAUDIUS HOOP106LS
SCHOONVELD	T0LS0000000002500000	25	LS	Makhado	SCHOONVELD25LS
RIETBOKVLEI	T0MS0000000004490000	449	MS	Makhado	RIETBOKVLEI449MS
ZWARTKLIP	T0LS0000000002000000	20	LS	Makhado	ZWARTKLIP20LS
BALMORAL	T0LS0000000006000000	60	LS	Makhado	BALMORAL60LS
VULPAN	T0LS0000000006400000	64	LS	Makhado	VULPAN64LS
GRUISPAN	T0LS0000000006500000	65	LS	Makhado	GRUISPAN65LS
GRUISPAN	T0LS0000000006500000	65	LS	Makhado	GRUISPAN65LS
LEEUEWKNOP	T0LS0000000006600000	66	LS	Makhado	LEEUEWKNOP66LS
LEEUEWKNOP	T0LS0000000006600000	66	LS	Makhado	LEEUEWKNOP66LS
TER SCHELLINGEN	T0LS0000000001500000	15	LS	Makhado	TER SCHELLINGEN15LS
SCHIERMONIKOOG	T0LS0000000001600000	16	LS	Makhado	SCHIERMONIKOOG16LS
HOOGELAATS	T0MS0000000003990000	399	MS	Makhado	HOOGELAATS399MS
VERVULLING	T0MS0000000004010000	401	MS	Makhado	VERVULLING401MS
DU PLOOY	T0MS0000000006000000	600	MS	Makhado	DU PLOOY600MS
TAMBOTIE	T0MS0000000004220000	422	MS	Makhado	TAMBOTIE422MS
ROOS	T0MS0000000006050000	605	MS	Makhado	ROOS605MS
DIAMANT	T0MS0000000006280000	628	MS	Makhado	DIAMANT628MS
AFSTAP	T0MS0000000006080000	608	MS	Makhado	AFSTAP608MS
KORTDRAAI	T0MS0000000006090000	609	MS	Makhado	KORTDRAAI609MS
VOGELSTRUIS	T0MS0000000004150000	415	MS	Makhado	VOGELSTRUIS415MS
DANIE	T0MS0000000004160000	416	MS	Makhado	DANIE416MS
DE BEERS LOOP	T0LS0000000005320000	532	LS	Aganang	DE BEERS LOOP532LS
FAIR LAURIE	T0LS0000000005340000	534	LS	Aganang	FAIR LAURIE534LS
GRAAFF REINET	T0LS0000000005350000	535	LS	Aganang	GRAAFF REINET535LS
LONSDALE	T0LS0000000005380000	538	LS	Aganang	LONSDALE538LS
LOUISIANA	T0LS0000000005390000	539	LS	Aganang	LOUISIANA539LS
POUR LA PATRIE	T0LS0000000005400000	540	LS	Aganang	POUR LA PATRIE540LS
HONEYMOON	T0MS0000000006100000	610	MS	Makhado	HONEYMOON610MS
VRYHEID	T0MS0000000004170000	417	MS	Makhado	VRYHEID417MS
DUIJEN	T0MS0000000004190000	419	MS	Makhado	DUIJEN419MS
WITLAAGTE	T0MS0000000004210000	421	MS	Makhado	WITLAAGTE421MS
SANDHEUVEL	T0MS0000000004250000	425	MS	Makhado	SANDHEUVEL425MS
FRAAIFONTEIN	T0MS0000000004470000	447	MS	Makhado	FRAAIFONTEIN447MS
KNOPJESDOORN	T0MS0000000004480000	448	MS	Makhado	KNOPJESDOORN448MS

FARMNAME	SG_CODE	FARM_NO	MAJ_REGION	MUNICNAME	NM_NUM_DIV
KAALPLAATS	TOMS0000000004510000	451	MS	Makhado	KAALPLAATS451MS
LEENA	TOMS0000000004530000	453	MS	Makhado	LEENA453MS
TWYFEL	TOMS0000000006290000	629	MS	Makhado	TWYFEL629MS
RINGER	TOMS0000000004030000	403	MS	Makhado	RINGER403MS
BUCHAN	TOMS0000000004040000	404	MS	Makhado	BUCHAN404MS
BRUNO	TOMS0000000004070000	407	MS	Makhado	BRUNO407MS
VERLOOREN	TOMS0000000004090000	409	MS	Makhado	VERLOOREN409MS
BRUILOF	TOMS0000000005980000	598	MS	Makhado	BRUILOF598MS
BIERMAN	TOMS0000000005990000	599	MS	Makhado	BIERMAN599MS
KALKHEUVEL	TOMS0000000004540000	454	MS	Makhado	KALKHEUVEL454MS
JUPITER	TOLS0000000007170000	717	LS	Aganang	JUPITER717LS
BILLINGSGATE	TOLS0000000006510000	651	LS	Aganang	BILLINGSGATE651LS
VENUS	TOLS0000000006520000	652	LS	Aganang	VENUS652LS
RAMPIETJESFONTEIN	TOLS0000000005980000	598	LS	Aganang	RAMPIETJESFONTEIN598LS
CERES	TOLS0000000005990000	599	LS	Aganang	CERES599LS
LUTTIGSDALE	TOLS0000000005830000	583	LS	Aganang	LUTTIGSDALE583LS
KALKSPRUIT	TOLS0000000006330000	633	LS	Aganang	KALKSPRUIT633LS
UITZICHT	TOLS0000000006350000	635	LS	Aganang	UITZICHT635LS
VLAKLAAGTE	TOLS0000000006360000	636	LS	Aganang	VLAKLAAGTE636LS
EENSGEVONDEN	TOLS0000000006450000	645	LS	Aganang	EENSGEVONDEN645LS
COMMISSIEDRIFT	TOLS0000000006460000	646	LS	Aganang	COMMISSIEDRIFT646LS
LANGVERWACHT	TOLS0000000006470000	647	LS	Aganang	LANGVERWACHT647LS
VULCANUS	TOLS0000000005840000	584	LS	Aganang	VULCANUS584LS
PERSIE	TOLS0000000002000000	200	LS	Aganang	PERSIE200LS
ZOMERSFONTEIN	TOLS0000000006040000	604	LS	Aganang	ZOMERSFONTEIN604LS
OLYMPUS	TOLS0000000005850000	585	LS	Aganang	OLYMPUS585LS
JUNO	TOLS0000000005860000	586	LS	Aganang	JUNO586LS
CHLOE	TOLS0000000005870000	587	LS	Aganang	CHLOE587LS
VLAKFONTEIN	TOLS0000000005880000	588	LS	Aganang	VLAKFONTEIN588LS
WESTHEIM	TOLS0000000001910000	191	LS	Aganang	WESTHEIM191LS
WESEL	TOLS0000000001930000	193	LS	Aganang	WESEL193LS
BURGWAL	TOLS0000000001950000	195	LS	Aganang	BURGWAL195LS
TERBRUGGE	TOLS0000000001560000	156	LS	Aganang	TERBRUGGE156LS
LANARK	TOLS0000000001990000	199	LS	Aganang	LANARK199LS
LUCY'S TOWN	TOLR0000000006870000	687	LR	Aganang	LUCY'S TOWN687LR
CROMFORD	TOLR0000000006900000	690	LR	Aganang	CROMFORD690LR
SCHOONGELEGEN	TOLR0000000006950000	695	LR	Aganang	SCHOONGELEGEN695LR
SOUR APPLE TREE	TOLR0000000006910000	691	LR	Aganang	SOUR APPLE TREE691LR
GOEDGEVONDEN	TOLR0000000007320000	732	LR	Aganang	GOEDGEVONDEN732LR
WELGELEGEN	TOLR0000000003950000	395	LR	Aganang	WELGELEGEN395LR
PRAGUE	TOLR0000000007340000	734	LR	Aganang	PRAGUE734LR
ROZENKRANS	TOLR0000000004240000	424	LR	Aganang	ROZENKRANS424LR
MATALAS LOCATION	TOLS0000000005910000	591	LS	Aganang	MATALAS LOCATION591LS

These farms are within the Limpopo Province and comprises of rural settlements, commercial farming areas, urban settlements and agro-industrial with associated infrastructures.

4.3 Scope of Work Layout and design

The proposed project includes the following activities:

- ~~Establish the Nzhelele Substation Site,~~
- Establish Borutho-Nzhelele \pm 250km 400kV transmission power line;
- ~~Install 2x 250MVA 400/132kV transformers at Nzhelele MTS and terrace Nzhelele for end state 3x 250MVA 400/132kV transformers,~~
- ~~Terrace the Nzhelele 400kV yard for an end state of 4x 400kV feeders,~~
- ~~Terrace the Nzhelele 132kV yard for an end state of 8x 132kV feeders,~~
- ~~Establish the control building, telecommunication infrastructure, oil dam, and~~
- ~~Establish the entire access road infrastructure to and within Nzhelele MTS.~~
- ~~Commission all new infrastructure by year 2017.~~

4.4 Project Motivation

The project was initiated as part and parcel of power transmission network grid improvement and stabilisation within and across the Limpopo Province. Polokwane Customer Load Network (CLN), including the Tabor and Spencer power corridor, remains susceptible to voltage instability and is the weakest part of the Northern Grid network due to being operated beyond its reliability power transfer limit. In addition to this, the Polokwane CLN, i.e., Tabor and Spencer 275kV and 132kV network, is susceptible to low voltages regardless of the approved and commissioned network strengthening in year 2010:

- Tabor-Spencer 275kV line, and
- 2nd 250MVA 275/132kV transformer.

Listed below is another approved 400kV network re-enforcement in the Polokwane CLN which is expected for commissioning by the end of year 2012:

- Witkop-Tabor 400kV line, and
- Tabor 500MVA 400/132kV transformer.

The combined transformation capacity at Tabor and Spencer MTS of 846MW exceeds the installed and the approved transformation capacity of 712MW. In addition to this, the low voltages and thermal constraints in the 132kV Distribution network for both existing and planned network remains far below operational par. The Tabor and Spencer 275/132kV transformation recorded peak in the year 2010 was 280MW and 210MW, respectively. The exceeded Tabor 275/132kV transformation firm capacity will be restored to optimal operational and transmission capacity once the Witkop-Tabor 400kV line and the 1st

of the 500MVA 400/132kV transformer have been commissioned. The Spencer 275/132kV transformation firm capacity of 234MW will be exceeded by 40MW in year 2015, as shown in load forecast, therefore, compromising the network reliability by violating the set Grid Code N-1 transformation criteria.

Furthermore, the lengthy Tabor and Spencer 132kV Distribution networks stretching 200km from Polokwane to 50km away from the Mussina border-post result in low voltages and thermal constraints during N-1 transformation and line contingencies in year 2011 and beyond. The expected Tabor and Spencer 132kV load growth is located 100km north of Tabor and 70km from Spencer, therefore, the Transmission outreach constraint will cap the load growth. Following the findings after an assessment of the Tabor and Spencer 400kV, 275kV and 132kV network constraints for the 20 year horizon, Eskom SOC Limited Grid Planning has proposes the following:

- Establish 3x 250MVA 400/132kV Nzhelele Main Transmission Station (MTS),
- Construct Tabor–Nzhelele 130km 400kV line,
- Construct Borutho–Nzhelele 250km 400kV line, and
- Commission all the associated infrastructure by year 2017.

~~However, the proposed servitudes for the Tabor-Nzhelele-Borutho 400kV power line is likely to be more challenging to acquire due to the Soutpansberg mountain range section of which the lines will have to traverse through to feed into the Nzhelele MTS. However, the planned commissioning date of 2017 has taken into account the EIA approval processes and possible project planning challenges.~~

~~The above proposed network solution meets the 10-year Distribution load requirements in the Tabor and Spencer network areas and it is also informed by the 20-year Transmission and Distribution load forecast in meeting the Transmission 20-year plan.~~

~~It is in this context that this project is proposed and motivated to be considered for approval by compliance authorities in light of its highlighted significance and critical role in the future socio-economic and national development interests.~~

Figure 1: Locality map in 1: 50 000 showing the 3 Powerline routes and main roads and substations around the project area

4.5 Technical Details of the Proposed Powerline

The proposed powerline will be approximately 250km long. Various structures are being considered for use during the construction in different sections of the line subject to landscape features.

[Please show various 400kV towers](#)

4.5.1 400kv Tower types

Towers for the proposed powerline would be between 29m and 40m in height. Their total footprint area for each tower would be around 41, 6m x 70,6m. The distance between each tower would be approximately 430m. The actual number of towers, the type of towers and other support structures associated with the proposed powerline would be confirmed and detailed following approval of final corridor for the proposed development. In general, the type of towers to be used would consider weight, the area (e.g. topography characteristic), height, costs and erection time. In addition, from an engineering perspective, transmission powerline routes are planned with as few bends as possible.

Examples of some of the towers that Eskom would select from for the proposed 400kV transmission powerline and which have been widely used in similar development are attached as Appendix 8. The cross-rope and self-supporting suspension towers are typical of most single structures, having been developed to support 400kV lines. The tower type generally carries triple Bersfort and twin Dinosaur conductors, a relatively light configuration.

Proposed Activities and Project Timeline

The activities for the construction and operation will be finalised during EIA phase. Design details of the powerline will also be finalised [after the approved corridor is known](#). during EIA phase. However, the powerline is expected to be operational in 2017.

Preconstruction

The project is currently on the pre-construction phase where the EIA study is conducted. This study includes describing the project, determining the project alternatives, environmental management plan for the proposed project to be reported in the EIA Report. Permits from landowners (through EIA study) would be acquired. These will be produced in reports (Scoping and EIA), which are part of the EA studies and will inform authorities in making their decision. When the project is approved and Record of Decision is provided, the project will need to be advertised and await objections from IAPs for 30 days. Should all parties be satisfied and the ROD stands, only can the construction phase commence.

Construction

As illustrated above, construction will commence once pre-construction studies are completed. Construction is estimated to take about 12 months. We currently envisage construction to begin in 2014. The construction activities for the proposed development will include the following activities.

Access roads

Creation of access roads and construction camps form part of the proposed project. Access road will enable transportation of the material and construction teams to the site and facilitate post construction maintenance. The access road will be gravel and constructed for vehicles. These access roads will be along the entire length of proposed powerline. They will be used for construction phase and operation, mainly for maintenance. The information about the access point and exact route for the access roads will be negotiated and finalised with the landowners after completion and approval of the EIA study.

Construction Camp

The construction camps will be located at the nearest appropriate areas within the approved servitude corridor of proposed location of power lines. The exact locations will be negotiated and finalised with relevant land owners, where applicable, after completion and approval of the EIA study.

Construction of transmission powerlines

The following activities will be conducted as part of constructing the transmission powerlines:

- Survey of the route for the powerline
- Selection of best-suited structures and foundations
- Final design of powerlines and placement of towers
- Issuing of tenders and award of contract to construction companies
- Vegetation clearance and construction of access roads (where required)
- Pegging of structures
- Construction of foundations
- Assembly and erection of structures
- Stringing of conductors
- Rehabilitation of disturbed area and protection of erosion sensitive areas
- Testing and commissioning.

Stringing of Conductors

Eskom Holdings Limited has strict international best-practice methods of building powerline such as the proposed Borutho-Nzhelele Transmission Power line. For example, the construction teams would guide wires, to string the conductors between towers. This can be undertaken mechanically or by hand. The line will generally be strung in sections. There will be cable drums placed at 2 km intervals during this stringing process. In order to minimise any potential negative impacts on the surrounding areas, these cable drums would be placed within the approved servitude.

Operation and maintenance

The operation and maintenance of the transmission powerline will be an on-going process for the planned life span for Borutho to Nzhelele powerline. The Powerline will be monitored and managed according to Environmental Management Plan that will be provided in EIA phase and post-construction Operational EMPs. In addition, Eskom has established and approved international practices guides for operating and managing such transmission lines.

STATUTORY REQUIREMENTS

Introduction

The proposed development is guided and governed by Legislative Acts and Ministerial Guidelines (also see Table 5). In addition, EIA studies for electricity generation, transmission and distribution projects are also guided by additional internal Eskom Guidelines and Policies (also see www.eskom.co.za).

Legislations Related to the project

Constitution of South Africa (Act 108 of 1996)

The Constitution (Act No. 108 of 1996) provides the legal basis for allocating powers to different spheres of Government and contains a number of rights, primary to this study are those right specifically relevant to the national energy policy. The Constitution states that Government must establish a national energy policy to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the nation. Energy should be made available and affordable to all citizens, irrespective of geographic location. The production and distribution of energy should be sustainable and lead to an improvement in the standard of living of citizens (DME, 2003b:6). Section 24 of the Bill of Rights provides that:

“Everyone has the right:

a) to an environment that is not harmful to their well being and

b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that:

prevent pollution and ecological degradation;

promote conservation; and

secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.”.

Energy Policy

The White Paper on Energy Policy (DME, 1998) sets out Government Policy with regard to the supply and consumption of energy for the next decade. The policy strengthens existing energy systems in certain areas, calls for the development of underdeveloped systems and demonstrates a resolve to change in a number of areas. The policy addresses most elements of the energy sector.

Furthermore, the White Paper on Energy Policy identified the need to undertake an Integrated Energy Planning (IEP) process in order to achieve a balance between the energy demand and resource availability, whilst taking into account the health, safety and environmental parameters. In addition, the policy identified the need for the adoption of a National Integrated Resource Planning (NIRP) approach

to provide a long-term cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies.

Electricity Regulation Act of 2006

The proposed development is aligned to the following objectives (DME, 2006b:6):

- Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa;
- Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in South Africa;
- Facilitate investment in the electricity supply industry;
- Promote the use of diverse energy sources and energy efficiency; and

Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. In addition, the Electricity Regulation Act (Act No 4 of 2006) in terms of section 46 (2c) projects involving new generation capacity that is needed to ensure the continued uninterrupted electricity supply would require authorisations or exemptions in terms of NEMA (No 107 of 1998) or as may be required by any other law for the purpose of authorisation for proposed Eskom developments (DME, 2006).

Integrated Energy Plan (IEP) – 2003

The Department of Minerals and Energy (DME) commissioned the IEP to provide a framework in which specific energy policies, development decisions and energy supply trade-offs could be made on a project-by-project basis. The framework was intended to create a balance in providing low cost electricity for social and economic development, ensuring a security of supply and minimizing the associated environmental impacts. The IEP projected that as the years accumulate the additional demand in electricity would necessitate an increase in electricity generation capacity in South Africa. Therefore, contemporary concerns relate to electricity capacity to accommodate growth in demand (DME, 2003a).

Integrated Resource Plan (IRP) – 2010-2030

The Department of Energy, under the New Generation Capacity regulations has authorised the System Operations and Planning Division in Eskom to produce the IRP for electricity in consultation with the Department and the National Energy Regulator of South Africa (NERSA) (DOE, 2011). The objective of the IRP is to develop a sustainable electricity investment strategy for generation capacity and transmission infrastructure for South Africa over the next 25 years. In summary, the IRP is intended to:

- Improve the long term reliability of electricity supply through meeting adequacy criteria over and

above keeping pace with economic growth and development

- Ascertain South Africa's capacity investment needs for the medium term business planning environment;
- Consider environmental and other externality impacts and the effect of renewable energy technologies.
- Provide the framework for Ministerial determination of new generation capacity (inclusive of the required feasibility studies) as envisaged in the New Generation Capacity regulations.

The National Heritage Resources Act (No. 25 of 1999)

The proposed development comprises certain activities (e.g. changing the nature of a site exceeding 5 000m² and linear development exceeding 300m or river crossing for more than 50m in length) that require authorisation in terms of Section 38 (1) of the NHRA, Act 25 of 1999. Section 38 (8) of the Act states that if heritage considerations are taken into account as part of an application process undertaken in terms of the ECA, there is no need to undertake a separate application in terms of the National Heritage Resources Act (NHRA). The requirements of the National Heritage Resources Act can thus be addressed as an element of the EIA process, specifically by the inclusion of a Heritage Impact Assessment (South African Heritage Resource Agency, 1999). In addition, for instance, NEMA section 24 (4) (b) (iii) appears to reinforce the provisions of NHRA by requiring that procedures for assessing impacts including heritage impacts for most of NHRA sections 38 (1) activities be addressed in an application for Environmental Authorisation.

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

In terms of the Act, the sourcing of material for road construction purposes (i.e. the use of borrow pits) is regarded as mining and accordingly is subject to the requirements of the Act. In terms of the proposed project, Section 106 (3) provides exemption from the Act. "Only where the organ of state has obtained formal exemption from the Minister, the organ of state has to:

- make formal application for exemption;
- notice of the exemption has to be gazetted by the Minister; and
- the organ of state has to compile an EMP per borrow pit and submit these to DMR for approval" (DME, 2002).

Development Facilitation Act (No. 67 of 1995)

The Development Facilitation Act (DFA) is the flagship statute, which sets the overall framework and administrative structures for planning throughout the country. It is a framework Act with broadly worded provisions to allow individual provinces to enact more detailed planning laws and regulations to meet

their own specific needs and circumstances. The DFA and its provincial equivalent may be relevant should Eskom require a rezoning of the land from agricultural to industrial zoning (South Africa, 1995).

Expropriation Act (No. 63 of 1975)

The Expropriation Act is used to acquire land from unwilling sellers (South Africa, 1975). If necessary, Eskom transmission would need to acquire additional land for this development. This would have to take place during the pre-construction phase of the development.

National Environmental Management: Biodiversity Act (No. 10 of 2004)

Provisions of this Act, which are relevant to this study, are the guiding principles relating to threatened and protected ecosystems and species, species and organisms posing a threat to biodiversity, permits relating to listed threatened and protected species, alien species or invasive species. Cognisance is also taken of the list of critically endangered, vulnerable and protected species as listed in the Government Notice No. R151 of 23 February 2007.

National Environmental Management: Waste Act (Act No. 59 of 2008)

In terms of section 16 (1) of the Act, duty of care is applicable to (DEAT, 2008b):

- Avoid the generation of waste and where such generation cannot be avoided, to minimize the toxicity and amounts of waste that are generated;
- Reduce, re-use, recycle and recover waste;
- Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
- Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
- Prevent any employee or any person under the proponent's supervision from contravening this Act; and
- Prevent the waste from being used for an unauthorised purpose.

Conservation of Agricultural Resources Act (Act 43 of 1983)

In Terms of GN 1048 of 1984 and GN 2485 of 1999, the Act provides management principles relating to weeds and invaders and also categories of weeds and invaders (DOA, 1983).

National Water Act (No 36 of 1998)

The National Water Act states that duty of care to remedy the effects of pollution to water resources needs to be taken into consideration in all circumstances (section 19). The Act also stipulates

procedures to be followed in the event of an emergency incident that may impact on a water resource (Section 20) as well as governing water use licences (Section 21) if required for construction purposes (DWAf, 1998).

Promotion of Administrative Justice Act (PAJA) (Act no 3 of 2000)

The Promotion of Administrative Justice Act aims to give effect to the right to administrative action that is lawful, reasonable and procedurally fair, and to the right to written reasons for administrative action as contemplated in Section 33 of the constitution of the Republic of South Africa 1996 and provides for matters incidental thereto (PAJA, 2000). In particular, the proposed development was considered in accordance with this Act in terms of the following (PAJA, 2000:4):

An administrator undertaking procedurally fair administrative action must give adequate notice of the nature and purpose of the proposed administrative action:

- a reasonable opportunity to make representations;
- a clear statement of the administrative action;
- adequate notice of any right of review or internal appeal, where applicable; and
- adequate notice of the right to request reasons if they were not provided In cases where an administrative action affects the rights of the public, an administrator, must decide whether to hold a public inquiry and therefore conduct the public inquiry or appoint a suitably qualified person to do so and determine the procedure for the public inquiry, which must:
 - include a public hearing and comply with the procedures to be followed in connection with public inquiries;
 - conduct the inquiry in accordance with that procedure; and
 - compile a written report on the inquiry and give reasons for any administrative action taken or recommended If an administrator decides to follow a notice and comment procedure, the administrator must:
 - take appropriate steps to communicate the administrative action to those likely to be materially and adversely affected by it and call for comments from them;
 - consider any comments received; and
 - comply with the procedures to be followed in connection with notice; and
 - comment procedures

Any person whose rights have been materially and adversely affected by administrative action and who has not been given reasons for the action may, within 90 days after the date on which that person became aware of the action, request that the administrator concerned furnish written reasons for the action. The administrator to whom the request is made must, within 90 days after receiving the request, give that person adequate reason in writing for the administrative action.

National Environmental Management: Protected Areas Act (Act 57 of 2003). (NEMPAA)

NEMPAA provides for protection and conservation of ecologically viable areas representative of South Africa’s biological diversity and its natural landscapes and seascapes. The Act also supports the establishment of a national register of all national; provincial and local protected areas, for the management of those areas in accordance with national norms and standards, for intergovernmental cooperation and public consultation in matters concerning protected areas, for continued existence, governance and functions of South African National Parks and for matters in relation to protected areas. The proposed development would traverse environmental sensitive areas (to be identified by biodiversity specialists during field work). Nonetheless, mitigation measures will be adhered to with regards to avoid and / or minimise detrimental impacts on the environmental sensitive areas

EIA Regulations 2010 promulgated in terms of NEMA under Government Notice (GN) No. 543 outline the activities for which Basic Assessments or EIAs should apply.

Table 5: Activities listed within Government Notice No. R544, R545 and R546 applicable to this project (as per numbering in the Government Notice)

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
GNR545(Listing Notice 2) of 18 June 2010	8	the construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex
GNR544(Listing Notice 1) of 18 June 2010	10,	the construction of facilities or infrastructure for the transmission and distribution of electricity i).outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more
	11	the construction: (i) canals (ii) channels (iii) bridges (iv) dams (v) weirs (vi) bulk storm water outlet structures (vii) marinas (viii) jetties exceeding 50 square metres in size, (ix) slipways exceeding 50 square metres in size (x) buildings exceeding 50 square metres in size, or (xi) infrastructure or structure covering 50 square metres or more

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
	22,	<p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of watercourse, excluding where such construction will occur behind the development setback line.</p> <p>the construction of a road, outside urban areas</p> <ul style="list-style-type: none"> (i) with a reserve wider than 13,5 meters or (ii) where no reserve exists where the road is wider than 8 meters, or (iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in government Notice 387 of 2006 or activity 18 in Notice 545 of 2010 <p>The transformation of land bigger than 1000 square meters, to residential retail, commercial, industrial or institutional use, where, at the time of the coming into effect of this Schedule such land was zoned open space or had an equivalent zoning.</p>
	24,	<p>Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). The decommissioning of existing facilities or infrastructure for</p> <ul style="list-style-type: none"> (i) electricity generation with a threshold of more than 10MW (ii) electricity transmission and distribution with a threshold of more than 132kV (iii) nuclear reactors and storage of nuclear fuel (iv) activities, where the facility or the land on which it is located is contained (v) storage or storage and handling of dangerous goods of more than 80 cubic metres
	26,	<p>the expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</p> <p>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre</p> <ul style="list-style-type: none"> (i) where the existing reserve is wider than 13, 5 meters, or (ii) where no reserve exists, where the existing road is wider than 8 metres- excluding widening or lengthening occurring inside urban areas.
	38,	<p>The construction of a road wider than 4 metres with a reserve less than 4 metres with a reserve less than 13, 5</p> <ul style="list-style-type: none"> (i) in an estuary: (ii) outside urban areas, in <p>(aa) A protected area identified in terms of NEMPAA, excluding</p>

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
	19	<p>(cc) Sensitive areas as identified in an environmental management framework as completed in chapter 5 of the Act and as adopted by the completed authority;</p> <p>(dd) Sites or areas identified in terms of an international convention</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional,</p> <p>(ff) Core areas in biosphere reserves</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve,</p> <p>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined,</p> <p>(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse when no such setback line has been determined</p> <p>iii inside urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.</p>

Bearing in mind the above Regulations and listed activities, and as been discussed in preceding sections of this report, the proposed development requires ENVIRONMENTAL IMPACT ASSESSMENT and a full EIA process. Following the submission and acknowledgement of the EIA application by DEA (Reference No DEA: 14/12/16/3/3/2/287 and NEAS: DEA/EIA/0001049/2012, ENVIRONMENTAL IMPACT ASSESSMENT study for the project was formulated in line with the applicable regulation to achieve the following:

- a) Conduct at least the public participation process set out in Regulation 54-57
- b) Give notice in writing of the proposed application to any organ of state which has jurisdiction in respect of any aspect of the activity
- c) Open and maintain a register of all interested and affected parties in respect of the application in accordance with Regulation 57
- d) Consider all objections and representations received from interested and affected parties following the public participation process

- e) Subject the application to ENVIRONMENTAL IMPACT ASSESSMENT by identifying
- i. Issues that will be relevant for consideration of the application
 - ii. The potential environmental impacts of the proposed; and
 - iii. Alternatives to the proposed activity that are feasible and reasonable
- f) Prepare a ENVIRONMENTAL IMPACT ASSESSMENT report in accordance with Regulation 28; and give all registered interested and affected parties an opportunity to comment on the ENVIRONMENTAL IMPACT ASSESSMENT report in accordance with Regulation 57

Eskom guidelines

The following Eskom guidelines are also relevant to the proposed development:

- Air Quality Management Policy (ESKPBA3)
- The Control Of Dust Exposure Within Eskom (ESKADAAD6)
- Environmental Impact Assessment (ESKPVAAL7)
- Passive Fire Protection For Oil Filled Equipment In High Voltage Yards (FSGASAAQ8)
- Standard For Bush Clearance And The Maintenance Of Overhead Powerlines (ESKASABG3)
- Guidelines For Weed Eradication At Eskom Substations Using Herbicides (TRR/S.92/034)
- Oil Spill Clean-Up And Rehabilitation (ESKAGAAD7)

DESCRIPTION OF STUDY AREA

1. Introduction

This section discusses the key characteristics of the biophysical and human environmental aspects of the potentially affected area. For this project, the study area is defined as the development footprint and its immediate surroundings as well as to a larger scale; the local municipal areas, the broader district and region. The information pertaining to the receiving environment has been complemented with information from desktop studies and physical studies. During the EIA stage, the biophysical and human environmental aspects supplemented with results from the various specialist impact assessments comprising: Vegetation; Fauna; Avifauna; Wetland; Agriculture; Visual; Heritage; and Socio-economic impact assessments as well as tourism have been attached to this report.

1.1 Biodiversity

1.1.1. Fauna

The proposed powerline would pass through sections that are heavily degraded, others slightly changed and others with limited sections of primary vegetation cover. Based on observations and preliminary reconnaissance survey, the primary vegetation cover is most likely limited to the grassland biome. The grassland can be subdivided into numerous vegetation units depending on the presence of different soil types that ranges from sandy to clay, as well as a moisture gradient. The chemical composition of the soil also plays a major role in determining the vegetation unit. In the grassland, the absence of a dominant tree or shrub layer is characteristic. The grassland is dominated by grasses such as Finger grass (*Digitaria eriantha*), Red grass (*Themeda tiandra*), various love grasses (*Eragrostis chloromelas*, *E. lehmanniana*, *E. superba*), Horse grass (*Triraphis andropogonoides*), Carrotseed grass *Tragus koeleroides*, Three-awned grass species (*Aristida congesta*, *A. adscensionis*) (Beater, 2006).

There is a possibility that protected fauna and flora species may be found in the proximity of the study area from Borutho to Nzhelele. The majority of this study area is in a state of transformation, with a number of settlements and small towns dotted throughout the immediate surrounds intermingled with agricultural areas, rural settlements and business developments. As a result, a great deal of the vegetation within the study area is being transformed (Beater, 2007).

The fauna and vegetation studies that will be conducted would help in identifying the species and methods of handling them. The findings would be available during the EIA phase. The powerline will also run through agriculture fields as shown Plate 1 below.



Plate 1: Agriculture circle based on the central pivot point of irrigation such disturbed land sections dominate the proposed powerline servitude.
The project area is currently degraded predominantly by agricultural land use activities. The preliminary field survey did not record any major wild faunal species colonies along the powerline routes. There are number cattle ranches within the project area.

1.1.2. Birds

Eskom has a commitment to conservation and has established an Environmental Division to investigate problems related to the possible interactions between wildlife and electrical equipment (Ledger, 1988). Therefore one of Eskom's responsibilities is to cause as little destruction to bird life as possible, whether by electrocution, collision or any other cause. A particular concern is the mortality of endangered and vulnerable birds that may be the result of interactions with transmission lines. The death of such birds due to collisions with an Eskom Line is a serious loss to these small populations. A number of bird species are to be found along the banks of the river course and the wooded ravines on either side of the river. Black Storks will undoubtedly use the banks of the river or wetlands as foraging areas (Beater, 2007). An assessment on avifauna will be conducted during the EIA phase to identify potential impacts and mitigation measures on any identified species that may occur in the study area.

1.2 Climate

The Limpopo region has a wide climatic variation. The Polokwane to Musina region is reflective of the province and offers pleasant climate for most of the year. Blessed with year round sunshine, (<http://www.myforecast.com/bin/climate.m?city=77209&metric=false>) it can get hot in the summer period (October- March), averaging 27 Degrees Celsius. Winter is a sunny season of chilly mornings, warm middays, dry afternoons and cool to cold nights.

1.3 Land use

The project area is predominantly a commercial farming area with a mixture of game, cattle and crop cultivation both dry land and rural residential areas forms part of the land use, (see Plate 2). Large tracts of land within the study area are still in a natural state (largely undisturbed by human development) particularly close to Nzhelele near the end of the powerline. Relatively some land portions within the project can be classified as degraded, and also some sections have been disturbed by past impacts (e.g. access roads, construction substations, boundary fence lines, distribution powerlines, etc.) especially the areas where there are human settlements such as Jupiter, Venus, Sefahlane, Luxemburg and many others.



Plate 2: View of residential areas in Moetagare, in Mokopane area where the powerline will traverse.



Plate 3: View of selected sections of farming areas, the powerline will pass through farming areas. Note that 70% of the powerline servitude traverses through farming areas.

1.4 Geology and Soils

Soil itself is created by the physical and chemical weathering of bedrock, deposition of other sediments and soils and the breakdown of organic matter. Soil formations affected by a series of factors including the organisms that live on and in it, the climate of the region, the topography (aspect, slope, etc), bedrock below and time (Pidwirny 2008). The study of soils is known as Pedology and the evolution of soils is often referred to as Pedogenesis. The geology of the lower portion of the Limpopo River consists largely of consolidated and unconsolidated sedimentary rocks (Ashton *et al.* 2001), including argillites, fluvial sandstones and mudstones (Chinoda *et al.* 2009). These sediments form a region of shallow sloping plains interrupted occasionally by exposed granitic intrusions (SARDC 2002). The sediments of this region are largely alluvial in origin, including Ferrigenous arid sands (Chinoda 2009). The coastal zone is lined with interior dunes, including some consolidated dunes, and coastal dunes (Chinoda *et al.* 2009).

1.5 Existing infrastructure

The study area is within rural communal and commercial agricultural areas, hence there some existing infrastructure. There are access roads (see Plate 4 and 5) and the distribution powerlines and telecommunications, main roads running through the study area.



1.1.1.1.1 Plate 4: View of existing powerlines in the project area.



Plate 5: View of proposed powerline route running next to the existing railway line.

1.6 Noise

The main source of high noise level associated with the proposed project area derives from traffic from the local communities, and also from agricultural machinery and activities.

1.7 Water features

The area may consist of a number of water bodies such as pans, rivers, streams and drainage lines. The proposed development is anticipated to cross a number of small streams. A wetland assessment would therefore be conducted and address mitigation measure for potential impacts on any watercourses during the EIA phase of the project (See plate 6).



Plate 6: View of a water body located in the vicinity of the proposed powerline route near alternative 1.

1.6 Air quality

The existing powerlines are not currently a source of any potential air pollution. The nature of the proposed development entails that it is unlikely that there will be any activities during the operational phase of the development, which would generate any emissions. As such, apart from temporary construction vehicular pollution, the operation of the proposed powerline is highly unlikely to cause air pollution in the surrounding area.

The only potential source of air pollution for sensitive receptors in the project area (such as surrounding farmlands and Eskom employee temporary dwellings) from the proposed development would be dust that may be generated during the construction phase. Dust levels depend on the type and level of construction activity being undertaken as well as the prevailing meteorological conditions. Dust emissions are typical caused by land clearing, drilling, blasting and cut and fill operations. The excavation for new development is likely to generate dust, which may travel into surrounding farmlands areas.

However mitigation measures, which will be put in place during the construction phase, are likely to prevent dust from affecting areas beyond the boundaries of the site. The Environmental Management Plan will specify measures such as the damping down of exposed surfaces to prevent dust travel.

1.8 Human environment

The individual local municipalities (affected by the proposed project) have demographic features that resemble the districts in which they are located. The following socio-economic characteristics have been gathered from the Capricorn and Vhembe Districts Integrated Development Plans (IDPs).

The affected areas have high levels of poverty, unemployment and illiteracy. The rural areas in the project area also have a high level of female-headed households. The main economic activities are commercial agriculture, wholesale and retail. The levels of income in the municipalities are also low based on the fact that unemployment is high. Access to water, lighting and refuse removal in the area are other challenges. Furthermore, the construction and maintenance of the transmission powerlines and substations could lead to a change in the number and composition of people within any given community, which in turn could lead to economic, land use, and socio-cultural change processes.

A question that is regularly raised by interested and affected parties is whether the installation of powerlines will have a detrimental medical effect on those living in close proximity of the powerlines. In 2006, Eskom commissioned an independent study conducted by Empetus Close Corporation to assess the effect of electric and magnetic fields (EMF) on the surrounding environment. The report, and several others from international researchers and experts, highlights that all household appliances and other electrical equipment generate electrical and magnetic fields (EMF). Therefore people are generally exposed to varying levels of EMF in their daily lives at work and at home. EMF is always created, in varying levels, with the generation of electricity and the frequency of the electrical power system. Overhead powerlines generate electric and magnetic fields but not any different from what people are already exposed to from other sources in their daily lives. (Refer to Electrical and magnetic Fields from Overhead Powerlines in Appendix 5).

Table 4: Summary of typical electric field levels measured in the vicinity of the Eskom Powerlines (Empetus Close Corporation).

VOLTAGE (kV)	MAX ELECTRIC Field (V/m)	ELECTRIC FIELD AT SERVITUDE (V/m)	SERVITUDE WIDTH (m)
132	1,300	500	15,5
275	3,000	500	23,5
400	4,700	1,500	23,5
765	7,00	2,500	40,0

Table 7: Summary of magnetic field in the vicinity of the Eskom Powerlines (Empetus Close Corporation).

Voltage (kV)	Current	Max Magnetic field	Magnetic field at Servitude Boundary	Servitude Width
132	150	4,0	1,0	15,5
275	350	6,0	1,0	23,5

400	650	10,5	2,5	23,5
765	560	6,0	1,5	40,0

The above tables (Table 6 and Table 7) illustrate that the electric and magnetic fields fall to lower levels with an increase in distance from the line. The main concern that is raised with regard to powerlines is that they are thought to increase chances of cancer. No evidence of a causal relationship between magnetic field exposure and childhood leukaemia or breast cancer has been found and no dose-response relationship has been shown to exist between EMF exposure and biological effects (Ibid).

The Empetus Report concluded that according to findings of studies on the effects of electric and magnetic fields on plants with levels typical of a powerline environment, complying with the requirements for proper servitude management as prescribed by the electric utility, are unlikely to affect plants in terms of growth, germination and crop production.

The guidelines for electric and magnetic field exposure set by the International Commission for Non-ionising Radiation Protection (ICNIRP 2000) receives world wide support and are endorsed by the Department of Health in South Africa (2006). Calculations of electric and magnetic field levels created by overhead powerlines have shown that areas where members of the public may be exposed at the servitude boundary and further away from the line are well within the ICNIRP guidelines. Where field levels exceed the ICNIRP guidelines within the servitude, Eskom is experienced and has advanced techniques that exist to reduce the field levels.

The proposed development may traverse through section where it is near residential areas on the Mokopane side, however it is not anticipated to result in prohibitive and high significant or unmitigatable impacts.

Nonetheless, one class of impact that has been identified relates to heritage resources, such as graveyards or single graves associated within the proposed servitudes especially on the residential side. These are usually fixed in space and Eskom will have to consider applicable mitigation or apply avoidance measure where applicable should the line be cleared to proceed as planned.

1.9 Heritage

The project may impact on a range of heritage resources as defined in Section 3 of the National Heritage Resources Act (No. 25 of 1999) including places and buildings of cultural and historical significance, archaeological sites, graves and burial grounds. Stone Age sites are marked by stone artefacts found scattered on the surface of the earth or that form part of the deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (ESA) (from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (from 250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (from 22 000 years ago to about 2 000 years ago). The same category of Iron

Age archaeological sites are also anticipated to be available in the project area. A detailed Heritage Impact Assessment will however be undertaken during the EIA phase.

1.10 Construction camp

The proposed powerline will require the erection of a temporary construction camp. Due to the time limits nature of this project the construction camp will also be small and will be located within the existing servitude boundaries. The EMP will include strict mitigation measures, which will manage the construction camp during construction. Eskom and the independent contractors both appoint Environmental Control Officer (ECO), who will be responsible for the implementation of these measures. Due to these mitigation measures, the presence of a construction camp is not expected to impact negatively on the Socio economic environment of the site.

1.11 Visual landscape

The visual impact of powerlines depends on the complex relationship between the visual environment (landscape), the development (object), and the observer (e.g. local residents or farmers). To further elaborate; the visual environment (landscape) is a combination of landform and land cover. It determines whether the object will be visible to observers and whether the landscape provides any significant visual absorption capacity. It also determines the extent of visual compatibility of the object with its immediate surroundings and the background to the object (Eyethu Engineers, 2000).

Numbering please

DISCUSSION OF THE PROJECT ALTERNATIVES

Introduction

The identification of alternatives is a key aspect of the success of the EIA process and was initiated at the start of this project in the scoping phase. All feasible alternatives must be fully addressed and their advantages and disadvantages compared in order to determine the best alternatives. There are however some significant constraints that have to be taken into account when identifying alternatives for a project of such a long powerline. Such constraints include financial, social and environmentally related issues that will be discussed in the evaluation of the alternatives. This section includes strategic, technical, site, route and no go option alternatives.

Strategic alternatives

As part of the planning exercise, the division of Eskom SOC Limited responsible for Transmission investigated different alternatives to the preferred powerline. They identified the preferred technical and cost effective options for the proposed development. The power line will be approximately 250 km long traversing through terrain of almost uniform environmental sensitivity. Hence, preference is given to developing a power line running directly from and to the proposed substations at Borutho and Nzhelele Sites. The shortest possible route will also ensure minimum impact on the receiving environment.

Technical and Process Alternatives

1.1.3. Overhead Powerlines

From engineering, planning and financial perspectives, overhead lines are less costly to construct than underground lines. They are also less destructive on the ground compared to underground cabling. Therefore, the preference with overhead lines is mainly on the grounds of costs and intrusive nature. Overhead lines allow high voltage operations and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air-cools the conductors that produce heat due to lost energy (Swingler *et al*, 2006). The overall weather conditions in the Limpopo Province are less likely to cause damage and faults on the proposed overhead transmission powerline. Nonetheless, if a fault occurs, it can be found either quickly by visual means using a manual line patrol or, in urgent cases, by helicopter patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days.

In terms of impacts caused by the proposed development, factors such as visual intrusion and threats to sensitive habitat are not generally the same along the whole route. Should the alignment be proposed in sensitive areas such as river crossings, the tower dressing method may be used. This would involve lowering the conductors into position using an aerial method of construction such as a helicopter, which would require little or no clearing on the ground.

1.1.4. Underground lines

Underground cables have generally been used where it is impossible to use overhead lines. This is often because of space constraints, for example, in densely populated urban areas or for sea crossings. Underground cables are oil cooled and are also at risk of groundwater contamination. Maintenance is also very difficult on underground lines compared to overhead lines. When a fault occurs in an underground cable circuit, it is almost exclusively a permanent fault due to poor visibility. Underground lines are also more expensive to construct than overhead lines. Factors that may increase the cost of an underground system include (Swingler *et al*, 2006):

- Rock Excavation;
- Installation in Pavement (Streets or Sidewalks);
- Requirements to Bore Underneath Street Crossings;
- Right of Way Acquisition Costs;
- Reactive Compensation Requirements at Substations. Underground cable is capacitive in nature and the longer the length of circuit, the more likely the need for compensation; and
- Radial Configuration of the Line. Absence of another transmission source to maintain service during an outage of the line may require installation of additional underground cable redundancy.

[Tunnel for underground cabling](#)

Design Alternatives

Tower design

There are various types of tower design that has different implication in terms of cost for implementation. The need for selection of a tower type will be determined by Eskom engineering team that will consider the tower type that is more feasible and can still be less risk in terms of collision with birds. Self supporting suspension tower is the one that will be suitable in most places of the Borutho to Nzhelele 250 km powerline and also depending on the terrain and also suggestions from different specialists.

self supporting suspension [picture](#)

Self supporting suspension is a typical of most single circuit structures in use at the time, having been developed to support Eskoms introduction of 400kv lines to the national grid. It typically carries twin Dinosaur conductor a relatively light configuration. The use of a V-string assembly allows for compaction of phase spacing which in turn results in both structural and electrical efficiency. In terms of the economical feasibility of this tower, it was found that self-supporting suspension towers are more costly compared to others towers. The impetus to opt this tower design it is expensive but does not require more land as compared to other ones, as shown on Appendix 4

Cross rope suspension tower [picture](#)

This tower is more suitable for long distance powerline whereby most part goes straight and doesn't have lost of bends and turning. This is more preferred design that is suitable for birds in relation to powerline impact on Birds. It requires a lot of land as compared to other towers.

Compact cross rope suspension tower. [picture](#)

The cross rope tower concept was modified in a unique design, which introduces an inverted delta configuration, in which all phases are approximately equally spaced. This configuration results in greater electrical efficiency over long distance links, and also enables the reduction of related substation equipment costs

Guyed Vee Suspension Tower Voltage [picture](#)

Eskom developed this structure for optimal use with the quad Zebra configuration. The guyed vee towers has one large foundation and four guys therefore four smaller foundation. Guyed vee towers provide the best protection from lightning impulses due to the ground wire and cross arm configuration. Tower cross bar helps with the live line maintenance. Problems with guyed vee towers are that they limited to relatively flat terrain.

Route Alternatives

For this study, three alternative routes are being considered each estimated to be 250km long with a 3000m wide corridor being considered. However, the final approved ~~servitude~~ corridor would be reduced to the appropriate width (55m) according to the final engineering designs, ~~and approvals by the DEA.~~

Preferred Power Line (Option 1)

The preferred powerline route starts from Borutho substation located near Mokopane. The route runs in a slightly straight alignment for about 60km. Passing areas like Luxemburg, Brilliant, Overdyk, Bochem, Schroelen, It continues with a few bends in and out of rural village settlement. Along the route, it traverses through subsistence farming areas passing a number of graveyards, schools, communities and farms. The route also traverses across streams and possible wetlands. Therefore, this corridor affects the communities of Mokopane. The line will also cut through flat topography dominated by commercial farming with a mixture of game, cattle and crop cultivation in its midsection.

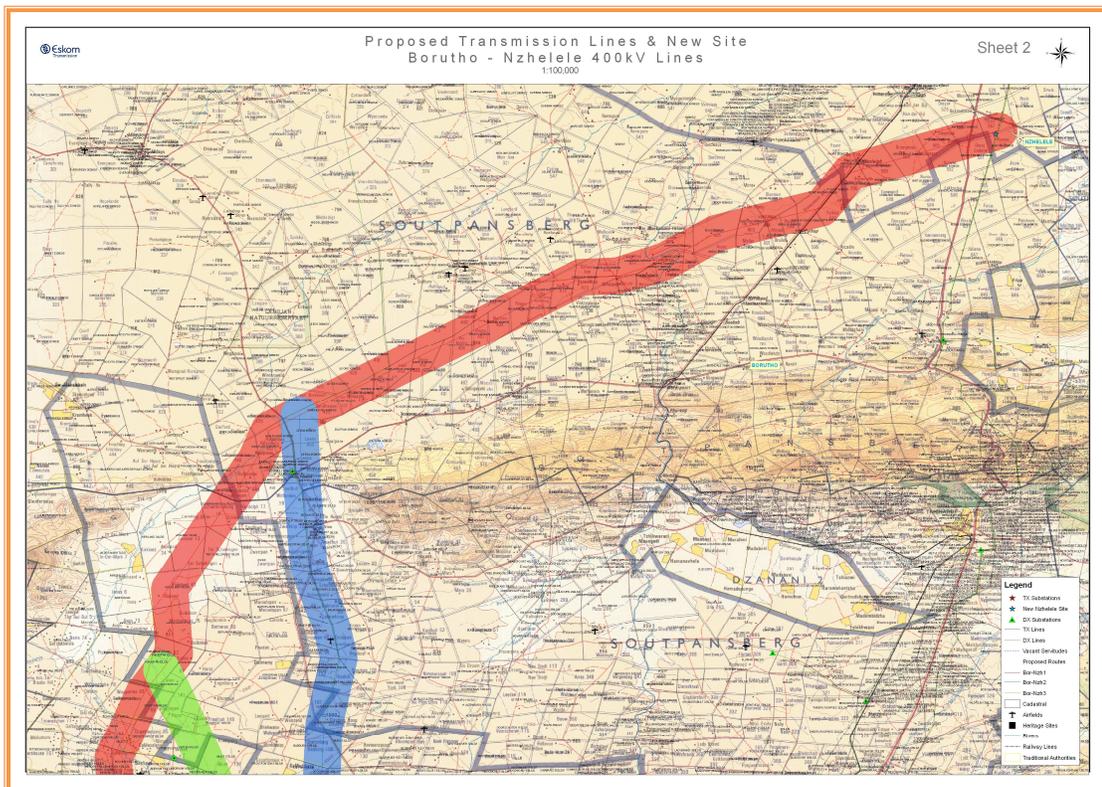


Figure 3: Continuation of 3 routes traversing through already developed project area.

Alternative Powerlines Option 2

The Alternative Route 2, (which is blue in colour as shown by the attached map Figure 3 starts from the main route or the preferred route at Ntolane Village. It will run slightly straight, bending towards and avoiding some villages. The route Option 2 is estimated to be 80km and passes through farmhouses and crossing two rivers within the corridor. There is a tarred district road, so the powerline would cross R567 Road close an existing cemetery. It bends to avoid an existing communication tower going towards Maponto village, then it re-joins the route on Option1.

Alternative Powerlines Options 3

Alternative Option 3 starts from Borutho substation and slightly bends on the right as shown on the map. It traverses into similar environment crossed by Option 1 and 2 approximately. It passes Venus village, Sefahle village, Lepotlaka village, Road 567, Maribara village and a few cemeteries as compared to Route Opton 1. Most deviations are due to avoiding environmental features and dwellings where possible. However findings of the specialist surveys will confirm what environmental sensitive features are to be avoided within the study area during the EIA Phase.

Demand alternatives

Demand can generally be defined as the activities performed by the electricity supply utility, which are designed to produce the desired changes in the load shape through influencing customer usage of electricity and to reduce overall demand by more efficient use. These efforts are intended to produce a flat load duration curve to ensure the most efficient use of installed network capacity.

By reducing peak demand and shifting load from high load to low load periods, reductions in capital expenditure (for network capacity expansion) and operating costs can be achieved. Some of the basic tools are the price signals (such as time of use tariffs) given by the utility and direct load management. This option is practised to a certain extent. No other alternative energy sources have been identified at this stage.

No-go option

The “do nothing” Alternative is the option of not undertaking the proposed development, which implies that the 400kV powerline line would not be constructed. Retention of the status quo would mean that it would not be possible to meet the growing electricity demands in the area and other surrounding towns. This option is not economically feasible because electricity users such as farmers and domestic users would be unable to avoid interruptions. Consequently, without the proposed new power line there is an increasing possibility that outages could occur, resulting in economic losses that could run into millions of rands, particularly for the various industries, farmers in the area. The ‘No Go’ option is usually considered when the proposed activity is envisaged to have such significant long-term negative environmental impacts that mitigating measures cannot ameliorate the

Based on the identified need for the proposed development to proceed and the fact that although there could be negative impacts associated with the proposed development, there will be mitigating measures to minimise or eliminate negative impacts, where possible, associated with the construction and operational /maintenance phases for power line developments. It is reasonable to indicate that the “No Go” alternative is not an option to be considered for this activity.

With reference to the above discussion, it should be noted that it is important to identify potential impacts in the early development process in order for timely influence on power alignment, the position of power line, technical designs criteria and budget allocations for effective implementation of mitigation measures.

The most prominent envisaged of the proposed activity would be the provision of electricity. Electricity supply developments are generally intended to promote economic development and improve the social welfare of communities, industries and mines. A steady growth in electricity demand is expected to continue in South Africa for some time because required electrification of housing projects and developments such roads, schools and railway lines.

[Numbering please](#)

POTENTIAL ENVIRONMENTAL IMPACTS

The environmental impacts of a project are those consequential changes in environmental parameters, in space and time, compared with what would have happened had the project not been undertaken. The table below gives a simplistic summary of the anticipated negative environmental impacts of the proposed development and mitigation measures. It must be acknowledged that the intended overview of issues does not highlight a wide range of details such as: the differences in impacts between the different phases (for example, construction, operation and closure); spatial extent and predicted lifetime of the impact. Detailed significant impacts and mitigation analyses would be presented alongside impact assessment findings and from issues raised by I&APs during the EIA phase.

Biodiversity

Biodiversity is an important environmental component. It is essential for the regulation of natural processes that support human life such as soil formation. Vegetation will be cleared for the construction camp as well as for the servitude; this will result in loss of species that depend on the grassland. There will be habitat loss and degradation as a result of the vegetation clearance and natural environmental processes such as soil erosion will be affected. As shown in the plates above (description of affected environment chapter) the proposed site and alternatives do not have much vegetation cover, hence vegetation clearance will be minimal.

As a result of the noise during construction activities, animal species may migrate in search of other habitat; this may disturb the ecosystem in the area. In addition, birds may be electrocuted by power line in three possible ways. The possible ways are: simultaneously touching two live wires and simultaneously an energised wire and any other piece of equipment on a pole or tower that is bonded to the earth through a ground wire.

Land use

Current or future land uses may be affected due to the proposed construction of the power line. Powerlines usually run across various property boundaries and livestock camps. Boundary fences may be damaged during construction or gates may be left open resulting in the unplanned integration of livestock. The land earmarked for the proposed development is currently mine land and other areas are farmlands and are used for subsistence farming thus the construction of the power line will result in changes of the land use.

Visual impact

All construction activities would involve the use of variety construction equipment, stockpiling of soils, materials and other visual signs. While evidence of such will be visual to the farm owners and others in the nearby vicinity, such visual disruptions will be short term and limited to the construction phase only.

Archaeological/heritage resources

Cultural heritage resources can be broadly defined as physical features, both natural and man-made, which are associated with human activity. Heritage resources would include both tangible and intangible resources such as archaeological resources, palaeontological remains, meteorites, historical sites and beliefs systems, religious practices, ideas and oral traditions respectively. The National heritage Resources Act (Act No.25 of 1999) regards the following as heritage resources:

- Places, building structures and equipment,
- Places to which oral traditions are attached
- Places which are associated with living heritage
- Historical settlements and townscapes
- Landscapes and natural features
- Geological sites of scientific or cultural importance
- Graves and burial grounds.

Any development that alters the status quo has the potential to impact upon any of the listed heritage resources particularly during construction phase.



Plate 7: View of cemeteries at the Sefahlane area.

Water resources

Construction grading and utility excavations for the pylon installations would increase the sediment load in storm water during rainfall events. Sediment sources created during construction include soil stockpiles and soil tracked across construction areas, debris resulting from the installation of electric pylons foundation. These sediment loads could be deposited into the water bodies close to the site.

Due to the vast spatial extent of power line developments, it is often impossible for the power line corridor not to cross over water bodies such as rivers and wetlands. Construction activities within the vicinity of these water bodies create problems if not taken care of to prevent them. These range from erosion into rivers, which creates water pollution to draining of wetlands in order to give way for the construction equipment. Some of the construction equipment could be located within floodplains and/or within 1:50 000 year flood lines. The combination of all these presents threat to water resources.

Soil

Soil has an important role in the environment as it supports biodiversity and provides for a physical base for plants, buildings and other infrastructure. Soil structure will be disrupted during the digging of foundation for the new, pylons for the power line and during excavation works.

Continuous movement of heavy machinery to and from the construction site will result in soil compaction thereby reducing its capacity to hold water which will in turn result in increased runoff during the rainy season. Fuel leakages and accidental oil spills from construction vehicles and machinery have the capability of contaminating soil once they infiltrate into the soil, this indirectly also affects plant growth in the near future.

Mixing of cement on unpaved surfaces during construction will result in change of soil chemistry, such as changes in the alkalinity/ acidity of the soil, which will reduce soil fertility hence indirectly affecting flora. Such an effect will be limited to the construction phase and it will be of short duration and it will be limited to the construction site. The significance of the impact can be avoided if mitigation measures are implemented.

Noise

Noise levels are expected to increase as a result of various construction activities. The noise will be limited to the construction phase.

Air quality

The quality of the air will be impacted on and the sources are likely to emanate from: excessive emission of exhaust gases from construction vehicles, dust during excavation works, digging of foundations, stock piled soils and gravel surface access roads.

Health and safety

If construction workers are exposed to excessive and continuous levels of construction-related dust and noise their health could be affected. Such exposure to dust may aggravate conditions such as asthma. Exposure to excessive levels of noise may result in temporary deafness, shock and discomfort.

Infrastructure and services

Powerlines often intersect or are aligned in close proximity to existing infrastructure and services such as roads, telecommunication lines, boundary lines and existing powerlines. There could be temporary disruption of services during the construction of the power line.

Socio economic

Employment opportunities may arise during the construction phase especially for activities that do not require the use of machinery. This will have a positive impact on the local community especially if provision of appropriate training and skills development is implemented. Other potential social impacts associated with the proposed development will emanate from safety and security concerns of the affected communities from the uncontrolled influx of migrant workers during the construction phase of the project. This is especially so given the fact that the project area is sparsely populated and contractors may have to bring in labour from outside the immediate project area.

Due to the specialised and technical complexity of the proposed development, it is unlikely that local service providers qualified to undertake the job will be found within the project area. As such, contractors may have to be retained from other areas either nationally or even internationally.

Topography

The topography of the area will determine the level of visual exposure of the power line. The power line will be visible from a distance if it is located on an elevated landscape. There are other linear developments already in the vicinity of the project area and as such, the proposed development will conform to some of these developments.

10.13. Avifauna

The construction of the Borutho to Nzhelele 400kv Powerline in the Limpopo could potentially have a very negative effect on birds in the area, especially the Endangered Cape Vulture. The birds are likely to utilise the powerline for perching and roosting, which will place them at risk of collision with the earth wires. Eskom has got different bird nesting guidelines, which will be used on the construction of the powerline as well with the Management plan, which will be used. The purpose of the bird nesting guideline is to use on ways of dealing with the phenomenon in a manner that will reflect Eskom's stance on the environment as well as to prevent distribution of power to customers and the guidelines explain that a bird incident happens when a bird physically strikes either the overhead conductor or overhead ground wire of a powerline. In case of transmission lines, the overhead ground wire of a powerline. In case of distribution, the overhead ground wire is usually involved. It is generally accepted that birds usually avoid the highly visible bundled conductors but often fail to see the thin ground wire. (refer to in Appendix 6).

ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES

Measuring environmental impacts

There are guidelines and universal formulas developed for assessing or measuring identified or anticipated impacts on a given development's receiving environment. This study would apply such standards. There are at least seven generic rating scales that are used into this EIA study. These are:

- Duration
- Extent
- Intensity
- Significance
- Status of impact
- Probability and
- Degree of confidence

1.1.5. Duration

Table 8: Period of Impact Rating.

RATING	DESCRIPTION
Short term	0-5 years
Medium term	5-15 years
Long term	Where the impact will cease after the operational life of the activity
Permanent	The impact will occur even after the operational and decommissioning of the project has occurred.

1.1.6. Extent

Extent defines the physical or spatial scale of particular impact on the receiving environment.

Table 9: Extent of Impact Rating.

RATING	DESCRIPTION
Local	Limited to the site and its immediate surroundings
Regional	Impact extends beyond site boundary.
National	Impact is widespread, it can be Countrywide

1.1.7. Intensity

Evaluation of intensity is used to measure or establish whether the impact would be destructive or the level of destruction particular impacts will have on a given environment.

Table 10: Impact Intensity Rating.

RATING	DESCRIPTION
Low	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.
Medium	Where the affected environment is altered but natural, cultural and social functions and processes continue, although in a modified way.
High	Where natural, cultural and social functions or processes are altered to the extent that they will temporarily or permanently cease.

1.1.8. Significance

Significance scale refers to threshold of the importance of a particular impact on the receiving environment.

Table 11: Significance Rating.

RATING	DESCRIPTION
Very high	Impacts could either of high intensity at a regional or national level and last for a long time
High	These impacts could of high intensity at a regional level and last for a medium term or they could be of high intensity at a national level and go on for a short duration.
Medium	Impacts could be either of high intensity at a local level and endure in the medium term or of medium intensity at a regional level in the medium term.
Low	Impacts could both be of low intensity at a regional level and endure in the medium term or of low intensity at a national level in the short term.

1.1.2

1.1.9. Status of Impact

The status of an impact is used to describe whether the impact would have a negative, positive or no effect on the receiving environment.

1.1.10. Probability

Probability describes the likelihood of the impact occurring during the proposed development, after the development or during the operational phase of the development.

Table 12: Impact Probability Rating.

RATING	DESCRIPTION
Improbable	The possibility of the impact occurring is very low or unlikely
Probable	There is a possibility that the impact will occur.

Definite	The impact will definitely occur
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1.1.11. Degree of confidence

Degree of confidence measures the level of reliability of the impact predictions subject the availability of relevant information.

Table 13: Degree of Confidence.

RATING	DESCRIPTION
High	Greater than 70% sure of impact prediction.
Medium	Between 35% and 70% sure of impact prediction.
Low	Less than 35% sure of impact prediction.

11 ENVIRONMENTAL IMPACTS ASSESSMENT AND MITIGATION MEASURES

This section represents methodology used and adopted in assessing the identified or anticipated impacts on the proposed powerline's receiving environment. The section then later continues to the actually assessment on anticipated impact and the mitigation measures.

Measuring Environmental Impacts Assessment Methodology

There are guidelines and formulas developed for assessing or measuring identified or anticipated impacts on a given development's receiving environment. There are at least seven generic rating scales that are used into this EIA study. These are:

- Duration
- Extent
- Intensity
- Status of impact
- Probability and
- Degree of confidence
- Significance

4.4.31.1.2 Duration

Table 0.1: Period of Impact Rating.

RATING	DESCRIPTION
Short term	0-2 years
Medium term	2-15 years
Long term	Where the impact will cease after the operational life of the activity
Permanent	The impact will occur even after the operational and decommissioning of the project has occurred.

4.4.41.1.3 Extent

Extent defines the physical or spatial scale of particular impact on the receiving environment.

Table 0.2: Extent of Impact Rating

RATING	DESCRIPTION
Local	Limited to the site and its immediate surroundings
Regional	Impact extends beyond site boundary.
National	Impact is widespread, it can be Countrywide

4.1.51.1.4 Intensity

Evaluation of intensity is used to measure or establish whether the impact would be destructive or the level of destruction particular impacts will have on a given environment.

Table 0.3: Impact Intensity Rating.

RATING	DESCRIPTION
Low	Where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.
Medium	Where the affected environment is altered but natural, cultural and social functions and processes continue, although in a modified way.
High	Where natural, cultural and social functions or processes are altered to the extent that they will temporarily or permanently cease.

4.1.61.1.5 Status of Impact

The status of an impact is used to describe whether the impact would have a negative, positive or no effect on the receiving environment.

4.1.71.1.6 Probability

Probability describes the likelihood of the impact occurring during the proposed development, after the development or during the operational phase of the development.

Table 0.4: Impact Probability Rating.

RATING	DESCRIPTION
Improbable	The possibility of the impact occurring is very low or unlikely
Probable	There is a possibility that the impact will occur.
Definite	The impact will definitely occur

4.1.81.1.7 Degree of confidence

Degree of confidence measures the level of reliability of the impact predictions subject the availability of relevant information.

Table 0.5: Degree of Confidence.

RATING	DESCRIPTION
Low	Less than 35% sure of impact prediction.
Medium	Between 35% and 70% sure of impact prediction.
High	Greater than 70% sure of impact prediction.

4.1.91.1.8 Significance

Significance scale refers to threshold of the importance of a particular impact on the receiving environment.

Table 0.6: Level of significance

RATING	DESCRIPTION
Low	Impacts could both be of low intensity at a regional level and endure in the medium term or of low intensity at a national level in the short term.
Medium	Impacts could be either of high intensity at a local level and endure in the medium term or of medium intensity at a regional level in the medium term.
High	These impacts could of high intensity at a regional level and last for a medium term or they could be of high intensity at a national level and go on for a short duration.
Very high	Impacts could either of high intensity at a regional or national level and last for a long time

4.1.101.1.9 Degree to which the impact can be reversed

Table 0.7: Degree of Reversibility.

RATING	DESCRIPTION
Low	Less than 35% sure of impact prediction.
Medium	Between 35% and 70% sure of impact prediction.
High	Greater than 70% sure of impact prediction.

4.1.111.1.10 Degree to which the impact may cause irreplaceable loss of resources

Table 0.8: Degree the impact may cause irreplaceable loss of resources

RATING	DESCRIPTION
Low	Less than 35% sure of impact prediction.
Medium	Between 35% and 70% sure of impact prediction.
High	Greater than 70% sure of impact prediction.

4.1.121.1.11 Degree to which the impact can be mitigated.

Table 0.9: Degree to which the impact can be mitigated

RATING	DESCRIPTION
Low	Less than 35% sure of impact prediction.
Medium	Between 35% and 70% sure of impact prediction.
High	Greater than 70% sure of impact prediction.

Cumulative Impact Assessment

The proposed development of powerline and substation works will not have significant cumulative impacts, considering the current status of environment at the proposed areas and the other activities within the area (such as agriculture). The identified impact for the proposed powerline and substation works are direct as opposed to be indirect. Impacts will be observed as development occurs. No climatic change effects are expected from the development, and in time lag. If impacts such as fragmentations of environment and others occur, they have likelihood to occur because of other activities in the area such as mining in and around the substation in Bokmakierie.

Impact Assessment

This impact assessment section assesses the potential impacts towards the receiving environment of the proposed development. The section is separated according to the phases that will happen for the project which are construction, operation and decommission. Construction and decommission is handled together as they would have similar impacts in most cases and where they would be different, the sections are separated.

Air Quality

The quality of the air will be impacted on during construction and decommissioning phases only. The sources are likely to emanate from: excessive emission of exhaust gases from construction vehicles, dust during excavation works, digging of foundations, stock piled soils and gravel access roads. The dust may affect animals, vegetation and people on site and the surroundings. Please refer to impact for vegetation and flora for details of dust generation.

Table 0.10: Rating matrix for air quality impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Short term
Intensity	Low
Probability of occurrence	Definite
Degree of confidence	Medium
Status	Negative
Significance	Medium- Low
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Low

Degree to which the impact can be mitigated	High
Mitigation measures:	<p>Mitigation measures will include the following but not limited to:</p> <ul style="list-style-type: none"> • No open fires will be permitted on site. • Burning of materials, grass and refuse will not be permitted on site. • Construction machinery and vehicles will be maintained and serviced regularly. • Speed limits of about 40km/hr will be enforced and maintained on the construction site.

Soil

Soil structure will be disrupted during the digging of foundation for the new poles and during excavation works associated with the development. Continuous movement of heavy machinery such as cranes used to erect the towers to and from the construction site will result in soil compaction thereby reducing its capacity to hold water. This will result in increased runoff during the rainy season.

Fuel leakages and accidental oil spills from construction vehicles and machinery have the potential of contaminating soil. This indirectly affects plant life and other organism that reside in the soil in the immediate and long term future. Mixing of cement for the foundations on unpaved surfaces during construction will result in change of soil chemistry, particularly changes in the alkalinity or acidity of the soil. This will result in reduced soil fertility thereby indirectly affecting flora and consequently the fauna that depend on both the soil and the flora. Such an effect will be limited to the construction phase and it will be of short duration limited to the construction site. The significance of the impact can be avoided if mitigation measures are implemented. Please refer to the Environmental Management Programme (EMPR) for mitigation measures Attached as Appendix 1.

Table 0.11: Rating matrix for soil impacts in the construction and operational phase

Criteria	Rating
Extent	Local
Duration	Long term
Intensity	Low
Probability of occurrence	Probable
Degree of confidence	Medium
Status	Negative
Significance	Low
Degree to which the impact can be reversed	Low

Degree the impact may cause irreplaceable loss of resources	Medium
Degree to which the impact can be mitigated	Medium
Mitigation measures	<p>Mitigation measures will include the following but not limited:</p> <ul style="list-style-type: none"> • Inspection of equipment for fuel leaks prior to use on construction sites and implement inspection schedules to prevent contamination of soil and ground by fuel spills. • Cement mixing should be done on impervious surfaces and not directly on the soil. • Measures to prevent soil erosion should be implemented such as design of storm water drainage system in order to control the volume, speed and location of runoff. • No maintenance of vehicles on site will be permitted.

Grasses and Forbs were also identified along routes as specified on the specialist report of Bredenkamp. The grasses identified have no significance importance to South Africa, while forbs were weed. No trees were identified and red data species were identified. On the entire proposed routes for the lines the natural vegetation was totally transformed, and there is no sign of the original grassland and hence different impact of the proposed development for vegetation will include:

Destruction of vegetation in the footprint of tower structures

This may only be an issue if the tower is situated within a sensitive habitat or within a species population of special concern. The potential magnitude of this impact is minor due to the small size of the pylons relative to the overall extent of the natural vegetation. It will have an impact at the scale of the proposed infrastructure, which is local. The duration of the impact will be long term and the probability of occurrence is definite.

Disturbance of natural vegetation through trampling, compaction by motor vehicles

Destruction of vegetation may occur around construction sites.

Impacts on the movement and migration of animal species

This will occur if the infrastructure imposes an insurmountable barrier to movement. Consequences of this may include:

- Impaired gene flow within fragmented populations;
- Breakdown of ecological relationships, e.g. pollinator-plant; and
- Breakdown of migration routes.

Soil erosion, increase in silt loads and sedimentation

This will occur during soil disturbance and increased run-off from compacted areas during construction phase and decommission. Where there are erodable soils, it is possible that construction of infrastructure will result in local exposure of the soil surface or increase in runoff of impermeable surfaces.

Increased noise pollution during construction

This may affect animals in the vicinity causing stress in individuals of various animal species, which may result in them moving away or cause changes in behavior or causing some territorial animals to be displaced.

Increased risk of veld fires

There is a higher risk of veld fires around construction sites due to the use of fires for cooking and warmth by construction workers.

Table 0.12: Rating matrix for vegetation impacts in the construction phase and operation

Criteria	Rating
Extent	Local
Duration	Long
Intensity	High
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium High
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Medium-High
Degree to which the impact can be mitigated	High
Mitigation measures	Mitigation measures will include the following but not limited to: <ul style="list-style-type: none"> • Contractor to avoid unnecessary removal of vegetation cover

	<ul style="list-style-type: none"> • Confine impacts only to the development area. • Limit movement of vehicles and personnel through areas of sensitivity. • Grassland occurring on and near construction site should be retained where possible in order to assist in retarding erosion • No fire and cooking allowed or designated areas.
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Avifauna

During construction there is possibility to destruct habitats of birds with the construction of access roads, the clearing of servitudes. Birds also pose threat of causing electrical faulting during operation.

Table 0.13: Rating matrix for avifauna impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Short
Intensity	High
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	Low
Mitigation measures	Mitigation measures will include the following but not limited to: Confine impacts only to the development area.

The avifauna will be impacted by the proposed powerline and substation works during operation as the birds will pose threats to be electrocuted on towers and at the substation station, and colliding with the actual powerlines, which are earth wires and conductors.

Table 0.14: Rating matrix for avifauna impacts in the operational phase

Criteria	Rating
Extent	Local

Duration	Long
Intensity	High
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium High
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Medium
Degree to which the impact can be mitigated	Medium
Mitigation measures	Mitigation measures will include the following but not limited to: The line should be fitted with the standard Eskom "bird Perch" on the top of all poles in order to provide a safe perching space. Hunting will not be permitted

Ecology

Ecology is an important environmental component. It is essential for the regulation of natural processes that support human life such as soil formation. Vegetation will be cleared for the construction camp as well as for the servitude; this will result in loss of species that depend on the grassland. There will be habitat loss and degradation as a result of the vegetation clearance and natural environmental processes such as soil erosion will be affected. As shown in the plates above (description of affected environment chapter) the proposed site and alternatives do not have much vegetation cover, hence vegetation clearance will be minimal.

As a result of the noise during construction activities, animal species may migrate in search of other habitat; this may disturb the ecosystem in the area. In addition, birds may be electrocuted by power line in three possible ways. The possible ways are: simultaneously touching two live wires and simultaneously an energised wire and any other piece of equipment on a pole or tower that is bonded to the earth through a ground wire.

Table 0.15: Rating matrix for socio-economic impacts in the operational phase

Criteria	Rating
Extent	Local

Duration	Long
Intensity	High
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium High
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Medium-High
Degree to which the impact can be mitigated	High
Mitigation measures	<p>Mitigation measures will include the following but not limited to:</p> <ul style="list-style-type: none"> • Contractor to avoid unnecessary removal of vegetation cover • Confine impacts only to the development area. • Limit movement of vehicles and personnel through areas of sensitivity. • Grassland occurring on and near construction site should be retained where possible in order to assist in retarding erosion

Wetland and Riparian areas

Sivest on Appendix xxx says construction grading and utility excavations for the pylons would increase the sediment load in storm water during rainfall events. Sediment sources created during construction include soil stockpiles and soil tracked across construction areas, debris resulting from the installation of electric pylons foundation. These sediment loads could be deposited into the water bodies close to the site. Due to the vast spatial extent of power line developments, it is often impossible for the power line corridor not to cross over water bodies such as rivers and wetlands. Construction activities within the vicinity of these water bodies create problems if not taken care of to prevent them. These range from erosion into rivers, which creates water pollution to draining of wetlands in order to give way for the construction equipment. Some of the construction equipment could be located within floodplains and/or within 1:50 year flood lines. The combination of all these presents threat to water resources.

Table 0.16: Rating matrix for water resources impacts in the construction and operational phase

Criteria	Rating
Extent	Local
Duration	Short
Intensity	High
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium-High
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Medium
Degree to which the impact can be mitigated	Medium
Mitigation measures	<p>Mitigation measures will include the following but not limited to:</p> <ul style="list-style-type: none"> • Construction to take place during dry season • Construction should avoid sedimentation • Access road to be sealed with dust suppressant • Develop wetland and vegetation habitat biomonitoring programme • Gabion structures and giofibres to be used

Land Use

The project area is predominantly a commercial farming area with a mixture of game, cattle and crop cultivation both dry and rural residential areas form part of the land us. Current or future land uses will be affected due to the proposed construction of the powerline. Relatively some land portions within the project area can be classified as degraded, and also some sections have been disturbed by past impacts, (e.g. access road construction of substations, boundary fences line, distribution powerlines, etc) especially the areas where there are human settlements such as Jupiter, Venus, sefahlane, Luxnburg and many other areas. Most of the area is dominated by vast open areas of natural vegetation, and mielie crops.

Table 0.17: Rating matrix for land use impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Long term
Intensity	High
Probability of occurrence	Definite

Degree of confidence	Medium
Status	Negative
Significance	High
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	High
Mitigation measures	Mitigation measures will include the following but not limited to: <ul style="list-style-type: none"> • Confine impacts only to the development area.

Visual Impact

The erection of power lines would involve the digging of foundations, which would require soil to be excavated. The excavated soil will have to be stockpiled. While evidence of such will be visual to the farm owners and others in the nearby vicinity, such visual disruptions will be short term and limited to the construction phase only. The transmission suspension towers are considered for 400kv especially the Self Supporting; this structure is typical of most single circuit structures and typical carries twin Dinosaur conductor, a relatively light configuration

Table 0.18: Rating matrix for visual impacts in the construction and operational phase

Criteria	Rating
Extent	Local
Duration	Short term
Intensity	Low
Probability of occurrence	Probable
Degree of confidence	Medium
Status	Negative
Significance	Low to Medium
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	Medium
Mitigation measures	Mitigation measures will include the following but not limited to: <ul style="list-style-type: none"> • Confine impacts only to the development area.



Archaeological / Heritage Resources

The proposed powerline will go through disturbed areas due to previous land uses such as existing powerline, railway line activities and residential use. Under such disturbed conditions the chances of archaeological material preserved in situ are unlimited as stated by the Heritage Specialist report (Appendix 5A).

Impact will include:

- Impact on fossils
- Impact on late stone age and possible iron age sites

Table 0.19: Rating matrix for archaeological impacts in the operational phase

Criteria	Rating
Extent	Local
Duration	Short term
Intensity	High
Probability of occurrence	Definite
Degree of confidence	Medium
Status	Negative
Significance	Medium-Low
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	High
Degree to which the impact can be mitigated	High
Mitigation measures	Mitigation measures will include the following but not limited to: <ul style="list-style-type: none"> • If during construction, the Contractor unearths archaeological resources or unmarked graves, all work will stop immediately and Eskom Holdings SOC Limited will be notified who will in turn inform an Archaeologist for further action on what should be done.

Noise

Noise levels are expected to increase as a result of various construction activities and use of heavy machinery. The noise will be limited to the construction phase. . Many people will be affected by construction activities as the proposed powerline routes are in residential and in farms from dense population are

Table 0.20: Rating matrix for noise impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Short term
Intensity	Low
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Low
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	High
Mitigation measure	Mitigation measures will include, but not limited to: <ul style="list-style-type: none"> Working hours will be limited to 6:00am -17:00pm strictly from Monday-Friday. Affected residents will be notified of excessive noisy activities (if any are going to take place). Open liaison channels with affected community will be developed in order to facilitate their concerns and complaints about the construction activities.

Health and Safety

The construction workers will be exposed to excessive and continuous levels of construction-related dust and noise, without protective measure, which may affect their health. Mitigation measure such as Personnel Protective Equipment (PPE) will assist in reducing health impacts. Exposure to dust may aggravate conditions such as asthma, while exposure to excessive levels of noise may result in temporary deafness, shock and discomfort.

Other impact will include:

- Impact of electromagnetic fields on human beings

- Fire hazards pose a threat to human health and safety

Table 0.21: Rating matrix for health and safety impacts in the construction and operational phase

Criteria	Rating
Extent	Local
Duration	Short term
Intensity	Low
Probability of occurrence	Definite
Degree of confidence	High
Status	Negative
Significance	Medium
Degree to which the impact can be reversed	Low
Degree the impact may cause irreplaceable loss of resources	Medium
Degree to which the impact can be mitigated	High
Mitigation measures	<p>Mitigation measures will include, but not limited to:</p> <ul style="list-style-type: none"> • All workers will be fully informed about the Health and Safety Policy by the contractor • All workers will wear PPE at all times. • No worker shall act in any way that may pose risk to other workers.

Socio Economic

Employment opportunities will rise during the construction phase. Local unskilled people may be hired for unskilled labour. However in most instances, the contractor brings their own workforce. This may bring positive impact on the local community especially if provision of appropriate training and skills development is implemented.

Other potential social impacts associated with the proposed development will emanate from safety and security concerns of the affected communities from the uncontrolled influx of migrant workers during the construction phase of the project. This is a highlight because the project area is sparsely populated and contractors may have to bring in labour from outside the immediate project area.

Impacts would include:

- Employment of local labour (South African citizens and people local to the area) and preference given to a local contractor

Table 0.22: Rating matrix for economic impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Short
Intensity	High
Probability of occurrence	Probable
Degree of confidence	Low
Status	Positive
Significance	Low- Medium
Degree to which the impact can be reversed	Medium
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	Does not require mitigation
Mitigation measures	<ul style="list-style-type: none"> • There are no mitigation measures as the proposed development has positive socio-economic impact • Where possible, hire local people.

Economic impacts will include:

- Employment of local labour (South African citizens and people local to the area) and preference given to a local contractor
- National and provincial importance of project in terms of promoting economic growth in the region and South Africa

Table 0.23: Rating matrix for economic impacts in the operational phase

Criteria	Rating
Extent	Local
Duration	Short
Intensity	High
Probability of occurrence	Probable
Degree of confidence	Low
Status	Positive
Significance	Medium

Degree to which the impact can be reversed	High
Degree the impact may cause irreplaceable loss of resources	Low
Degree to which the impact can be mitigated	Does not require mitigation
Mitigation measures	<ul style="list-style-type: none"> • There are no mitigation measures as the proposed development has positive socio-economic impact, the development is supported. • Where possible, hire local people.

Social impacts

Social impact will include

- Immigration of construction workers may lead to social disruption, increased crime, sexually transmitted diseases.
- The social routine and social networks may be disrupted during the construction process.
- Road traffic safety, particularly relating to construction traffic.

Table 0.24: Rating matrix for social impacts in the construction phase

Criteria	Rating
Extent	Local
Duration	Short
Intensity	High
Probability of occurrence	Probable
Degree of confidence	Low
Status	Positive
Significance	Low- Medium
Degree to which the impact can be reversed	Medium
Degree the impact may cause irreplaceable loss of resources	Low

Degree to which the impact can be mitigated	Does not require mitigation
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Summary of key findings of EIA

All identified impacts will be evaluated with regards to their significance as illustrated in Table 12.1.

Table 0.254: Summary of Impacts

ISSUE	DETAILS	PHASE OF CONCERN	POTENTIAL SIGNIFICANCE OF IMPACT	
			Before mitigation	After mitigation
1. NATURAL ENVIRONMENT				
1.1 Erosion	Erosion on access roads may become a problem.	Construction & Operation	Medium low	Low
1.2 Importation of alien vegetation	Importation of alien vegetation through building materials	Construction	Medium High	Low
1.3 Impact on flora	General impacts on flora.	Construction & Operation	Medium	Medium Low
1.4 Impact on fauna	Impacts on the natural fauna in the area	Construction & Operation	Medium	Low
1.5 Impacts on Avifauna (birds)	Impacts on birds.	Operation	High	Low
1.6 Impact of construction camps	The construction camps may have an impact on the natural environment	Construction	Potentially High	Moderate to low
1.7 Impact on ecology	Disturbance on ecological habitats	Construction and Operation	Medium High	Medium
2. AESTHETICS				
2.1 Visual impact	Visual impacts will be significant in the local area	Operation	Low to Medium	Low
2.2 Sense of Place	Negative impact on the aesthetic qualities associated with the landscape in the project area in the vicinity of the powerline	Operation	Low to Medium	Low to Medium
3. WELL BEING				
3.1 Dust & Noise (within plant area)	Dust & noise control during construction	Construction	Low	Negligible
3.2 Corona noise	The effect of the corona (low "buzzing" noise) may be noticeable in properties immediately adjacent to the servitude.	Operation	Low	Negligible
3.3 Electro-magnetic fields	Impact of electromagnetic fields (EMFs) on animals, people and vegetation	Operation	Low	Low

3.4 Fire hazard	The construction and operation of the powerline may alter the occurrence and management of fires in the area. The change in the nature of fire hazards and events can have safety, economic and ecological implications.	Operation & Construction	High	Medium - Low
4. LAND ISSUES				
4.1 Property value reduction	Negative impact on property values	Operation	Medium (perceived)	Low (positive)
5. SOCIAL				
5.1 Disruption of social networks and daily movement patterns	The social routine and social networks may be disrupted during the construction process.	Construction	Low	Low
5.2 Location of construction camps	The establishment of construction camps	Construction	Potentially High	Potentially low (positive)
5.3 Gravesites	Protection of gravesites, disinterment of graves	Construction	Potentially high	Low
5.4 Traffic Safety	Road traffic safety, particularly relating to construction traffic.	Construction	Low	Low
6.FARMING RELATED ISSUES				
6.1 Access to properties	The creation of new or improved access to properties, for access to the power line, brings potential associated issues that need to be considered.	Construction & Operation	Medium to High	Low
6.2 Access roads	The physical creation and use of new roads, or increased use of existing roads will also have associated impacts	Construction & Operation	Potentially High	Medium to Low
6.3 Loss of agricultural potential	Restrictions on land use and activities will impact on the agricultural potential of the land.	Construction & Operation	Medium	Medium
6.4 Season for construction activities	Certain activities (construction and operation) may have greater impacts on the environment and agricultural activities at certain times of the year.	Construction	Medium to Low	Low
7. CULTURAL AND ARCHAEOLOGICAL SITES				
7.1 Palaeontological Sites	Impact on fossils.	Construction	Negligible	Negligible

7.2 Archaeology	Impact on late stone age and possible iron age sites.	Construction	Medium to Low	Low
8. CONSTRUCTION CAMP ISSUES				
8.1 Immigration of construction workers	Immigration of construction workers may lead to social disruption, increased crime, sexually transmitted diseases.	Construction	Medium to high	Medium to low
9. ECONOMIC				
9.1 National and Provincial Impact	National and provincial importance of project in terms of promoting economic growth in the region and South Africa	Operation	High (positive)	High (positive)
9.2 Local Benefits	Economic benefits that the power line will bring to the mine	Construction & operation	Low to Medium (positive)	Medium (positive)
9.3 Job Creation	Employment of local labour (South African citizens and people local to the area) and preference given to a local contractor	Construction & operation	Low to Medium (positive)	Medium (positive)
10. Wetlands and Riparian areas				
10.1 Disruption of hydrological integrity	The proposed development will impact on hydrological integrity of wetland areas on site	Construction & operation	Medium	Medium- Low

AUTHORITY CONSULTATION AND PUBLIC PARTICIPATION

Introduction

A public participation as required by DEA was carried out the details of public participation are as follows. The public is classified as a group whose interest may be affected positively or negatively by the proposal of an activity or project and who are concerned with the proposal or activity and its consequences. The public should be adequately engaged in processes that affect their biophysical, social, cultural and economic environment. The increasing degree of decentralization in decision making and the growing influence of NGO, community based organisations for example in Bookmarie where the substation the farm is owned the community, and the private sector has increased opportunities for this.

For the different levels of success-achieved thus far in the process of public participation many different perceptions exist with regard to the value it adds and its effectiveness. To ensure an effective process the objectives with regards to the process should be clearly be defined as well as partakers responsibility, appropriate approaches and techniques. The level of engagement considers the social profile of stakeholders, context related issue literacy)ad spatial scale of the activity.

Public Participation Process (PPP) is a cornerstone of any EIA. It is an integral requirement of the National Environmental Management act (Act 107 of 1998). The nature and manner in which the public participation process (PPP) should take place is governed by Chapter 6 of the Environmental Impact Assessment Regulations (GN No. R.543 of 02 August 2010). This chapter outlines the PPP should be advertised on site and in the media, the requirement of maintaining a register of Interested and affected parties (IAPs) and the entitlement of Registered IAPs to comment on written submissions to the Decision- Making Authority. The process followed during the public participations has taken into account all aspects of public participation as stipulated in legislation.

Public Participation Process

The principles of the National Environmental Management Act (NEMA) govern many aspects of EIA'S, including public participation, including the provision of sufficient and transparent information on an ongoing basis to the interested and affected parties to allow to comment.

The PPPs primarily based on two factors, firstly the ongoing interaction with the environmental specialist and the technical teams in order to achieve integration of environmental assessment, technical assessment and public participation throughout. Secondly to obtain the bulk issues to be addressed early on in the process, with the latter half of the process designed to provide environmental and technical evaluation of these issues. These findings are presented to interested and affected parties for verification that their issues have been captured and for further comment.

Providing Interested and Affected Parties (I&APs) with opportunity to express their concerns and/or views on issues relating to a proposed development is one of the aims of ENVIRONMENTAL IMPACT ASSESSMENT, as mandated by best practice and the regulations, as it means of focusing on the relevant issues to ensure that the concerns of the IAPs are addressed, as well as ensuring that the environmental report deals with those identified issues and is thus useful to the decision maker whose obligation is to review the report and either authorise or reject the application.

1.1.12. Objectives of Public Participation

The public participation process is designed to provide and accessible information to interested and affected parties (IAPs) in an objective manner to assist them:

- During the Impact Assessment Phase:
 - Verify that their issues have been considered by the specialist and technical investigations
 - Comment on the findings of the EIA

1.1.13. Press Advertising

In accordance with the requirements pertaining to advertising as detailed in the Regulations, on site notices, press advertisements, sending emails and registered letters will utilised to bring the proposed activity to the attention of IAPs..

- On 15 March 2012 on site notices were erected primarily on the main transportation routes adjacent to the proposed route alignment, the substations and also at the local shops (Appendix 3).

Public review of Draft ENVIRONMENTAL IMPACT ASSESSMENT Report

The draft ENVIRONMENTAL IMPACT ASSESSMENT Report will be sent to different departments and posted on different public areas for review and commenting by the key stakeholders and the I&APs from the..... I&APs will be notified with posted letters on the same day. The reports will be sent to:

- Limpopo Farmers Union.
- Aganang Municipality,
- Blouberg Municipality
- Makhado Municipality
- Mogalakwena Municipality
- Molemole Municipality.
- Heritage Resource Agency (Lihra)

- Department of Agriculture, Forestry and Fisheries
- Limpopo Department of Environment Agriculture and rural Development
- Department of Water Affairs

Public meetings

I&APs will be invited with registered letters, direct invitations through the local Councillors and community leaders and emails for Public meetings. The public meetings for the project will be held from the week of **November 2012**. All samples have been attached as appendices as follows:

- Appendix 3: List of registered IAPs so far.

Issues and Response Report

Government Regulation 543, Section 56, dictate that comments received from IAPs should be kept and response thereof recorded. Appendix 3 presents a comments sheet, which will be attached with comments.

Conclusions drawn from the EIA process

During the course of the EIA investigation, specialist input was obtained for all aspects of the proposed transmission power line along with the associated impacts on the receiving environment. Specialist assessment of route alternatives along with a comparative assessment of specialist findings helped elucidate the preferred route alternatives from a purely specialist perspective. The detailed public involvement process provided additional input on the potential impacts of the power line and must be used to inform the final route selection.

Possible impacts that have been identified are detailed below (according to the relevant specialist field) and significant impacts are detailed with possible mitigation measures proposed in order to reduce the cumulative impact of the development. It must be borne in mind that a transmission power line does not only provide benefits to a small number of individuals in a limited area but is part of the national electricity grid which benefits the nation as a whole..

Avifaunal perspective

□Through perching and nesting on power line towers, many of the larger bird species can cause electrical faults through their faeces, and nest material. However, on the structures proposed for this power line, it is not possible for these birds to perch or nest directly above the live hardware, so this impact is not anticipated to be significant at all. Some species will however still nest within the “columns” of the towers.. The proposed “cross rope suspension tower” can be seen in Appendix xxxx of the specialist report (refer to Appendix 4 of this EIR). The most significant anticipated impact of this power line on birds is that of collision with the earth wire. Fortunately the alignment currently crosses about seven main rivers namely, Matlala, natse, Brak, Sand, Seokeng, Mogwatsane and Tshipu rivers and arable lands at relatively good, narrow points. They represents important habitat for many bird species associated with water. River courses in general represent important flight paths for many bird species, therefore posing a collision risk.

Social perspective

□It is recommended that a Community Management and Monitoring Committee (CMMC) be established. This committee would serve as a communication channel between the community and Eskom. Members of the committee should include representatives from environmental groups, civil society, ward councillors, government departments, construction teams and Eskom. Such a committee will play an important role in executing the proposed mitigation measures. It is anticipated that most

social impacts pertaining to the power line will be experienced in the pre-construction and construction phases, with minimal impacts in the operational and decommissioning phases. There is no specific preference of a route alternative and the social impacts will all be similar regardless of the final route alignment selected.

Visual perspective

□ Alternative 1 is regarded as the most preferred alternative. Its alignment along the existing transmission line and transmission servitude is considered to cause the least impact on the landscape character due to the reduced sensitivity of the landscape along the roads and servitudes.

Although there are minor differences in the impact rating for the other alignments, they are all medium i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated. □

It is highly probable that the proposed 400kv transmission power line will have at least a medium negative impact on the local visual environment in the short term during the construction phase. During the operational phase, the significance of impact is predicted to be medium in the long term i.e. the impact will only cease after the operational life span of the project

Mitigation measures are not feasible after the route has been chosen i.e. mitigation can only take place in the routing of the line to avoid conflict areas. Therefore mitigation of any significant kind is not achievable during the operational phase.

Ecological perspective

□ From an ecological perspective alternative route 1 is very preferable to alternative route 2 and 3, due to the fact that it passes through an area already affected by existing infrastructure, i.e. gravel roads, railway line and a farm homestead complex.

Currently, either route 2 or 3 may be considered since the difference in ecological sensitivity is marginal. Route 2 has a small section of High sensitivity, but this is impacted by other infrastructure. Route 3 therefore less preferable from this aspect.

The entire substation site is covered with a disturbed plant community, dominated by *Dichrostachys cinerea*. The prominence of grasses such as *Heteropogon contortus*, *Pogonarthria squarrosa*, *Trichoneura grandiglumis* and *Eragrostis rigidior*, and weedy forbs confirms the relative disturbed condition of the vegetation. In the vicinity are a few individuals of the protected tree *Sclerocarya birrea*

(marula), though it seems that no protected trees are present within the footprint of the proposed substation, or along the loops.

Heritage perspective

Once the final route is decided and tower positions known, selections of the latter, which are deemed to be in potentially more sensitive locales, should be inspected more closely. There are no grounds presently.

All sites are protected by law: a permit would be required if any site is to be destroyed or graves to be shifted. Mitigation measures, if necessary, would need to be formulated and acted upon. From a heritage perspective, the proposed transmission power line is not expected to have a high negative impact since the pylon positions will be inspected by a qualified archaeologist prior to final siting and construction taking place.

Tourism perspective

From a tourism perspective visual impacts and potential disruption from construction activities are the greatest possible issues.

Tourism is a sensitive industry based primarily on subjective perspectives of visitors to an area. In destinations where tourism is focused on outdoors or based on natural elements, such as wilderness, sky, rivers, veld and wildlife, the tourism value rests largely on the experience which can be provided. The study area is such an area, and there is potential for negative visual impacts on tourism from the erection of a transmission line. This can potentially be an issue during the day as well as during the night. During the day, the line can potentially obscure views, degrade scenery and decrease the scenic value of the area or part of the area. Additionally, any lighting that may potentially be used may extend the visual impact into the night in a part of the country renowned for its night skies and stargazing.

There is also the potential that construction activities carried out in close proximity to tourism enterprises or to places where tourists visit will negatively impact on and detract from the tourist experience. Such impacts could include noise, site disturbance during the construction phase, dust from vehicles and visual and aesthetic impacts from such construction and crew camps on the feeling of tourists having a serene and secluded nature experience. The location of work camps in close proximity to tourism enterprises can also be a potential issue in terms of noise, light, and feelings of solitude that tourists are seeking out.

There are reports in the area of problems with the reliability and quality the power supply. If developments such as transmission lines can lead to better services for local people and for tourism enterprises seeking to provide a high standard of service, then there is potential for a positive impact, or

spin off, from the development. By better servicing areas with electricity, this can create an environment where tourism can emerge or improve.

General conclusion □

An in-depth Environmental Impact Assessment has been undertaken to provide the environmental authorities with sufficient information for the purpose of making an informed decision. The comparative assessment of the specialist findings showed that the route alternatives are all potentially feasible with adequate mitigation measures in place. The comparative assessment of specialist findings highlighted alternative one as preferred over 2 and 3, while the public are of the opinion that the potential economic losses that they would sustain should alternative one be selected far outweigh the potential impacts of the power line on the natural environment in the vicinity of alternative one.

Summary of findings regarding route alternatives in the farming section of the study area:

During the course of this EIA, numerous objections to this alternative were received from Mr. Louis Kotze (farm owner and chairperson of the Waterport Farmers Union), Mr. Wessel van Wyk (owner of Safari Game Lodge), Dr. J.C. Kriek (Kriek Helicopters), Mr. D.R. Fourie (farm owner) and Mr. J. Fourie (farm owner); refer to Appendix 13 for their formal objections. Their objections were based primarily on loss of farm space-based on the fact that their farms are their source of income such as game farming and dangers imposed by this powerline to aerial game management practices. The highlighted dangers regarding the presence of the transmission powerline to aerial game management must be carefully considered by the environmental authorities during final route selection. □:

- The majority of the specialist studies preferred this alternative to 1 and 3. This was based on the fact that alternative 1 and 3 passes through a sparsely populated area with little environmental sensitivity highlighted.

During the public meeting held in Nzhelele (2 August 2012), farm owners provided more insight into the 3 alternatives in the area. According to Mr. W. Bezuidenhout, the point at which alternatives that the powerline should follow the railway line rather than crossing into their farms, as this powerline would result in having no farms.

Recommendations

During the course of the EIA process, numerous specialists were commissioned in order to provide a professional opinion on potential issues resulting from the construction of the 400kV transmission power line between the Borutho and Nzhelele. Detailed public involvement was also conducted to help inform the process and get local opinion on the proposed project. Key interested and affected parties and also farmers were additionally consulted to comments and to enable to open discussion between all parties involved in order to ensure that the development results in the least significant impacts on the receiving environment.

Objections were received with regards to the proposed transmission power line, especially on the farmers side of Waterport as they do not want the lines to pas by their farms, however some famers did voice their concerns regarding the fact that the power line would not directly benefit them regarding route alternative 1. This fact that power will not be supplied to the local communities cannot be adequately mitigated however it is recommended that Eskom Transmission work closely with the community of Jupiter, Venus, Sefahlane, Boratapelo, Olympus to attempt to implement some form of electricity provision (including solar panels, etc). This small contribution would be greatly appreciated by the local community.

Final route selection should be based on specialist findings as well as public input. None of the proposed alternatives contain fatal flaws, however the over-riding impact of certain alternatives appears to be financially based (for the proponent as well as affected parties). No significant impacts or comments/objections have been received regarding the proposed Powerline.

Mitigation measures for the numerous impacts that have been identified are detailed in this report as well as the individual specialist reports and these mitigation measures must form part of the Record of Decision from DEA and the Limpopo Department of Environmental Affairs, to ensure that these impacts are minimised as far as practically possible. The following mitigation measures must be adhered to and apply to the transmission power line in it's entirety.

- All construction and maintenance activities should conform to generally accepted environmental best practice guidelines at all times. In particular, construction camps should preferably be placed in the towns and not close to natural vegetation so as to minimize the impact of illegal activities such as hunting, snaring, firewood collection.

- The ECO for the project should attempt to identify any breeding pairs of raptors (or any other bird species) and report them to Eskom as early as possible in the construction phase so as to allow adequate recommendations to be made with respect to minimising the impact on these birds,
- The raptor nests should not require any management and should be left alone as far as possible,
- All sections of power line crossing drainage lines should be marked, only on the one relevant span,
- Power lines crossing the Matlala, Natse, Brak, Sand, Seokeng, Mogwatane and Tshipu Rivers and associated arable lands should be marked, including one span either side,
- Power lines crossing or adjacent to any dams or open water sources should be marked, including one span either side,
- Since it would be impractical to mark the power line through all the natural vegetation areas to mitigate for collision of species, it is rather suggested that the power line be patrolled annually and areas where collisions have occurred can then be marked reactively,
- Marking of the power line should be according to the technical specifications contained in APPENDIX of the specialist avifaunal report (refer to Appendix of this EIR);
- Due to the sensitivity of the wetland areas, the difficulty in distinguishing them from the surrounding habitat, and their apparent absence from the land cover and land use data sets - it will be necessary for the Sivest to conduct a final “walk through” assessment once the exact alignment has been surveyed and each tower position has been pegged. This will allow the identification of exact spans of line that will need to be marked with a suitable marking device.
- Avoid sensitive habitats, as defined in the sensitivity assessment, when planning the power line route;
- Avoid populations of species of special concern, when planning power line route
- Use water sprayers to reduce dust emissions off road surfaces,
- Ensure effective fire control at camp and construction sites of construction crew,
- Raise awareness of necessity for fire control,
- Institute management system to react to veld fires that do occur
- Use existing access roads as service and construction roads, where possible,
- Avoid medium to tall vegetation in planning the power line route,
- Assess the planned pylon sites individually for sensitive ecological and heritage features;
- If it is necessary to cross potentially sensitive areas, then attempt to do so in a manner that will cause the least amount of fragmentation,
- Rehabilitate disturbed areas following construction and monitor erosion in areas previously

disturbed until the vegetation has suitably re-established,

- Don't translocate topsoil from one area to another or bring in topsoil from other areas,,
- It is recommended that a Community Management and Monitoring Committee (CMMC) be established. This committee would serve as a communication channel between the community and Eskom. Members of the committee should include representatives from environmental groups, civil society, ward councillors, government departments, construction teams and Eskom. Such a committee will play an important role in executing the proposed mitigation measures. It is anticipated that most social impacts pertaining to the power line will be experienced in the pre- construction and construction phases, with minimal impacts in the operational and decommissioning phases.
- An Environmental Control Officer must be appointed to ensure contractors conduct themselves in an appropriate way and to make sure that the EMP and the conditions of the RoD are implemented □

Recommendations pertaining to the substation works are as follows:

- Using existing access routes as much as possible during construction and maintenance of the substation.
- Limit disturbance to vegetation and rehabilitate disturbed vegetation as quickly as possible. .

The identification of the protected tree species should be confirmed before any management measures are proposed. If necessary, relevant permits must be obtained in order to relocate or destroy this individual specimen. All measures to relocate this specimen must be investigated as opposed to simply destroying it. □This Environmental Impact Report presents the relevant information to the Department of Environmental Affairs and the Limpopo Department of Tourism, Environment for the purpose of decision-making. Authority on the approval and development of the proposed activity as well as the final route alignment selection lies solely in the hands of the delegated decision maker. Nzumbululo Heritage Solutions, as independent consultants, primary involvement in the EIA process is to provide the relevant authority with access to all relevant information in relation to the proposed activity.

CONCLUDING REMARKS

Introduction

This section concludes the ENVIRONMENTAL IMPACT ASSESSMENT Report for the proposed construction of 400kV power line running for approximately +-250km from Borutho to Nzhelele Substations in Limpopo Province. The proposed location of the power line is in an area, which has already been disturbed especially in the first part of the project from Borutho to the residential areas of Bochum region. While the other part of the study area consists of commercial farming with a mixture of game, cattle and crop cultivation, the preliminary study data does not anticipate permanent barriers to the proposed development. Some sections of the study area contain subsistence farming. As such, several localities along the powerline route and project area are directly affected by the proposed development. Nonetheless, the proposed new power line will provide electricity to the local people and farmers and future developments in Limpopo Province. It is of critical importance that the proposed powerline be considered for approval as proposed subject to all applicable legislative and regulatory conditions being met.

Final Remarks

The power line route is located in an area of medium to high visual quality, and every effort should be made to minimize any further disturbances on the cultural landscape. Where they exist, heritage resources such as graves sites would be protected or avoided during the proposed development. However, given that there are other significant linear developments existing in the area (distribution power lines, railway line, telecommunication and dirt small access roads in some areas in the farming areas etc), and other substation sites, the proposed development will result in similar impacts to the existing infrastructure or landscape in the area. Therefore, studies, which will further be done on EIR, should also make detailed research along the entire route and associated alternatives. The results will allow relevant authorities adequate information to assess and decide on the most suitable powerline route.

Furthermore, given the relative homogeneity of the area, local deviations are likely to affect the overall impact of the power line. It is recommended that more public input and that further specialist avifauna, ecologists and archaeological and heritage specialists inputs be sought. These should form part of the EIAR to be submitted for final evaluation to DEA.

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