

**FINAL ENVIRONMENTAL IMPACT  
ASSESSMENT REPORT FOR THE PROPOSED  
TUBATSE STRENGTHENING PHASE 1 –  
SENAKANGWEDI B INTEGRATION WITHIN  
THE JURISDICTION OF GREATER TUBATSE  
LOCAL MUNICIPALITY IN THE LIMPOPO  
PROVINCE**

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## EXECUTIVE SUMMARY

Nsovo Environmental Consulting (hereafter referred to as Nsovo) has been appointed by Eskom Holdings SOC Limited (hereafter referred to as Eskom) to undertake the Environmental Impact Assessment (EIA) for the proposed construction of Tubatse Strengthening Phase 1 – Senakangwedi B Integration which will entail the following:

- Establishment of the new Senakangwedi B substation (1 x 800MVA, 400/275kV and 2X500, 400/132kV) to the south of the existing Senakangwedi substation;
- Construction of loop in and loop out power lines from Senakangwedi B to the existing Arnot – Merensky 400kV line;
- Construction of Tubatse – Senakangwedi B 400kV line;
- Construction of Senakangwedi – Senakangwedi B 275kV line;
- Construction of 8 x 132kV feeder bays (Equip 4);
- Construction of 2 x 275kV feeder bays (Senakangwedi and Senakangwedi B); and
- Construction of 4 x 400kV feeder bays (Equip 3).

The proposed development falls under Ward 31 of the Greater Tubatse Local Municipality which falls within the jurisdiction of the Greater Sekhukhune District Municipality in the Limpopo Province.

The proposed project includes activities that trigger the requirement of an Environmental Impact Assessment (EIA) as prescribed in Chapter 3 of GNR 543 of the EIA Regulations of June 2010. The primary listed activity under GNR 545 includes *Activity 8 (i.e. 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)* and other associated listed activities are included in **Table 3** below.

The EIA process was compiled in accordance with the requirements of GN R 543, 544, 545 and 546 of June 2010 under the National Environmental Management Act, 1998 (Act 107 of 1998).

As indicated above, the proposed project triggers activities listed in the afore-mentioned notices which are defined as activities that may have a detrimental impact on the environment and therefore requires Environmental Authorisation from the relevant authority (Department of Environmental Affairs (DEA)) prior to commencement.

Three alternative sites for the proposed Senakangwedi B substation and alternative power line routes have been identified and are being investigated.

The Scoping and draft EIA phases of the proposed project are complete and were approved and acknowledged by the DEA on 02 October and 20<sup>th</sup> November 2014 respectively. The draft EIA Report was made available for public review and comment to Interested and Affected Parties (I&APs), landowners, statutory bodies etc. The report entailed a detailed description of the baseline environment as well as the potential impacts and the recommended mitigation measures. Further, it allowed for the identification of key issues and concerns based on input from the relevant stakeholders, interested and affected parties and the EAP's professional judgment based on experience and expertise in the field. This final EIA report includes specialist studies that were commissioned to respond and provide meaningful input in addressing the issues and concerns raised during the scoping and draft EIA phases, a detailed assessment of the alternatives, a detailed impact assessment and recommendation of mitigation measures by both the specialist and the Environmental Assessment Practitioner (EAP). Further, the Public Participation Process (PPP) has been undertaken in accordance with the requirement of the NEMA. Issues raised thus far, have been included in the Comments and Response Report attached to this final EIA report.

Consideration of alternatives is considered to be a key requirement for any EIA process. Accordingly, the proposed project considered three alternatives as well as the no-go alternative. The consideration of alternatives considered technical, structural, economic and environmental feasibility. The various alternatives were identified during the Scoping wherein some were dismissed. The EIA phase considered and comprehensively assessed the alternatives subsequently the preferred alternative was selected based on a synthesis of the technical and environmental factors as well as input from the specialist studies that were undertaken. The route and no-go alternatives are comprehensively discussed and highlighted in this final EIA report. Further, the advantages and disadvantages of each alternative are also included which culminates to the selection of the preferred one.


This report includes a detailed impact assessment of aspects that were identified as key during the Scoping phase and includes issues that the EAP deems to be significant in project of this nature based on previous experience. The impacts identified were similar for all the three routes. With the proposed mitigation measures all impacts rated medium will be low while the high impact will be reduced to medium or low.

Although each specialist study had its own outcomes and recommendations, four of the seven specialists concurred that Alternative 1 is the preferred option for construction of the Senakangwedi B substation, associated

power lines and infrastructure. Impacts on the environment, sensitivity of the area as well as comments and issues raised by the Interested and Affected Parties (I&Aps) were considered.

The EAP has taken into consideration the issues raised and these have been discussed thoroughly in this report. Generally the nature and scale of the negative impacts are relatively small in comparison to the scale of the entire project and the benefits to be delivered by the project.

Input from the I&APs, specialists, organs of state etc. has been incorporated into this final EIA. The final EIA will be submitted to the DEA for decision making.

		
<i>"From the world we live to the world we seek"</i>		DOCUMENT CONTROL
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## ABBREVIATIONS

APPA	Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965)
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation (previously Department of Water Affairs)
EA	Environmental Authorisation
I&APs	Interested and Affected Parties
GSDM	Greater Sekhukhune District Municipality
GTLM	Greater Tubatse Local Municipality
LEDET	Limpopo Department of Economic Development Environment and Tourism
NEMA	National Environmental Management Act
SAHRA	South African Heritage Resources Agency

## 1 INTRODUCTION

The electricity transmission network within the Greater Tubatse Local Municipality (GTLM) has been under pressure and it is fast approaching its capacity. Mining activities in general require a substantial amount of electricity supply and with the rapid development of mines within the Greater Tubatse Local Municipality, this has necessitated Eskom Holding SOC Limited (hereafter referred to as Eskom) to embark on a strengthening project which aims to strengthen the electricity network within the Municipality.

Eskom has proposed to construct the new Senakangwedi B substation and the associated loop in loop out power lines (hereafter referred as the project). The proposed project will be constructed within a 20km radius from the existing Senakangwedi substation and it will affect various farms within the area. The existing Senakangwedi substation is located on Farm Spitskop 333KT near the Xstrata smelters along the R555 leading to Steelpoort Town.

The proposed project includes activities that trigger an Environmental Impact Assessment to be undertaken as prescribed in Chapter 3 of GNR 543 of the Environmental Impact Assessment (EIA) Regulations of June 2010. The primary listed activity under GNR 545 includes *Activity 8 (i.e. 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)* and other associated listed activities are included in **Table 7** below.

For this particular project, the project proponent or applicant is Eskom Holdings SOC Limited (hereafter referred as Eskom), the Competent Authority is the National Department of Environmental Affairs (DEA) and the independent environmental consultant is Nsovo Environmental Consulting (hereafter referred to as Nsovo). The proposed project will be undertaken in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the EIA Regulations as amended, further, other applicable Acts and Regulations will be equally considered.

This report forms part of the EIA process that aims to provide the DEA with information regarding the proposed project and its potential impacts on the environment. The report details the baseline information which will form the backdrop on which the assessment of potential impacts on the environment has been based. The report assesses the impacts identified during the Scoping and draft EIA phases as well as the specialist input to ensure that relevant information is provided, further, mitigation measures are proposed for the impacts identified.

## 2 DETAILS AND EXPERTISE OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo Environmental Consulting has been appointed by Eskom to be the independent Environmental Assessment Practitioner (EAP) for the proposed project. Below are the details of the EAP responsible for the project as well as the qualifications and related expertise.

Nsovo is conversant with the definition of an EAP as defined in Regulation 17 of the EIA Regulations promulgated in June 2010 in terms of the NEMA. This includes, inter alia, the requirement that Nsovo is:

- Objective and independent;
- Has experience in conducting Environmental Impact Assessments;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 1: Details of the EAP

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
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Fax Number	086 602 8821
Email	<a href="mailto:munyadzi@nsovo.co.za">munyadzi@nsovo.co.za</a>
Qualifications & Experience	<ul style="list-style-type: none"> <li>• BSc Honours in Environmental Management obtained from University of Johannesburg in 2004</li> <li>• BSc in Geography and Archaeology obtained from Wits University in 2003</li> <li>• Certificate in Project Management obtained From UNISA in 2007</li> <li>• 10 000 Women Certificate Programme in Business Management (GIBBS-current)</li> </ul> 11 years of experience
CV	Please find World bank CV attached
Project Related Expertise	In terms of project related expertise the EAP has completed the

	<p>following projects:</p> <ul style="list-style-type: none"> <li>• EIA for the proposed Foskor Merensky 275kV power line</li> <li>• EIA for the Wildebees Substation and loop in lines</li> <li>• EIA for the proposed Westgate DS 132kV Randfontein Strategic Servitude</li> <li>• Basic Assessment for Simmerpan Strengthening.</li> <li>• EIA for the proposed Wildebees infeed Station and associated power lines.</li> <li>• Basic Assessment for Marula Substation.</li> <li>• Basic Assessment for Craighall Benmore 88kV Cable.</li> </ul>
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### 3 DESCRIPTION OF THE PROPOSED ACTIVITIES

#### 3.1 BACKGROUND

The continuous development of mines in the GTLM is resulting in an increasing demand of electricity provision in the area. Due to this the existing Eskom network is fast approaching its capacity and it will not be able to accommodate the expected load growth in the coming years. Consequently, in order to cater for the future electricity needs in the area, Eskom has proposed to strengthen the network. The proposed power lines corridor will be approximately 26km in length and 2km wide. The footprint of the proposed Senakangwedi B substation will be approximately 1km<sup>2</sup>.

#### 3.2 THE PROPOSED SCOPE OF WORK

The proposed scope of work will entail the following:

- Establishment of the new Senakangwedi B substation (1 x 800MVA, 400/275kV and 2X500, 400/132kV); to the south of existing Senakangwedi substation;
- Construction of loop in and loop out power lines from Senakangwedi B to the existing Arnot – Merensky 400kV line;
- Construction of Tubatse – Senakangwedi B 400kV line;
- Construction of Senakangwedi – Senakangwedi B 275kV line;

- Construction of 8 x 132kV feeder bays (Equip 4);
- Construction of 2 x 275kV feeder bays (Senakangwedi and Senakangwedi B); and
- Construction of 4 x 400kV feeder bays (Equip 3).

### **3.3 ACTIVITIES ASSOCIATED WITH THE PROJECT**

The construction phase of the proposed project will take approximately 24 month and the activities included are discussed hereunder:

#### **3.3.1 Access roads**

Access roads will comprise of existing public roads and the use of private roads will be negotiated with land owners. However, where such roads do not provide access to site, access roads may need to be built. The construction of access roads will be compliant with a Type 6 gravel road. This comprises of 6 meter wide raised gravel extended to 14 meters with meadow drainage in flat terrain, increased to 16 meters with 'V' type drainage in rolling terrain. Where necessary, suitable erosion control measures will be implemented at watercourse crossings. Where necessary, culverts will also be constructed. Gravel required to build the road may be obtained from the nearest borrow pit/s and alternative supply of gravel will be considered.

According to the recommendation from the Department of Water and Sanitation (DWS) following the review of the draft Scoping Report, excessive wash down of soil shall be prevented and the disturbed areas shall be rehabilitated on an ongoing basis to prevent erosion.

#### **3.3.2 Corridor walk-down**

The primary objective of the corridor walk-down is to ensure that all sensitive areas are avoided and where need be; buffers are created for conservation purposes. Furthermore, the walk-down will aim to establish the exact coordinates for the establishment of the towers and Senakangwedi B substation.

#### **3.3.3 Construction camps**

The need and exact locality for construction camps will be addressed in the site specific Environmental Management Programme (EMPr).



### **3.3.4 Vegetation clearance**

Forty seven (47) and fifty five (55) meter servitudes for the proposed 275kV and 400kV power lines are required respectively. The clearance of flora will be limited to the exact footprint of the construction activities and according to the EMPr as well as Eskom policies and guidelines.

### **3.3.5 Substation and pylon construction**

The civil works will include the excavations of foundations and construction of the Senakangwedi B substation and towers as well as the associated infrastructure.

### **3.3.6 Steelworks structures**

The components will be delivered in segments, assembled and erected on site. Various types of towers are under consideration and the exact type will be determined by the terrain.

### **3.3.7 Stringing**

Once the towers have been erected, the conductors will be strung between the towers.

### **3.3.8 Feeder bays**

Feeder bays will be erected in the existing footprint of the existing Senakangwedi substation.

### **3.3.9 Completion of construction work**

On completion of construction work, the site will be rehabilitated as per the specifications of the construction EMPr.

Among other activities, the rehabilitation activities will include:

- Removal of excess construction material;
- Building rubble and waste;
- Repairing any damage caused as part of the construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and

- Replacing topsoil and planting indigenous vegetation where necessary.

#### 4 APPLICABLE LEGISLATION AND GUIDELINES

Documented in the subsequent section is a list of the current environmental legislation, which is considered to be pertinent to the construction and operation of the proposed Senakangwedi B substation and associated power lines. A description of legislation pertaining to the project is summarised in **Table 2** below.

The Environmental Impact Assessment (EIA) process followed is in compliance with the NEMA and the Environmental Impact Regulations of 2010 (GNR 543, 544 and 546 of 18 June 2010). The proposed development involves “listed activities”, as defined by NEMA. Listed activities are activities which may potentially have detrimental impacts on the environment and therefore require environmental authorisation from DEA. **Table 3** below, indicate the listed activities triggering the undertaking of the EIA. The proposed development occurs within the Limpopo Province and thus, the provincial authority is the Limpopo Department of Economic Development Environment and Tourism (LEDET) while the DEA is the decision-making authority.

Table 2 is a list of legislations that are applicable to the proposed project. It is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of each Act.

Table 2: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	National Environmental Management: Act 1998, (Act No. 107 of 1998)	The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), The principles set out in the National Environmental Management Act, 1998 (Act No. 107 of 1998), hereafter referred to as NEMA, apply to all listed projects. Construction and operation have to be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors.
Biodiversity	National	The purpose of the National Environmental

Aspect	Relevant Legislation	Brief Description
	Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).
Air quality management and control	Atmospheric Pollution Prevention Act, 1965 (Act 45 of 1965) (APPA)  National Environmental Management: Air Quality Act, 2004( Act	The object of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air and to prevent pollution of air and ecological degradation.  Part 6 of the Act makes provision for measures to control dust, noise and offensive odours. Section 33 specifically provides for the submission of plans to prevent pollution once mining operations have

Aspect	Relevant Legislation	Brief Description
	39 of 2004)	<p>ceased.</p> <p>This provision must be read together with the statutory requirements of the as well as the National Environmental Management: Air Quality Act. The Proposed Area has not been declared as a dust control area in terms of section 27 of the APPA.</p> <p>Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. Whilst none are promulgated at present, it provides that the Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances, the steps to be taken to prevent nuisance by dust or other measures aimed at the control of dust.</p>
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 ( Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMP. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation , 1989 ( Act 73 of 1989).
Water	National Water Act, 1998 (Act 36 of 1998)	This Act provides for fundamental reform of law relating to water resources and use <sup>1</sup> . The preamble to the Act recognizes that the ultimate aim of water resource management is to achieve sustainable use

Aspect	Relevant Legislation	Brief Description
		of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users.
Agricultural Resources	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996)	<p>The Constitution of South Africa, 1996 (Act No. 108 of 1996) provides for an environmental right (contained in the Bill of Rights, Chapter 2). In terms of Section 7, the state is obliged to respect, promote and fulfil the rights in the Bill of Rights. The environmental right states that:</p> <p>“Everyone has the right -</p> <p>a) To an environment that is not harmful to their health or well-being; and</p> <p>b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -</p> <ul style="list-style-type: none"> <li>-Prevent pollution and ecological degradation;</li> <li>-Promote conservation; and</li> <li>-Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”</li> </ul>

These Acts must be read with the Eskom policies and environmental guidelines.

The listed activities triggered by the project are as follows indicated below. Following a recommendation by DEA and LEDET post application and review of the Draft Scoping Report respectively; the listed activities have been reviewed and revised and the ones listed hereunder are applicable to the project. Refer to **Appendix E6-2 for comments from LEDET and DEA.**

Table 3: Listed Activities triggering Scoping and Environmental Impact Assessment.

Indicate the number and date of the relevant notice:	Activity No (s) (in terms of the relevant notice):	Describe each listed activity as per project description:
544	11(iii,v, xi)	<p>The construction of:</p> <ul style="list-style-type: none"> <li>(v) weirs;</li> <li>(Xi) infrastructure or structures covering 50m<sup>2</sup> or more</li> </ul> <p>Where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>This listing is applicable only in certain special areas, namely within a distance from a watercourse. The study area contains number of wetlands, rivers and other watercourses that may be affected depending on the route Alternative selected for the transmission lines. Should the DEA authorise the route Alternative which triggers a Water Use Licence Application (WULA), the process will be undertaken appropriately prior to commencement of construction activities in fulfilment of the requirements of DWS (Refer to Appendix E6-2).</p>
544	18 (i)	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from (i) a

		<p>watercourse;</p> <p>But excluding where such infilling, depositing, dredging, excavation, removal or moving</p> <p>(i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or</p> <p>(ii) occurs behind the development setback line.</p> <p>During construction it is anticipated that the proposed project will involve the infilling and removal of material into the watercourse/streams for crossing purposes.</p>
544	47	<p>The widening of a road by more than 6 metres, or the lengthening of a road by more than 1km-</p> <p>i) where the existing reserve is wider than 13,5m; or</p> <p>ii) where no reserve exists, where the existing road is wider than 8m.</p> <p>excluding widening or lengthening occurring inside urban areas.</p> <p>It is understood that there may be a requirement to widen or lengthen existing access roads for the purposes of the construction and operation of the proposed project.</p>
545	8	<p>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.</p> <p>The proposed project entails construction of a substation and associated 275 and 400kV power lines.</p>
546	12	<p>The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover</p>

		<p>constitutes indigenous vegetation.</p> <p>The construction of the proposed transmission power line will involve the clearing of vegetation for the final preferred route (tower footprints and vegetation clearing heights).</p>
546, 18 June 2010	10	<p>The construction of a road wider than 4 metres with a reserve less than 13.5 metres.</p> <p>(a) In Limpopo</p> <p>(ii) outside urban areas, in:</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p>

## 5 DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

The proposed substation will be constructed on an area of approximately 1km<sup>2</sup> whereas the power lines will be approximately 26km long. The proposed sites are located approximately 20km from Steelpoort which is the nearest town.

### 5.1 LOCAL AUTHORITY

The proposed development falls within Ward 31 of the Greater Tubatse Local Municipality which falls within the jurisdiction of the Greater Sekhukhune District Municipality in the Limpopo Province.

### 5.2 SURROUNDING LAND USES



### **5.2.1 Mining**

Although largely rural, the municipal area is rich in mineral resources which include iron ore, chrome, vanadium, platinum, and alusite and magnetite. This has resulted in some areas of the municipality and sections of Ward 31 becoming industrialised with the development of mines, smelters and large companies such as African Rainbow Minerals, Asmang, Samancor and Xstrata being active in the area.

### **5.2.2 Farming**

The proposed project traverses various farms that are used for various purposes including stock farming, especially near substation alternative site 3. Some of the farms traversed are currently redundant with no indication of any activity taking place.

### **5.2.3 Residential**

The proposed project stretches mostly across vacant properties, i.e. farms with no evidence of agricultural farming activity; however, one game farm was noted in proximity to substation alternative site 3. Nokaneng/ Kalkfontein rural village is the only village that is located close to the proposed project site. The village is situated approximately a kilometre away from substation alternative site 2. There are no residential areas in proximity to the other two site alternatives.

### **5.2.4 Commercial and industrial**

The commercial and industrial activities occurring around the proposed site include but not limited to the following:

- Ngululu bulk Carriers;
- Conway Johnson Transport;
- Bohlabatsatsi Eastern Development;
- Spitskop Ready Mix;
- Limpopo Ready Mix; and
- Babata Pumps.

## 5.2.5 Tourism

Tourism in the GTLM is underdeveloped as most tourist attraction places are found beyond the municipal boundaries e.g. the Kruger National Park, Malamala Game Reserve etc. Tjale heritage site is one of the tourism projects in Tubatse and is currently being developed by the Sekhukhune District Municipality. The mining activities and natural resources available in the area have created a definite potential to develop tourism and thereby diversify the economic base of the GTLM.

## 5.2.6 Sites of Archaeological and Cultural Significance

According to the Phase 1 Archaeological Impact Assessment Specialist Study Report (refer to **Appendix D4**) there is indication of Iron Age people settlement in the area approximately 600m from the nearby river. According to Huffman (2007), Iron Age people preferred to settle in areas with rich alluvial soils close to rivers.

The Dwars River national heritage site is situated between the loop in and loop out lines associated with alternative substation site 1. These lines are in close proximity (approximately 200 metres) to instigate a potential direct or indirect impact to the site; furthermore, archaeological stone walled sites were noted at the Alternative substation site 2.

## 5.3 SURFACE INFRASTRUCTURE

### 5.3.1 Roads

The primary roads that exist in close proximity to the project sites are the Regional Road 555 (R555) (Middelburg to Burgersfort) and R577, further there are other secondary and tertiary roads in the area. Substation site alternatives 1 and 2 are accessible through secondary roads, while substation site alternative 3 is also accessible through other roads. Generally access roads to all proposed sites exist, however; access to proposed substation sites 1 and 3 is relatively constrained.

### 5.3.2 Power lines

There are several other existing power lines located within the study area. The power lines range from distribution to transmission to power lines and these include Duvha-Leseding 400kV line, Merensky-Lavino 22kV and Arnot- Merensky 400kV power lines.

## 6 DESCRIPTION OF THE RECEIVING ENVIRONMENT

This section outlines those parts of the socio-economic and biophysical environment that could be affected by the proposed development. Making reference to the project description in Section 4 and knowledge of the existing environment; potential interactions between the project and the environment are identified in the next section (i.e. how, where and when could the project's activities affect various components of the environment). The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included.

Below is the description of the receiving environment.

### 6.1 SOCIO-ECONOMIC DESCRIPTION

#### 6.1.1 Provincial and District Municipality Description

The Greater Sekhukhune District Municipality (GSDM) covers a geographical area of approximately 13 527.72 km<sup>2</sup> with a population of 1 076 840 people living within 263 802 households. The District Municipality is situated in the southeast of the Limpopo Province and comprises 5 local municipalities namely:

- Ephraim Mogale Local Municipality (LIM471);
- Elias Motsoaledi Local Municipality (LIM472);
- Makhuduthamaga Local Municipality (LIM473);
- Fetakgomo Local Municipality (LM474); and
- Greater Tubatse Local Municipality (LIM475).

The District Municipality has a population density of 80 people per km<sup>2</sup> and a household density of 19.5 households per square kilometer, further it is characterised by some 740 sparsely populated and poorly serviced rural villages

scattered across the region. The road network links the districts to other areas, however, the roads are in a poor state, which is one of the many other service delivery challenges in the region.

Mining is the primary contributor to the economy of the region, particularly in the GTLM area. Of the 5 local municipalities in the district, four, including GTLM, fall within the Department of Cooperative Governance and Traditional Affairs' classification of most vulnerable municipalities (Department of Cooperative Governance and Traditional Affairs, n.d., pp. 14-15).

**Figure 1** below depicts the locality of the Greater Sekhukhune District Municipality in relation to the other District municipalities within the Limpopo Province.

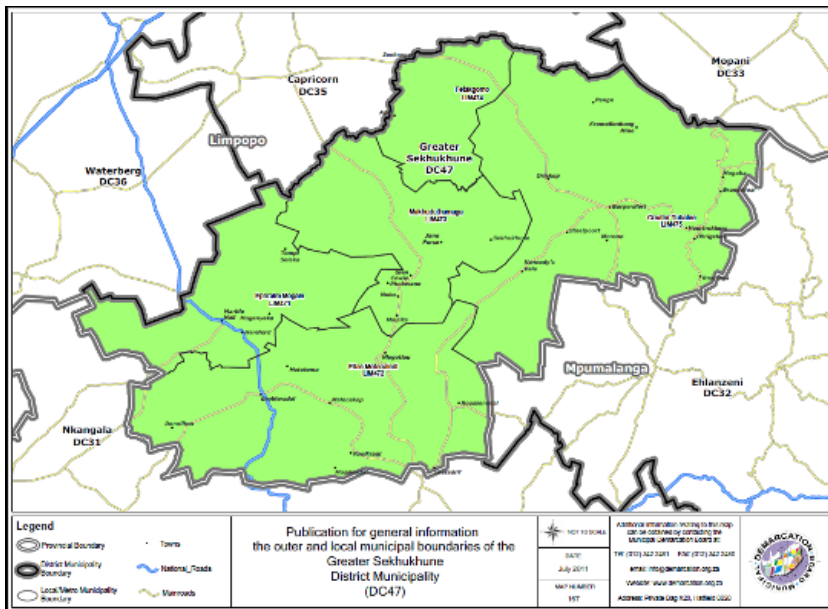


Figure 1: Greater Sekhukhune District Municipality (Source: Municipal Demarcation Board).

With regard to social indicators, GSDM has a dependency ratio of 74.7 and a sex ratio of 85.9. The population growth rate of the district, as measured between 2001 and 2011 was 1.07%. In 2011, the official unemployment rate was 50.9% with the official unemployment rate amongst the youth, aged between 15 and 34 years, being 60.6%. In respect of schooling amongst those aged 20 years and older, 20.9% have no schooling, 21.3% have a matric and 5.8% have a higher education. The population pyramid of GSDM is illustrated below in **Figure 2**.

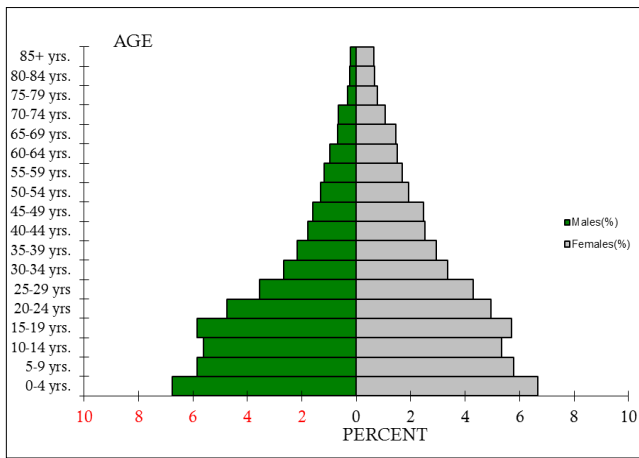


Figure 2: Population pyramid of the GSDM (Data source: Statistics South Africa, 2012)

### 6.1.2 Greater Tubatse Local Municipality

Greater Tubatse Local Municipality covers a geographical area of 4 550 km<sup>2</sup> and in 2011 had a population of 335 676 people accommodated in 83 199 households. This gives the area a population density of 73.77 per km<sup>2</sup> and household density of 18.28 per km<sup>2</sup>. On a geographical basis the municipality covers the largest area in Greater Sekhukhune accounting for 34.3% of the district and is illustrated below in **Figure 3**.

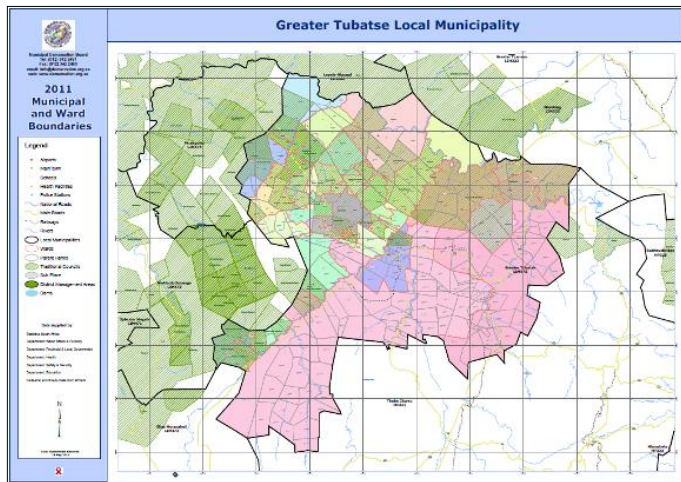


Figure 3: Greater Tubatse Local Municipality (Source: Municipal Demarcation Board)

Greater Tubatse is largely rural in nature and consists of 31 municipal wards. These wards incorporate six proclaimed townships and approximately 166 villages. It is indicated in the Integrated Development Plan of the local municipality that;

*“Due to its rural nature; the municipality is confronted with [a] high service delivery backlogs. Majority of the settlements are far apart which; makes the provision and maintenance of services very costly. Some*

*of these areas are too small to attain the economic threshold required to provide social facilities in a cost-effective manner” (Greater Tubatse Local Municipality, 2014, p. 19).*

Although largely rural, the municipal area is rich in mineral resources including chrome, vanadium, platinum, and alusite and magnetite. This has resulted in some areas of the municipality and sections of Ward 31 becoming industrialised with the development of mines and smelters and large companies such as African Rainbow Minerals, Asmang, Samancor and Xstrata being active in the area. In **Figure 4** a section of the Xstrata Lion Ferrochrome Smelter is viewed from the entrance to the Eskom’s Senakangwedi Substation.



Figure 4: Xstrata Lion Ferrochrome Smelter

The sex ratio of the municipality is 91.5 which imply that for every 100 women there are 91.5 males in the population. At 98.25% black Africans make up the largest quota of the population, followed by whites at 1.31% with the other population groups making up the remaining 0.43%. The dominant home language spoken across Greater Tubatse is Sepedi, which is spoken by 88.11% of the population followed by SiSwati spoken by 2.60%, isiZulu at 1.70% and Afrikaans at 1.52%. The remaining 7.59% constitutes the rest of the official South African languages.

The dependency ratio of the Municipality is 65.6% of which 60.4% of the population is of working age (between 15 and 64 years), with 34.5% under 15 years and 5.1% over 64 years of age. The official unemployment rate of Greater Tubatse is 50.3% with a high percentage of youth being officially unemployed at 59.6%. Amongst those aged 20 years and above, 15.1% have no schooling, 22.6% have a matric and 6.6% have a higher level of education. Between 2001 and 2011 the growth rate in the area was 2.19%.

Amongst the 83 199 households 25 347 are categorised as agricultural households and 46.9% are female headed. Formal dwellings account for 83.2% of the dwelling types in the municipality and 53.9% of the housing are either owned or are being paid off. Only 6.3% of households have flush toilets connected to the sewerage system, 7.9% have their refuse removed on a weekly basis, 9.5% have piped water delivered inside the dwelling and 75.7% use electricity for lighting.

As indicated above, the proposed project falls within Ward 31 of the local municipality illustrated in below.

### 6.1.3 Ward 31 of the Greater Tubatse Municipality

In comparison to the social indicators and population dynamics of Ward 31 against those of the local municipality, the population of the ward has a lower percentage of black African people at 88.06% compared to that of the local municipality at 98.25%. There are a significantly higher percentage of white people in Ward 31 at 10.69% compared to 1.31%. While the local municipality has a sex ratio of 91.5, indicating a higher percentage of females across the region, the situation is reverse in Ward 31 which has a sex ratio of 118, indicating a higher percentage of males. This is probably as a result of in migration due to at least a perception of job opportunities in the area. A lower percentage of the population of Ward 31 currently attends school compared to across the local municipality with the relative percentages being 26.11 and 34.92. The percentage of people that have no income in Ward 31 is 8.58% lower compared to that across Greater Tubatse.

The highest percentage of rented accommodation, at 45.33% is found in Ward 31. At 49.49% the highest percentage of owned and fully paid off housing is in the Greater Tubatse Local Municipality. Most types of dwellings across the region are house or brick/concrete structures on a separate stand or yard or on a farm. Refer to **Appendix D3**.

With regard to service delivery, this situation is virtually the same across both the Municipality and Ward 31 except for refuse disposal and toilet facilities in respect of which Ward 31 enjoys somewhat of a higher service delivery level. Regarding refuse removal 27.23% of households in Ward 31 have their refuse collected on a weekly basis compared to 7.93% across the municipality. In Ward 31 the situation is marginally better when it comes to lavatory facilities with 35.01% of households having flush toilets connected to the sewerage system compared to the 6.31% across Greater Tubatse. Refer to **Appendix D3**.

### 6.1.4 National and Regional Economy

The construction of the proposed substation and transmission power lines has become necessary as part of Eskom's undertaking to upgrade the country's existing electricity grid. Eskom has indicated that the proposed project is driven by the requirements of mines and industry in the area and is necessary to improve the security of electricity supply and thus benefit users on both a regional and national basis.

### 6.1.5 HIV, AIDS and other Sexually Transmitted Diseases

The prevalence of HIV in Limpopo is 16.3% which is lower than its neighboring provinces of Gauteng at 18.8% and Mpumalanga at 23.6% (Shisana, et al., 2014, p. 46). Further Shisana, et al (2014, p.48) highlights that in respect of the districts affected by the project the HIV prevalence rate ranges between 6 and 12% within the GSDM while Capricorn District Municipality has a rate of between 6 and 9%. It is therefore possible that an influx of contract workers from these areas could pose a risk to the HIV status of the province, particularly when this is considered against the fact that the area has a high level of poverty. Prostitution often follows contract workers due to there being a source of income.

## 6.2 CLIMATE

According to the Land Types and Agricultural Potential Report (**Appendix D1**), the climate of the area can be regarded as typical of the northern edge of the Highveld, with cool to cold, dry winters and warm moist summers (Paterson, Koch & Barrow, 1989). The main climatic indicators are given in **Table 4**.

Table 4: Climate Data

Month	Average Rainfall (mm)	Average Min. Temp (°C)	Average Max. Temp (°C)
Jan	98.6	17.6	30.1
Feb	81.8	17.4	29.7
Mar	62.6	15.7	28.2
Apr	37.1	11.4	27.4
May	11.0	7.0	24.5
Jun	6.3	3.4	21.7



Month	Average Rainfall (mm)	Average Min. Temp (°C)	Average Max. Temp (°C)
Jul	6.3	3.8	21.6
Aug	4.1	6.3	24.0
Sep	19.2	10.5	27.5
Oct	43.3	13.9	28.5
Nov	88.4	16.4	29.1
Dec	97.3	17.4	30.7
<b>Year</b>	<b>556.0 mm</b>	<b>19.3 °C (Average)</b>	

Temperatures vary from an average monthly maximum and minimum of 30.1°C and 17.6°C for January to 21.6°C and 3.8°C for July respectively. The extreme high temperature that has been recorded is 39.7°C and the extreme low –2.3°C. Frost occurs occasionally and is usually light.

### 6.3 GEOLOGY

The GTLM is situated on the eastern side of the Bushveld Igneous Complex and Transvaal geological system and is therefore underlain by both sedimentary and volcanic rock formations. Owing to the geological composition, the area is characterised by steep rising mountains, which are linked to undulating river valleys.

The proposed lines are divided between two types of geology namely gabbro and norite as depicted in **Figure 5** below. Gabbro refers to a large group of dark, coarse-grained, intrusive mafic igneous rocks chemically equivalent to basalt. The rocks are plutonic, formed when molten magma is trapped beneath the Earth's surface and cools into a crystalline mass (King, 2014).

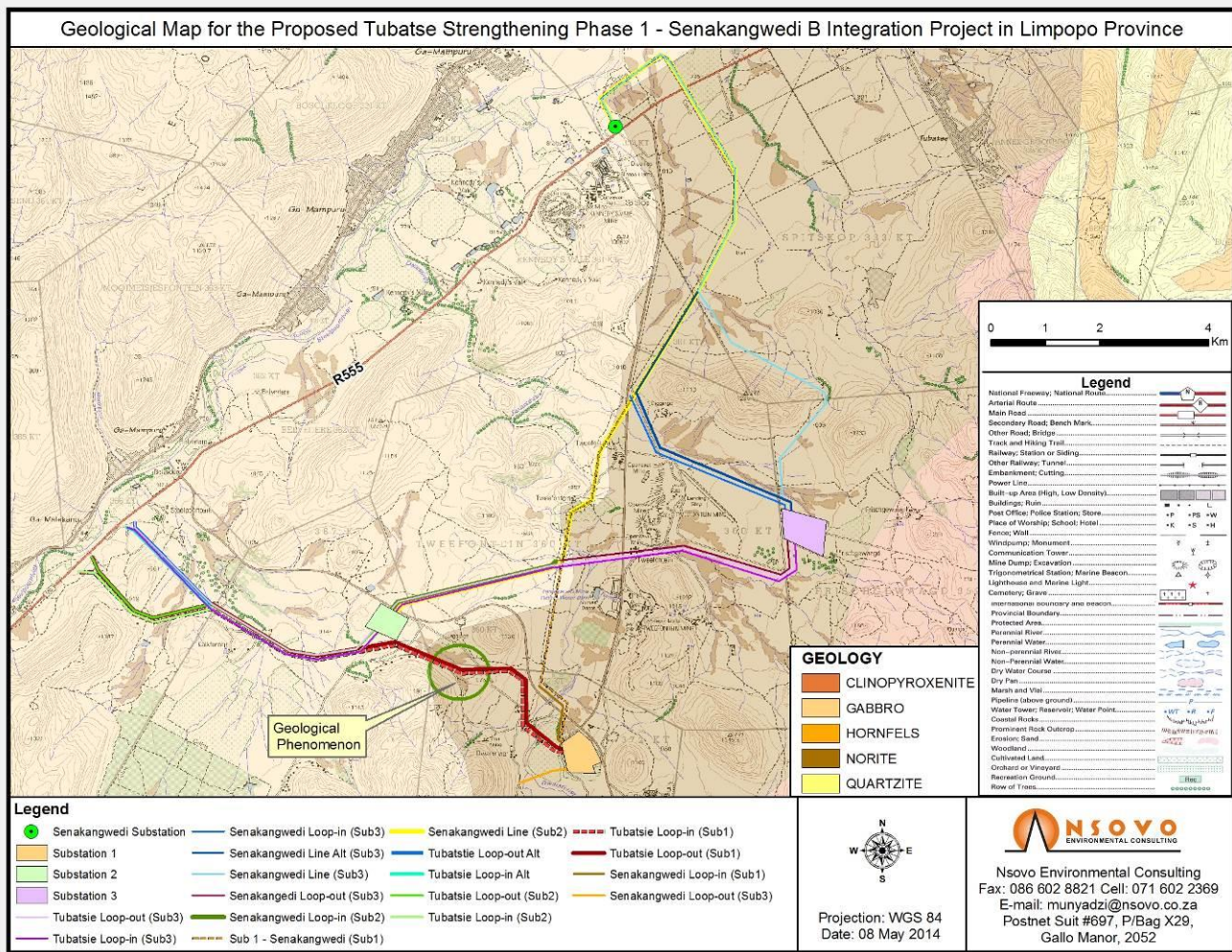


Figure 5: Geological Map

### 6.4 TOPOGRAPHY

The northern part of the GTLM is mountainous. The southern part is undulating and has a more moderate topography. Ridges and mountains form linear dividers between the settlements. Ridges further divide the municipal areas creating pockets of homogeneous compositions, which determine growth and development potential.

### 6.5 SURFACE WATER

According to the Wetland Assessment Report (**Appendix D7**), two perennial riparian areas were recorded on site, namely the Steelpot River and the Dwars River. The study site falls within Quaternary Catchments B41J, B41H and a small part of the study area is located in B41G. The existing Tubatse substation and associated proposed

power line infrastructure is located in quaternary catchment B41J. These riparian areas are linked to numerous smaller tributaries. The majority of the tributaries are temporary (ephemeral or episodic) streams with only a few being perennial.

Numerous artificial dams were also recorded throughout the study area and especially in the mining areas. Substation site Alternative 1 has a small temporary stream and it is also located within 500m of the perennial Dwars River. Substation site Alternative 2 is located directly adjacent to a regional road and no riparian or wetland conditions occur on this site.

Wetland conditions are associated with numerous of the perennial rivers and temporary streams recorded in the study area. The proposed power line routes cross perennial rivers and/or temporary streams a total of 37 times (Refer to **Figure 6** below).

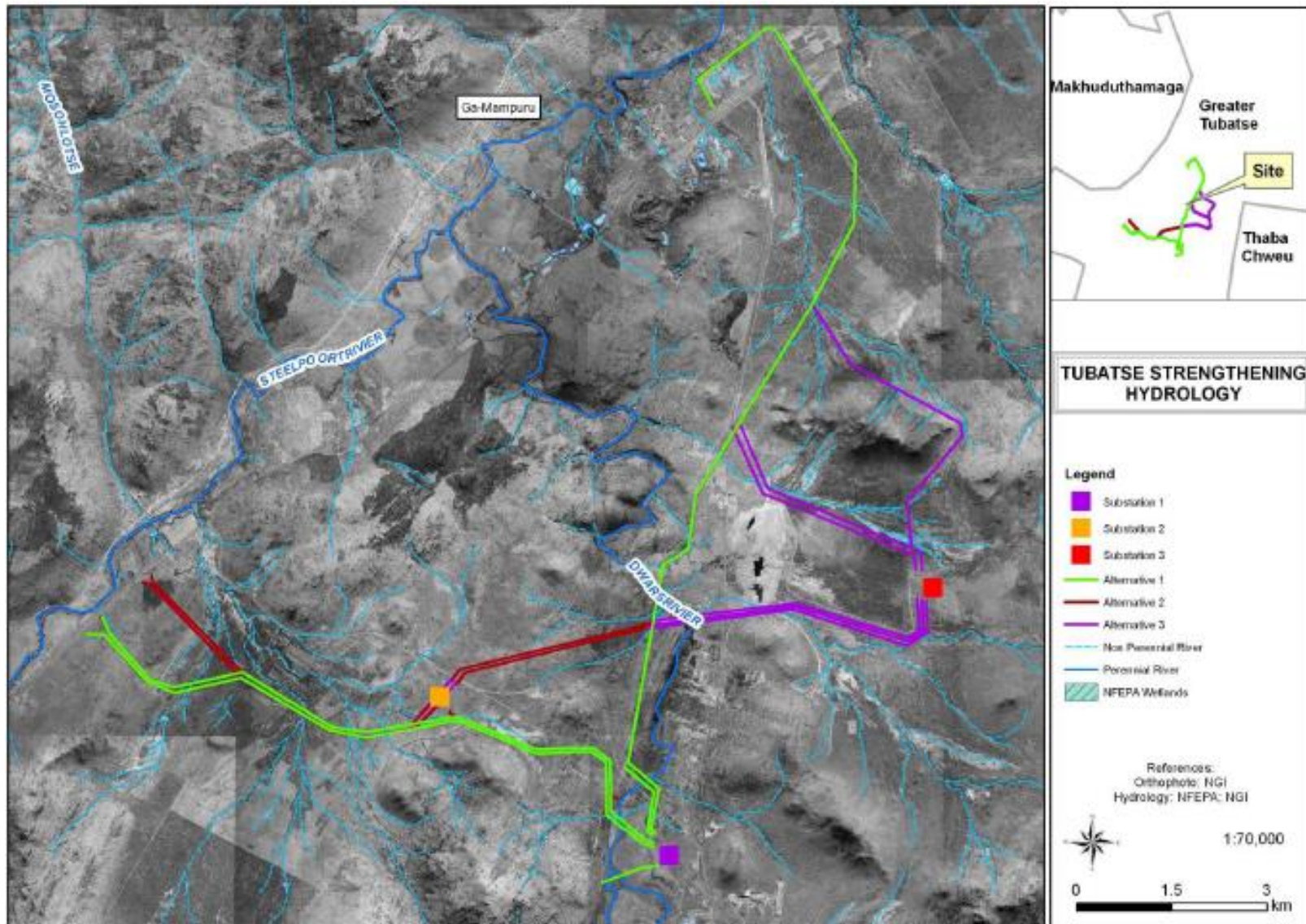


Figure 6: Wetlands and riparian areas within 500m of the proposed project

## 6.6 AIR QUALITY AND POLLUTION

The GTLM is found in the Northern part of the GSDM. The main towns in the area are Burgersfort and Steelpoort. And the primary activity in this area is the mining of chrome and platinum. There are three chrome smelters in the area; this implies that the area is likely to have air pollutants such as sulphur dioxide, nitrous oxide, chromium (VI) and particulate matter. There is also significant traffic in the area due to the transportation of minerals which introduces a substantial form of pollution from vehicles in the form of carbon monoxide and other noxious gases.

## 6.7 FLORA

The proposed project site is situated within the Savanna Biome of South Africa which is the largest Biome in southern Africa, occupying over one-third of the surface of the country. It is characterised by a grassy ground and a distinct upper layer of woody plants. Where this upper layer is near the ground, the vegetation may be referred to as shrubveld, where it is dense, as woodland, and the intermediate stages are locally known as Bushveld (Mucina & Rutherford, 2006). The vegetation includes wooded, shrubby hill slopes and grassy plains with scattered trees or bush-clumps. Diversity in Savanna is provided by variation in soil-type and topography; koppies, river lines and anthills (*termitaria*) provide localized changes in soil moisture and nutrients which create different habitats for plants and animals.

The Savanna Biome consists of different vegetation types. The substation alternative sites are situated within the Sekhukhune Mountain Bushveld, while the most northern extent of the proposed power lines is situated within the Sekhukhune Plains Bushveld. These vegetation types are characterised by dry micro-phyllous species (e.g. *Acacia* species) and broadleaved Savanna (e.g. *Combretum* species) on hills and mountain slopes (Mucina & Rutherford, 2006).

According to Mucina & Rutherford (2006) both vegetation types include a number of biographically important plant taxa, and plants endemic to these vegetation types as well as to the Sekhukhune area (i.e. these plants only occur within this vegetation type and / or area). The Sekhukhune Mountain Bushveld vegetation type is not considered to be threatened although mining activities, cultivation and urbanization have already transformed at least 15% of the current extent.

Conversely, the Sekhukhune Plains Bushveld is considered to be vulnerable to becoming completely transformed. Only about 2% has already been transformed by mining, urbanization and cultivation. Furthermore, the soils are vulnerable to erosion and subsistence grazing has resulted in donga formation and the invasion of the vegetation by alien invasive plant species (weeds). Refer to **Figure 7** for vegetation affected by the proposed project.

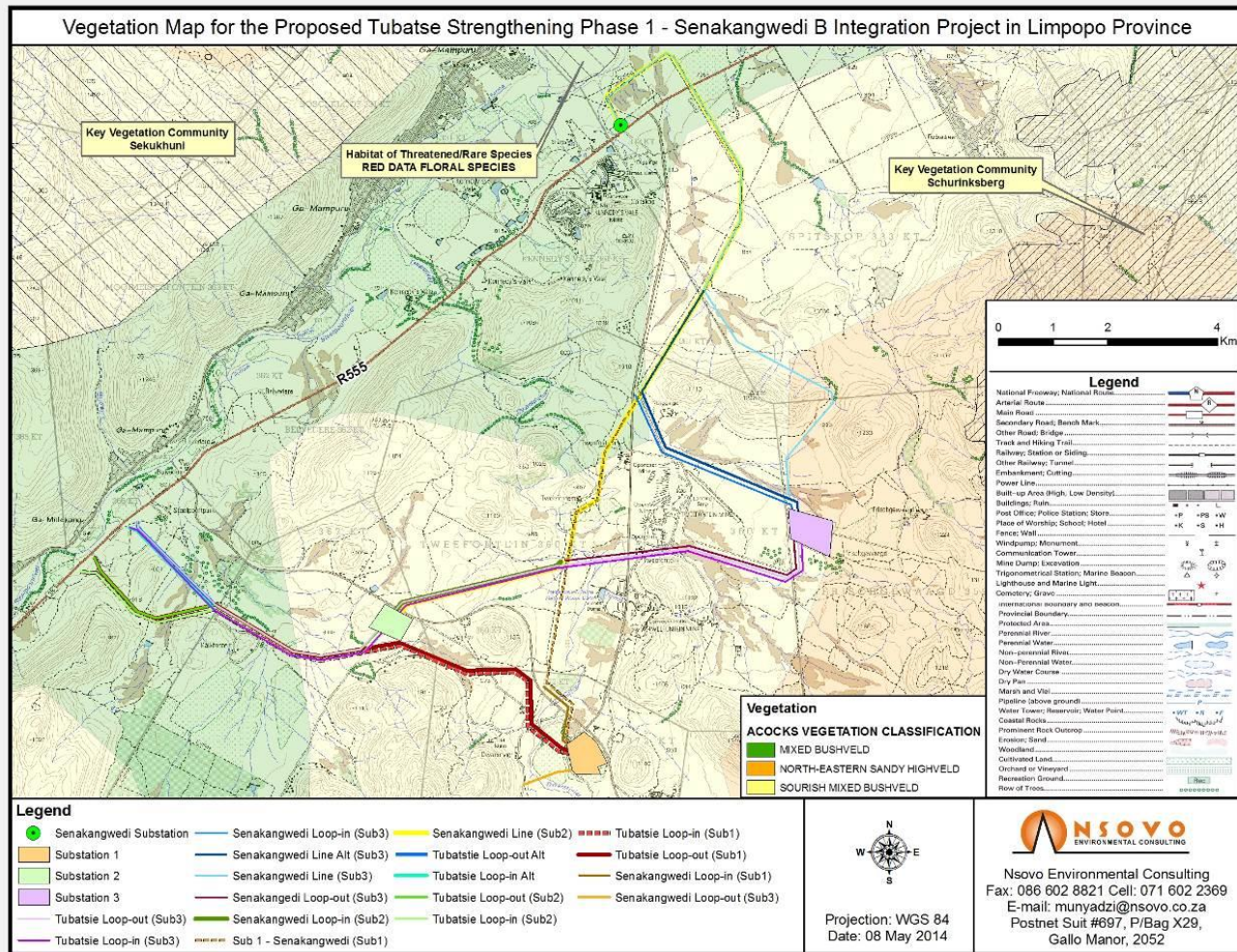


Figure 7: Representation of the vegetation types that the proposed project is situated in.

All three substation site alternatives are located in areas that are of ‘Least Concern’ or has ‘No Natural Habitat’ remaining. Substation site Alternative 3 is situated in close proximity to areas classified as ‘Important and Necessary’ to reach conservation targets. Refer to **Figure 9** below.

The proposed power lines may have an impact on some areas that are classified as ‘Important and Necessary’ as well as ‘Highly Significant’ in reaching conservation targets.

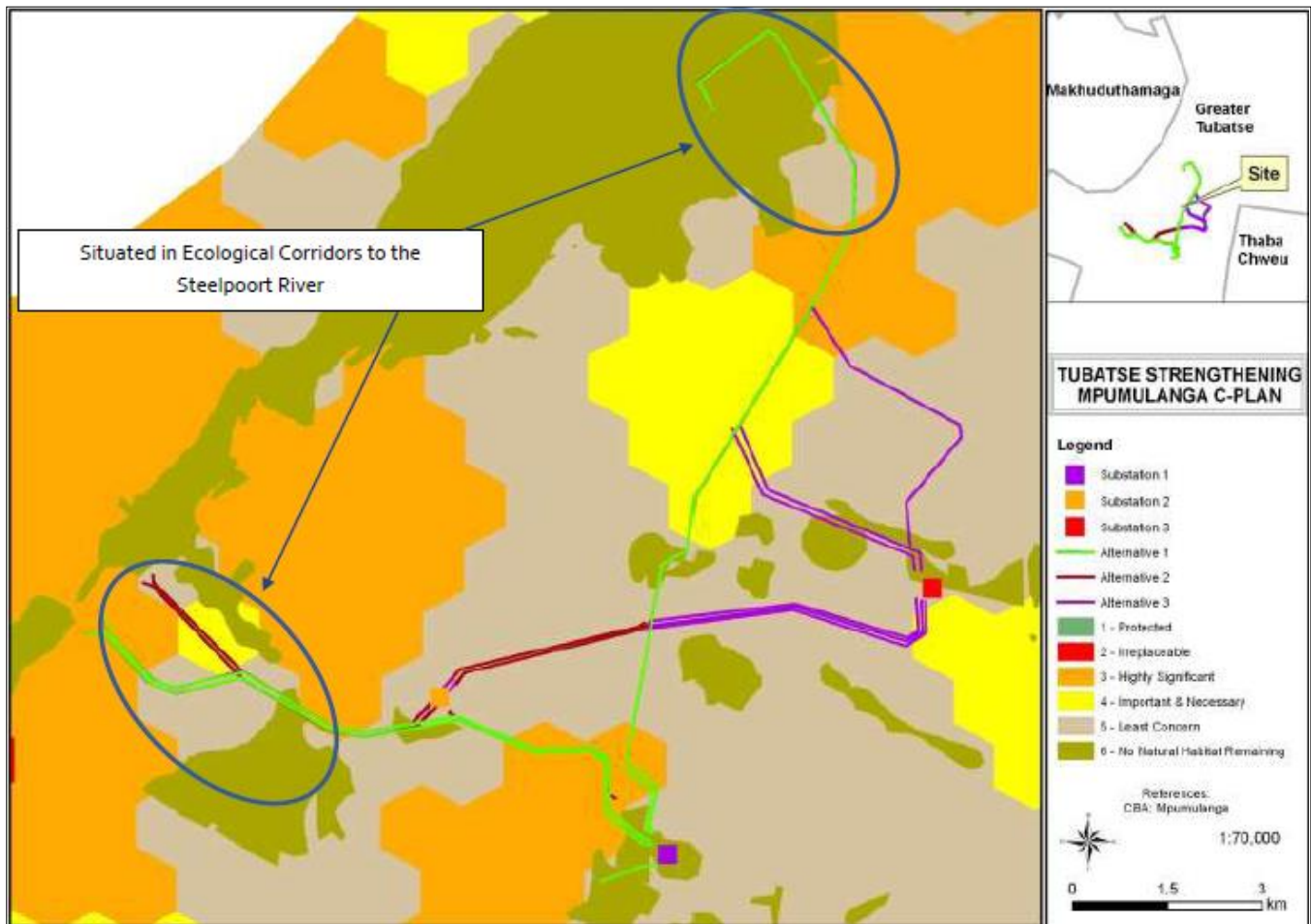


Figure 8: The site in relation to the Mpumalanga Biodiversity Conservation Plan (MBCP), Terrestrial categories.

The Vegetation Assessment Report also indicates that a list of fifteen (15) plants of conservation concern that could occur within the area of the proposed development was compiled using information from the South African National Biodiversity Institute’s (SANBI) checklist (SANBI, 2009), Raimondo *et al*, (2009), information from the Mpumalanga Tourism and Parks Agency (MPTA) and relevant literature pertaining to the area. **Table 3** below indicates the plants that have the likelihood of occurrence.

Table 5: Red Data/ Plants of Conservation Concern that have historically been recorded within the areas proposed for the project.

Species	Conservation status	Habitat and likelihood of occurrence
<i>Asparagus fougere</i>	Vulnerable	Mixed bushveld, on rocky, dolomite outcrops. Sekhukhuneland, Burgersfort to Penge. Highly likely to occur west of the substation Alternative 2 site within Alternative 1 and 2 corridors.
<i>Searsia batophylla</i>	Vulnerable	Dry bushveld, in low-lying areas and along watercourses. 650-975 m. Sekhukhuneland. Locally common, but range restricted. Highly likely to occur, especially in the northern portion of the development area
<i>Zantheschia jucunda</i>	Vulnerable	Sekhukhuneland, along the summit of the Leolo Mountains. Grassland, norite outcrops and cliffs.
<i>Zantedeschia pentlandii</i>	Vulnerable	Roosenekal to Dullstroom. Rocky hillsides. Highly likely to occur north and east and west of the substation Alternative 3 site and within Alternative 3 corridor.
<i>Dicliptera fruticosa</i>	Near Threatened	Savanna and open woodland, shady areas on rocky magnetite and dolomite slopes.
<i>Elaeodendron transvaalense</i>	Near threatened	Savanna or bushveld, from open woodland to thickets, often grows on termite mounds. Likely to occur in the substation Alternative 1 area, not on site, but along the Alternative 1 corridor
<i>Jamesbrittenia macrantha</i>	Near threatened	Grassy slopes with other scattered shrubs, restricted to norites (Figure 7). Endemic to Sekhukhuneland, declining due to mine and infrastructure expansion. Highly likely to occur around the substation Alternative 3 site and in a southern and westerly direction towards substation Alternative 1 & 2
<i>Lydenburgia cassinoides</i>	Near threatened	Roosenekal to Strydpoort Mountains. Exposed norite bedrock and dolomite. Highly likely to occur, especially the northern portion of the corridors (e.g. north of substation Alternative 3 site), the whole of the Alternative 3 corridor on norite as well as around the substation Alternative 2 area (Figure 7).
<i>Nerine gracilis</i>	Near Threatened	Occurs in moist grasslands. Likely occurrence in the substation Alternative 1 area.
<i>Urginea lydenburgensis</i>	Near threatened	Rocky ledges, rock fissures and shallow depressions. Likely occurrence in the substation Alternative 1 area
<i>Drimia altissima</i>	Declining	Hot, dry bushveld and thicket. Confirmed to occur at the substation Alternative 2 site



<i>Eulophia speciosa</i>	Declining	Various habitats including sand dunes, bushveld, thornveld and mountain grasslands.
<i>Euphorbia sekukuniensis</i>	Rare	Closed woodland and thicket. Plants grow in shallow soils on rocky outcrops among large boulders. Restricted to norite. 900-1300 m. Sekhukhuneland, Steelpoort River valley and along the summit of the Leolo Mountains as far as the Olifants River valley. <b>Highly likely to occur, as much of the eastern portion of the development is situated on Norite – see Figure 7.</b>
<i>Searsia sekhukuniensis</i>	Rare	Sekhukhuneland, Roossenekal to Steelpoort. Rocky hillsides in bushveld, on pyroxenitic substrates of the eastern rim of Bushveld Igneous Complex. <b>Highly likely to occur, especially the northern portion of the corridors (e.g. north of substation Alternative 3 site)</b>
<i>Aloe parvibracteata</i> (was <i>Aloe burgersfortensis</i> )	Rare in Mpumalanga, LC nationally	Savannah. <b>Likely occurrence on the northern extent of the Alternative 1 corridor</b>

## 6.8 FAUNA

### 6.8.1 Reptiles

According to the Vertebrate Assessment Report (**Appendix D6**) the three substation sites and the servitude routes fall outside the natural range of the striped harquin snake, Swazi rock snake, Transvaal quill-snouted snake, Eastwood's long-tailed seps, Soutpansberg flat lizard, Woodbush legless skink, Muller's velvet gecko, Methuen's dwarf gecko and Natal hinged tortoise. It is thus concluded that these species are absent on the study site. Furthermore, the Eastwood's long-tailed seps is officially extinct.

Further, the report indicates that the study falls inside the distributional range of the Southern African python. Due to the extensive size and diverse habitats and sub-habitats of the study site and adjoining areas, the South African python can be expected on the study site. According to Bradley (1990), Southern African pythons favour moist, rocky, well-wooded valleys, plantations or bush country and seldom if ever, stray far from permanent water (such as the Steelpoort River). The overall study area thus provides suitable habitat for the Southern Africa python, although the three substation sites are far too small to support a viable population (it is estimated that a single python needs at least a 100ha area to forage). The occasional Southern African python may occasionally venture onto one of the three substation sites or on the ultimately densely vegetated power lines servitude.

### 6.8.2 Bullfrogs

No potential breeding sites for the giant bullfrog is present on any of the three study sites. Considering the size of the three substation sites and that no breeding sites for bullfrogs are found on or near any of these or in sample

points along the servitude routes. The possibility of giant bullfrogs occurring on the study site is very minimal.

No other Red Data or sensitive species are deemed present on the site, either since the site is too disturbed, falls outside the distributional ranges of some species, or does not offer suitable habitat(s). Refer to Table 6 below for the species observed or deduced to occupy the site.

The following key must be used in interpreting Table 6:

√ - Definitely there or high probability to occur.

\* - Medium probability to occur based on ecological and distributional parameters.

? – Low probability to occur based on ecological and distributional parameters.

Table 6: The species observed or deduced to occupy the site [Systematics and Taxonomy as proposed by Bronner *et.al* (2003) and Sinner and Chimimba (2005)]

	SCIENTIFIC NAME	ENGLISH NAME
DD*	<i>Elephantulus brachyrhynchus</i>	Short-snouted elephant shrew
?	<i>Orycteropus afer</i>	Aardvark
√	<i>Lepus saxatilis</i>	Scrub hare
√	<i>Cryptomys hottentotus</i>	African mole rat
√	<i>Hystrix africaeaustralis</i>	Cape porcupine
*	<i>Pedetes capensis</i>	Springhare
*	<i>Paraxerus cepapi</i>	Tree squirrel
*	<i>Graphiurus murinus</i>	Woodland dormouse
*	<i>Acomys spinosissimus</i>	Spiny mouse
DD*	<i>Lemniscomys rosalia</i>	Single-striped grass mouse

*	<i>Rhabdomys pumilio</i>	Four-striped grass mouse
*	<i>Mus minutoides</i>	Pygmy mouse
*	<i>Mastomys natalensis</i>	Natal multimammate mouse
*	<i>Mastomys coucha</i>	Southern multimammate mouse
?	<i>Thallomys paedulus</i>	Acacia rat
?	<i>Thallomys nigricauda</i>	Black-tailed tree rat
*	<i>Aethomys ineptus</i>	Tete veld rat
DD*	<i>Gerbilliscus leucogaster</i>	Bushveld gerbil
*	<i>Saccostomus campestris</i>	Pouched mouse
*	<i>Dendromus melanotis</i>	Grey pygmy climbing mouse
*	<i>Dendromus mesomelas</i>	Brants' climbing mouse
*	<i>Dendromus mystacalis</i>	Chestnut climbing mouse
√	<i>moholi</i>	South African galago
√	<i>Papio hamadryas</i>	Chacma baboon
√	<i>Cercopithecus pygerythrus</i>	Vervet monkey
DD*	<i>Suncus lixus</i>	Greater dwarf shrew
DD*	<i>Crocidura cyanea</i>	Reddish-grey musk shrew
DD*	<i>Crocidura hirta</i>	Lesser red musk shrew
NT*	<i>Atelerix frontalis</i>	Southern African hedgehog
?	<i>Epomophorus wahlbergi</i>	Wahlberg's epauletted fruit bat
*	<i>Taphozous mauritanus</i>	Mauritian tomb bat
?	<i>Sauromys petrophilus</i>	Flat-headed free-tailed bat
*	<i>Tadarida aegyptiaca</i>	Egyptian free-tailed bat
NT?	<i>Miniopterus schreibersii</i>	Schreibers' long-fingered bat
*	<i>Neoromicia capensis</i>	Cape serotine bat
*	<i>Scotophilus dinganii</i>	African yellow house bat
*	<i>Scotophilus viridis</i>	Greenish yellow house bat
*	<i>Nycteris thebaica</i>	Egyptian slit-faced bat
NT*	<i>Rhinolophus clivosus</i>	Geoffroy's horseshoe bat
NT*	<i>Rhinolophus darlingi</i>	Darling's horseshoe bat
*	<i>Rhinolophus simulator</i>	Bushveld horseshoe bat
DD*	<i>Hipposideros caffer</i>	Sundevall's roundleaf bat
?	<i>Proteles cristatus</i>	Aardwolf
NT?	<i>Parahyaena brunnea</i>	Brown hyena
*	<i>Felis silvestris</i>	African wild cat
√	<i>Genetta genetta</i>	Small-spotted genet
√	<i>Genetta tigrina</i>	SA large-spotted genet
√	<i>Cynictis penicillata</i>	Yellow mongoose
√	<i>Galerella sanguinea</i>	Slender mongoose
*	<i>Mungos mungo</i>	Banded mongoose
√	<i>Canis mesomelas</i>	Black-backed jackal
DD?	<i>Poecilogale albinucha</i>	African weasel
√	<i>Ictonyx striatus</i>	Striped polecat
√	<i>Phacochoerus africanus</i>	Common warthog
√	<i>Tragelaphus strepsiceros</i>	Kudu
√	<i>Sylvicapra grimmia</i>	Common duiker
√	<i>Raphicerus campestris</i>	Steenbok
√	<i>Aepyceros melampus</i>	Impala

Refer to **Appendix D** for Vertebrate Assessment Report.

## 6.9 AVIFAUNA

The Avifaunal specialist report indicates that it is widely accepted within ornithological circles that vegetation structure and not species composition is most important in determining which bird species will occur in an area. The most prevalent vegetation type present on the site is “Sekhukhune Mountain Bushveld” (Mucina & Rutherford, 2006). The main relevance of this classification to this study is that bushveld is the dominant vegetation type on site. We can therefore expect the avifaunal community to be dominated by bushveld dependent species.

The micro habitats identified on or within close proximity to the study site include woodland, grassland patches, arable lands, wetland areas, and a river.

The first atlas data was collected over an eleven year period between 1986 and 1997 (Harrison *et al*, 1997). Although it is now quite old, it remains the best long term data set on bird distribution and abundance available to us at present. This data was collected on the basis of quarter degree squares, which is a relatively large spatial scale. The more recent SABAP2 collected data on the basis of pentads which are roughly 8km x 8km squares, and are hence much smaller than the quarter degree squares used in the first bird atlas project 1.

A full list of approximately 295 bird species recorded in the broader area within which this site falls, by the above two atlas projects, is shown in **Appendix 2** of the Avifauna specialist report. **Table 7** below details the Red List bird species (11) amongst these. **Appendix 2** of the Avifauna specialist report and **Table 7** below should be viewed as the species that could potentially occur on the site, provided that conditions and habitat are favourable.

Table 7: The Red List bird species for the proposed project

Common name	Species name
Eagle, Tawny	<i>Aquila rapax</i>
Eagle, Verreaux's	<i>Aquila verreauxii</i>
Falcon, Lanner	<i>Falco biarmicus</i>
Kestrel, Lesser	<i>Falco naumanni</i>
Kingfisher, Half-collared	<i>Alcedo semitorquata</i>
Roller, European	<i>Coracias garrulus</i>
Stork, Abdim's	<i>Ciconia abdimii</i>
Stork, Black	<i>Ciconia nigra</i>

Stork, White	<i>Ciconia ciconia</i>
Secretarybird	<i>Sagittarius serpentarius</i>
Vulture, Cape	<i>Gyps coprotheres</i>
Vulture, White-backed	<i>Gyps africanus</i>

Red List species face considerable conservation challenges and cannot afford additional mortality factors associated with the construction and operation of electrical infrastructure. In addition to the Red List species, the White Stork has also been included, as they are afforded international protection under the Bonn Convention on Migratory Species. Most species in **Table 7** above are large birds (i.e. the Secretary bird and storks) and could potentially be impacted on directly by the proposed power line, through collision. Those species that are physically smaller could face disturbance effects and habitat destruction during the construction of the proposed project.

It is important to note that due to the already disturbed nature of most of the site, the likelihood of many of the Red List species in **Table 7** above frequenting the site has been judged to be low. As a result, the impacts of the proposed project could be more important for the common bird species, which are generally more tolerant of human disturbance and hence more likely to regularly make use of this site. These include waterfowl such as ibises, geese, ducks, herons and many others.

Refer to **Appendix D1** for the Avifauna specialist report.

## 6.10 LAND TYPES AND AGRICULTURAL POTENTIAL

### 6.10.1 Soils

According to the Land Types and Agricultural Potential specialist report, the various proposed infrastructure (substations and transmission lines) is covered by a total of 4 land types, namely:

- **Ae27** - high base status, red, structureless soils, often deep);
- **Dc31** - mixed soils, with structureless soils and duplex soils (sandy topsoil over structured clay subsoil);
- **Ib192** - rock outcrops (>60% of the landscape) with shallow soils; and
- **Ic154** - mostly rock (>80% of the landscape) with little soil.

Refer to **Figure 9** below for the map indicating the four land types.

**Figure 17** below depicts the distribution of the land types (marked by black lines) within the study area.

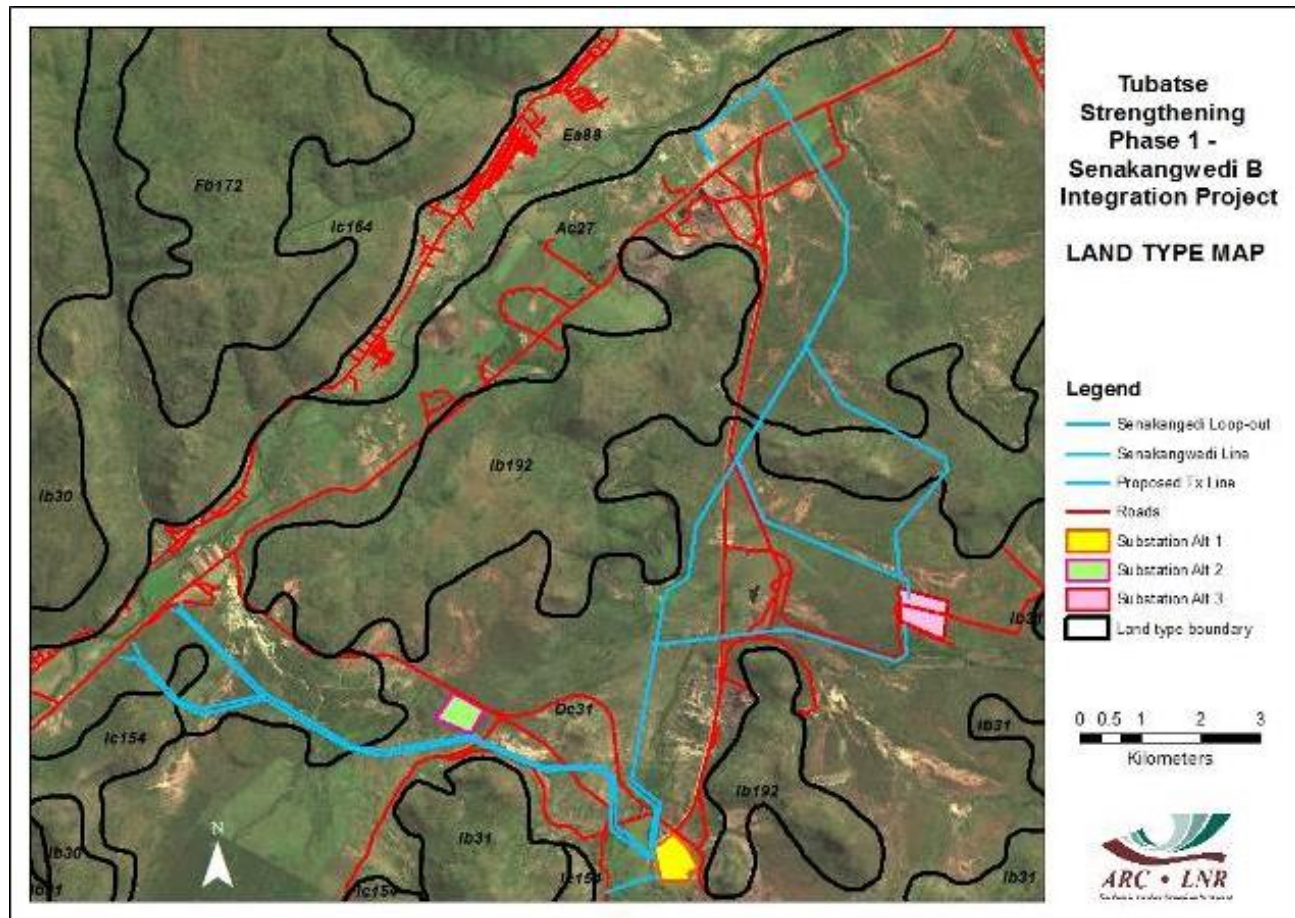


Figure 9: Distribution of land types within the study area.

The dominant soils occurring in each of the land types are shown in **Table 8** below. The right-hand column shows the total estimated percentage per land type of high, moderate and low potential soils, with the dominant category **in bold**. However, it should be noted that this refers to soil potential only, and that climatic restrictions are not taken into account.

Table 8: Soil properties per land type

Land Type	Dominant soils	Sub-dominant soils	Dominant Slopes	Agricultural Potential (%)
<b>Ae27</b>	Hutton 36/46; 450-1200+ mm SaCILm 39%	Valsrivier/Swartland 41; 600-1200+ mm; Cl 30%	2-12%	<b>H: 52.1</b> M: 30.8 L: 17.1
<b>Dc31</b>	Hutton 36/46; 450-1200+ mm SaCILm 29%	Valsrivier/Swartland 21/41; 450-1200+ mm; Cl 20%	1-5%	H: 38.5 <b>M: 44.5</b> L: 27.0
<b>Ib192</b>	Rock 64%	Mispah/Glenrosa; <300 mm; SaLm-SaCILm 24%	3-40%	H: 0.0 M: 0.6 <b>L: 99.4</b>
<b>Ic154</b>	Rock 85%	Mispah 10; 50-150 mm; SaLm-SaCILm 5%	6-100%	H: 0.0 M: 0.4 <b>L: 99.6</b>

### 6.10.2 Agricultural Potential

From **Table 5** and the land type distribution map on **Figure 13**, it can be seen that most of the infrastructure (including all three substation alternatives) fall in land type **Dc31**, with smaller portions of the proposed transmission lines in the north and west falling in land type **Ae27**. Only a very small portion of the infrastructure crosses either of the other two land types.

The soils across the study area are a mixture of red, structureless, freely-drained sandy clay loam soils of the Hutton (and occasionally Shortlands) form, with varying depth. Where these soils are deep, they have a high arable potential. However, there are also significant areas of duplex soils of the Valsrivier and Swartland forms, where a relatively sandy topsoil layer abruptly overlies a subsoil clay layer, usually structured. These soils are problematic for cultivation, as the removal of surface vegetation can often result in the exposed topsoil being eroded, leading to the formation of gullies, which can be very difficult to rehabilitate.

The climate of the study area shows that the rainfall is marginal for dryland (rain-fed) cultivation, especially in this area of warm to hot summer temperatures, exacerbated by the “bowl effect” of the surrounding steeper topography. The variable nature of the rainfall, both within seasons and across seasons, means that arable cultivation has significant risks, if no source of irrigation water is available to supplement the rainfall in times of shortfall (refer to Table 5 above).

## **6.11 SENSORY ASPECTS**

### **6.11.1 Noise**

The ambient noise levels of the proposed project area are within acceptable limits.

### **6.11.2 Visual Aspects**

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to some can be displeasing to others. The visual analysis of a landscape the impact of new developments and structures tend to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists.

In this regard, it is imperative that the applicant be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, and farmers. Many topographical features influence this environment and these features will need to be utilised when selecting an alignment so as to minimise visual impacts and intrusions.

## **7 PUBLIC PARTICIPATION PROCESS**

Public Participation Process (PPP) is any process that involves the public in problem solving and decision-making and it forms an integral part of the Scoping and EIA process. The PPP provides people who may be interested in or affected by the proposed development, with an opportunity to provide comments and to raise issues or concern, or to make suggestions that may result in enhanced benefits for the project.



Chapter 6, Regulation 54 through 57, of the EIA Regulations stipulates the manner in which PPP should be conducted as well as the minimum requirements for a compliant process. These requirements include (but not limited to):

- (a) fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
  - (i) the site where the activity to which the application relates is or is to be undertaken;
- (b) giving written notice to—
  - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
  - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
  - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of rate payers that represent the community in the area;
  - (v) the municipality which has jurisdiction in the area;
  - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
  - (vii) any other party as required by the competent authority;
- (c) placing an advertisement in—
  - (i) one local newspaper

The primary purpose of the chapter is as follows:

- To outline the PPP that was undertaken;
- To synthesise the comments and issues raised by the key stakeholders, interested and affect parties; and
- To ensure that the EIA process fully addresses the issues and concerns raised, if any.

## 7.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of the Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process i.e. the public's contribution will influence the decision. One of the primary objectives of conducting the PPP is to provide interested and affected parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of Regulations.

## 7.2 APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process was in line with the processes contemplated in Regulation 54 - 57 of the National Environmental Management Act, 1998 (Act 107 of 1998) ("the Act"), which provides that:

### 7.2.1 Identification of interested and affected parties

Interested and Affected Parties (I&APs) identified include pre-identified stakeholders (government department), landowners, Local Municipalities as well as other interested and affected parties.

### 7.2.2 Public participation database

In accordance with the requirements of the EIA Regulations under Section (24) 5 of NEMA, (Regulation 55 of GNR 543), a Register of I&APs must be kept by the public participation practitioner.

In fulfilment of this requirement such a register has been compiled and has been updated with the details of the I&APs. The database is attached as **Appendix E5**.

### 7.2.3 Site notices

On 5<sup>th</sup> and 6<sup>th</sup> December 2013, five A2 size notices were fixed at different conspicuous sites at the proposed project area i.e. the Greater Tubatse Local Municipality, existing Senakangwedi substation, Babinanoko Ba Mampuru Traditional Council Office, at the intersection of R577 and Richmond Road (near Uchoba substation).

Photographic evidence of the site notices are attached as **Appendix E1a**.

### 7.2.4 Distribution of notices to surrounding land owners/ occupiers

Notification letters were posted via registered mail to stakeholders on 26<sup>th</sup> November 2013 (Refer to **Appendix E2a** for proof of postage), whereas other site notices were hand delivered to landowners/occupiers on the 5<sup>th</sup> and 6<sup>th</sup> of December 2013. These notifications were informing the public and government stakeholders of the project as well as affording the public of an opportunity to register as I&AP and also to comment or raise any issue that they might have. This process was run for a 40 day calendar period as per the NEMA Regulations.

### 7.2.5 Municipality in which the site is situated and other governmental authorities

The project falls under the Greater Tubatse Local Municipality. Governmental authorities were informed by means of formal letters explaining the proposed activity on which they were invited to comment. Notification and request for comments were submitted to the following governmental stakeholders:

- Greater Tubatse Local Municipality;
- Limpopo Heritage Resource Agency;
- Limpopo Department of Roads and Transport;
- Limpopo Department of Agriculture ;
- Limpopo Department Economic Development, Environment and Tourism; and
- Limpopo Department of Water Affairs.

The notifications were sent by registered mail; refer to **Appendix E2b** for proof.

## 7.2.6 Placement of advertisement in the local newspaper

An advertisement was placed on the Legal Classifieds section of The Star newspaper and Gemeenskap (Steelburger/Lydenburg News) on 22 November 2013. On 14 December 2013, the advertisement was amended and published again on The Star newspaper. The advertisement was aimed at further informing the I&APs of the proposed activity and to invite them to submit their comments. A period of 72 days was allowed for the public to submit their comments, issues or concerns this was over and above the NEMA prescribed 40 days and was done so as to include public, school holidays and the festive break. Proof of newspaper advertisement is attached as **Appendix E1c**.

## 7.3 PUBLIC PARTICIPATION DURING SCOPING PHASE

### 7.3.1 Placement of draft Scoping Report for Public Review and Comment

The I&APs, stakeholders and landowners were informed of the availability of the draft Scoping Report and further invited to review and comment on the report. The methods of communication used were a newspaper advertisement published on The Star newspaper on 29<sup>th</sup> May 2014 (refer to **Appendix E1c**) and notification letters (refer to **Appendices E2a**)

**Table 9** below provides a detailed list of places and website address where the draft Scoping Report was made available for review and comment.

Table 9: List of places where the draft Scoping Report was made available for review and comment

Venue	Address	Contact
Nokaneng Crèche	Nokaneng Village in Tubase	Anna Khalo - 079 738 3784
Moshate Gamalekane	GaMalekane Village in Tubatse	Thabo Dibakwane - 082 355 0830
GaMampuru Tribal Council	GaMampuru Village in Tubatse	Eric Kgobisa - 083 566 8550
Roka Phasha Phokwane Tribal Council	Ga Phasha Village in Tubatse	Beauty Makofane - 083 490 7976
Nsovo Website	<a href="http://www.nsovo.co.za">www.nsovo.co.za</a>	Masala Mahumela - 011 312 5153

Stakeholders were informed of the proposed project and invited to participate by means of formal letters. Further, copies of the draft Scoping Report were hand delivered to the key stakeholders for review and comment in May 2014 and proof of submission is attached as **Appendix E2b**. The draft Scoping Reports were submitted to the following stakeholders:

- Department of Environmental Affairs;
- Greater Tubatse Local Municipality;
- South African Heritage Resources Agency;
- Limpopo Department of Roads and Transport;
- Limpopo Department of Agriculture ;
- Limpopo Department Economic Development, Environment and Tourism (LEDET) ; and
- Limpopo Department of Water Affairs.

Following the distribution of the draft Scoping Report to the stakeholders, comments were received from LEDET and Mpumalanga Department of Water Affairs acknowledging receipt of the report and providing comments and recommendations attached as **Appendix E6**.

### 7.3.2 Public Meetings

Public meetings were scheduled from the 25<sup>th</sup> to the 26<sup>th</sup> June 2014 at various places around the study area. Invitations of I&APs and Stakeholders were done via a newspaper advert published on The Star newspaper published on the 29<sup>th</sup> May 2014 as well as notification letters and e-mails (refer to **Appendices E1c and E2a**). The aim of these meetings was to notify I&APs, stakeholders, landowners and developers about Eskom's intention for the proposed project, furthermore, to record all issues, concerns and comments that may be raised by the I&AP's, stakeholders, Tribal Authorities, Ward Councillors and Developers who are affected by the proposed activity. Issues that were raised were recorded and are included as part of the Comments and Response Report (**Appendix E3**).

Public meeting were scheduled and held as per **Table 10** below:

Table 10: Details of Public meetings

Date	Time	Venue
25 June 2014	15H00 -17H00	Nokaneng Crèche
	18H00 - 20H00	Tubatse Chrome Club
26 June 2014	9H00 -11H00	Moshate Ga-malekane
	12H00 -14H00	Ga-Mampuru Tribal Council
	16H00 -1800	Roka Phasha Phokwane Tribal Council

On the 25<sup>th</sup> June 2014, public meetings were held at the Nokaneng crèche and Tubatse chrome club. The meetings were duly attended by community members; however, a low turnout was noted. Further, on the 26<sup>th</sup> June 2014 a public meeting was held at Moshate Ga-malekane Tribal Hall. The meeting was duly attended by the Ward councillors, Tribal Authorities and I&APs.

A focus group meeting was also held at Ga-Mampuru Tribal Council with the headman. The meeting scheduled with the Roka Phasha Phokwane Tribal Council could not take place due to internal miscommunication.

Proof of meeting minutes, attendance registers photographs from the meetings are included as **Appendices Appendix E7-1, E7-2 and E7-3**.

After the review and comment period for the draft Scoping was completed, the final Scoping Report together with the Plan of Study for EIA were prepared and submitted to DEA. The DEA accepted the reports and granted approval for the EIA phase to take place.

## 7.4 PUBLIC PARTICIPATION DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PHASE

### 7.4.1 Placement of the draft EIA report for Public Review

The I&APs, stakeholders and landowners were informed of the availability of the draft EIA Report and further invited to review and comment on the report. An advert informing the I&APs and stakeholders of the availability of the draft EIA and inviting them to review and comment on the report was published on Steelburger/Lydenburg newspaper on 7<sup>th</sup> November 2014 (refer to **Appendix E1c**). Furthermore, letters and emails were sent to the I&APs informing them of the availability of the draft EIA for comments and review. Site notices informing I&APs of the availability of the draft EIA report were placed at different conspicuous places on site (Refer to **Appendix E2a**).

**Table 11** below shows venues where copies of the draft EIA Report were made available for public review and comment.

Table 11: Venues where draft EIAs were placed for public review and comment.

Venue	Address	Contact
Masha Gosebo Crèche	Nokaneng/Kalkfontein Village in Tubase	Anna Khalo - 079 738 3784
Tubatse Chrome Club	R555 Main Road, Steelpoort, 1133	Jaqueline Engelbrecht – 013 236 5112
Nsovo Website	<a href="http://www.nsovo.co.za">www.nsovo.co.za</a>	Masala Mahumela - 011 312 5153

Apart from the above, copies of the draft EIA Report were sent to I&APs by email (refer to **Appendix E2a**).

Copies of the draft EIA were also submitted to Organs of State for review and comment. Below is the list of such Organs of State:

- Department of Environmental Affairs;
- Limpopo Department of Economic Development Environment and Tourism;
- Grater Tubatse Local Municipality;
- Limpopo Department of Agriculture;
- Limpopo Department of Water Affairs; and
- A soft copy was submitted on the SAHRA website.

Refer to **Appendix E2b** for the proof of submission of the draft EIA Reports.

## 7.4.2 Public Meetings

No issues were raised during the EIA phase that warranted a public meeting. All comments received have been addressed accordingly in the EIA and PPP report. Further detailed responses have been sent to the relevant parties.

## 7.5 SYNTHESIS OF ISSUES AND RESPONSE

Appendix E3 contains comments raised by the I&APs as well as the responses by the Environmental Assessment Practitioner.

# 8 DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

## 8.1 MOTIVATION FOR THE DEVELOPMENT

As part of the long term solution, Eskom has undertaken a series of projects to upgrade the existing electricity infrastructure and to construct new infrastructure where there is a need in the country. The Proposed Tubatse Strengthening Phase 1 – Senakangwedi B Integration is driven by mine development and it forms part of the new infrastructure that Eskom has planned, the objective being to ensure reliable energy supply.

The propose project will ensure the following:

- The power line will form part of the link to strengthen the supply network between the existing Senakangwedi substation and the proposed Senakangwedi B substation;
- Improvement in reliability of electricity supply which will primarily benefit mines in the area; and
- Improve the economic status of South Africa.

## 8.2 BENEFITS OF THE PROJECT

The proposed project is beneficial as it will allow for load growth in the region. It is envisaged that the proposed project would ensure reliable supply to industry, predominantly the mines in the area; this will indirectly benefit communities as reliable electricity will result in uninterrupted production and therefore growth in industry, which



could potentially yield additional jobs. The overarching impact will be positive economic spinoffs, which benefit the community, the region and country at large.

### **8.2.1 Supporting Strategies**

At the regional level, the project would contribute to reliability of power supply. There would also be a less tangible but nonetheless important benefit of positioning the municipalities on the lead in terms of sustainable energy supply.

At the national level, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (DME 1998). The priorities to which this project would contribute are laying the groundwork for promoting electrification and off-grid power supply.

## **9 DESCRIPTION OF FEASIBLE AND REASONABLE ALTERNATIVES**

The identification of alternatives is an important component of the EIA process. The various identified alternatives are discussed below. These alternatives are assessed in terms of environmental acceptability as well as technical and economic feasibility.

Four alternative sites including the no-go alternative are being considered for the Senakangwedi B substation. Power lines will be constructed in order to connect the existing Senakangwedi and the newly proposed Senakangwedi B substations. The power line corridor will be determined by the location of the substation site. A 2km corridor is assessed on all the options within which servitude of 55m and 47m for 400kV and 275kV respectively will be utilised. The project has considered various technical options of which the proposed were found to be technically, economically and environmentally viable compared to the other options. The various alternatives are presented in this final EIA Report.

### **9.1.1 Technical Alternatives**

The technical alternatives that were considered include above ground as well as underground power lines following which the option of constructing an underground cable was assessed and dismissed during the scoping phase. The dismissal was based on the technical non-feasibility due to the geology, topography, maintenance and financial

implications of the proposed routes as well as consideration of advantages and disadvantages as indicated in **Table 12** below.

Table 12: Technical Alternative Analysis

Technical Alternative	Advantages	Disadvantages
Underground 275kV and 400kV power ground	<ul style="list-style-type: none"> <li>• Minimal visual Impact.</li> <li>• Minimisation of the impact on land use.</li> </ul>	<ul style="list-style-type: none"> <li>• Increased ground disturbance therefore, increased impact on sensitive environments.</li> <li>• High maintenance costs; and</li> <li>• High construction costs (about 10 times more than the above ground cables).</li> </ul>
Aboveground 275kV and 400kV power ground.	<ul style="list-style-type: none"> <li>• Minimal ground disturbance, therefore reduced impacts on sensitive environments;</li> <li>• Economically feasible as it offers cost saving; and</li> <li>• Easy and reduced maintenance Cost.</li> </ul>	<ul style="list-style-type: none"> <li>• Considerable visual impact.</li> </ul>

### 9.1.2 Structural alternatives

Three design alternatives have been proposed and these are the Guide V type, Cross rope suspension type and the Self-supporting suspension type. These are illustrated in **Figures 10, 11, 12, 13, 14, 15** and **16** below. It is important to note that the topography will largely dictate the types of towers to be used. From this perspective, it should be noted that where the line crosses mountainous terrains and where it changes direction at an angle, there will be a need to use self-supporting towers. Narrow base towers may be utilised on sections where space is a challenge. An example of these is illustrated in **Figure 7** below.

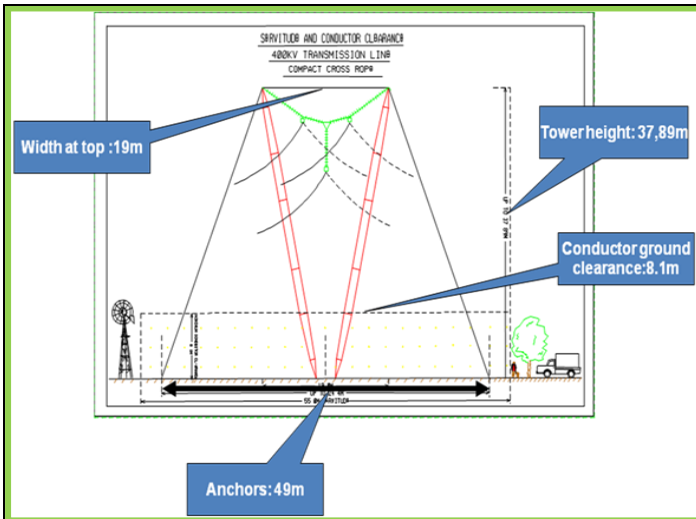


Figure 10 : Guide V tower

Figure 11: Photographic Guide V tower

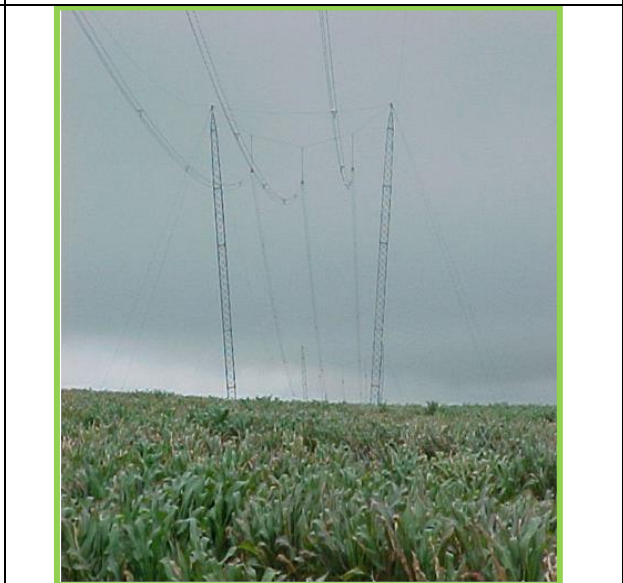
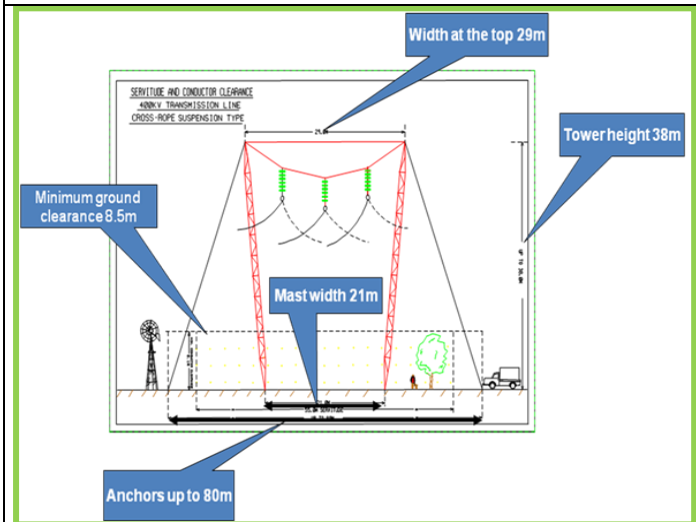


Figure 12: Cross rope suspension tower.

Figure 13: Photographic illustration of a Cross rope suspension tower.

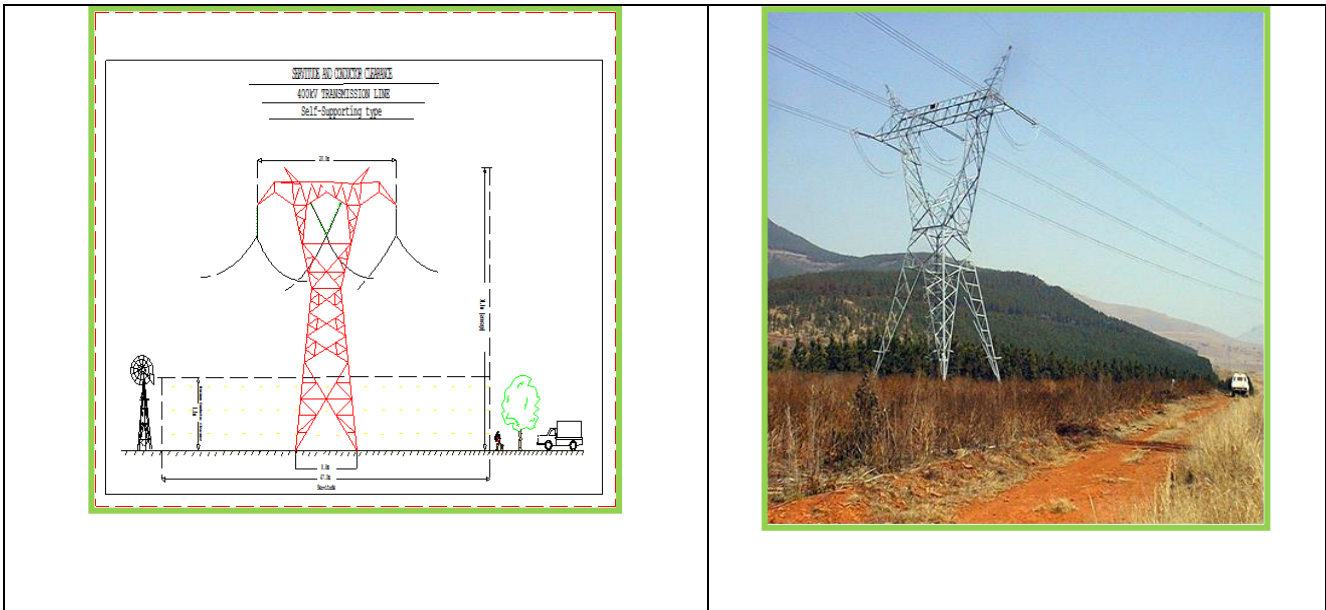


Figure 14: Self-supporting suspension tower.

Figure 15: Photographic Self-supporting suspension tower.

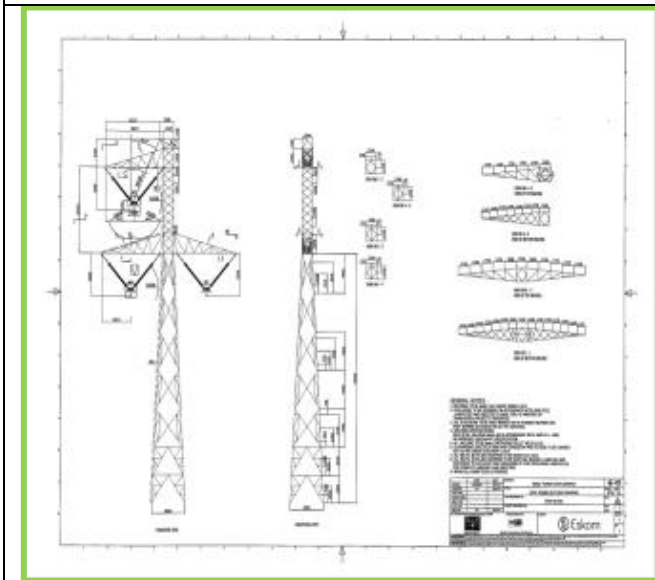


Figure 16: Narrow base tower

None of the above options have been dismissed and remain alternatives depending on the terrain and topography.

Based on input from the specialist, it is recommended that where at all possible the narrow base tower be used to reduce the visual impact as well as the impact on fauna. The narrow base minimise the footprint and possibility of birds flying over.

### 9.1.3 Sites alternatives

#### 9.1.3.1 Alternative 1

This site is situated on Farm Dwars Rivier 372KT adjacent to the existing Uchoba substation. The site is located in close proximity to an unnamed road that leads to Middelburg. Further, there is a quarry operation adjacent to the site and the Dwars Rivier mine within approximately a kilometre distance. The proposed substation will be connected to the existing Senakangwedi substation through the proposed power line which will traverse the R555, R577 Road and an unnamed road. Further, the line will traverse farms and the Tweefontein mine property. No residential communities were noted in proximity to the site during the study.

Substation site alternative 1 (depicted in orange) lies in a corridor which is approximately 26km long. Refer to **Figure 8** below.

#### 9.1.3.2 Alternative 2

Alternative 2 is situated on Farm Tweefontein 360KT about 1km away from Nokaneng/Kalkfontein village. The site is also adjacent to the road which leads to Middelburg. The proposed substation will be connected to the existing Senakangwedi substation through a proposed power line which will traverse the R555 and R577 roads as well as farms with no formal agricultural activities.

Substation site alternative 2 (depicted in green) lies in a corridor which is approximately 21.5km long. Refer to **Figure 8** below.

#### 9.1.3.3 Alternative 3

Alternative 3 is situated on Farm Frischgewaagd 359KT. This substation will be connected to the existing Senakangwedi substation through a proposed power line which will traverse the R555 road and some game farms.

Substation site alternative 3 (depicted in Purple) lies in a corridor which is approximately 26.2km long. Refer to **Figure 8** below.

### 9.1.4 No-go alternatives

In accordance with GNR 543, consideration must be given to the option not act. This option is usually considered when the proposed development is envisaged to have such significant negative environmental impacts that mitigation measures cannot ameliorate effectively.

The no-go alternative would be the option of not undertaking the construction of the proposed project. It would imply no improvement in reliability of electricity supply which would benefit electricity users primarily the mines. Should the no-go alternative be adopted, the mines will be deprived of a much needed essential service, particularly given the already existing problem with energy supply countrywide.

The alternative substation sites and associated power line corridors are illustrated in **Figure 8** below. An A3 copy of the locality map is attached as **Appendix A**.

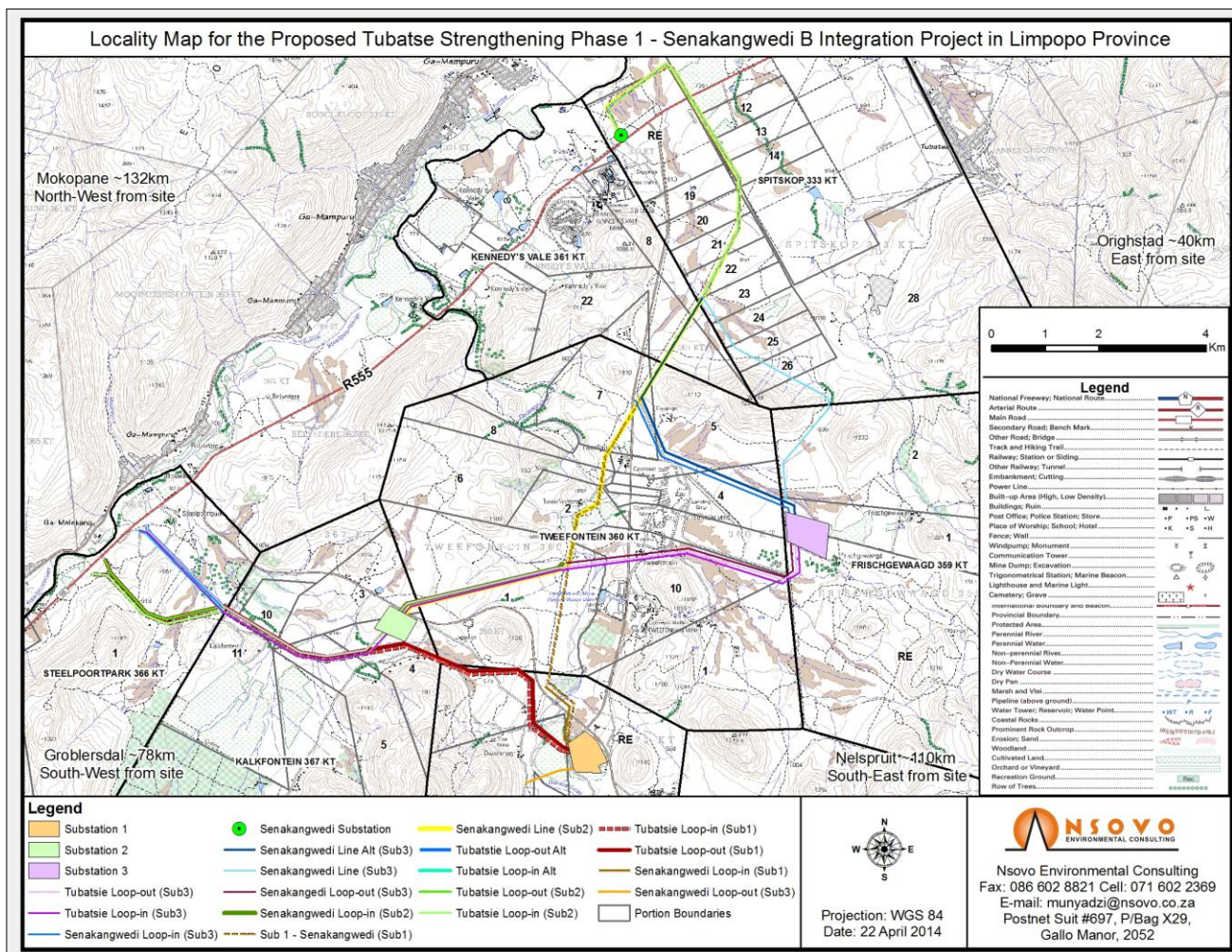


Figure 17: Locality Map indicating alternatives considered.

**Table 13** below indicates site alternative analysis with advantages and disadvantages of each site.

Table 13: Site alternative analysis

Site Alternative	Advantages	Disadvantages
Substation site 1	<ul style="list-style-type: none"> <li>• It is located adjacent to the existing Uchoba substation (less visual impacts due to existing Uchoba substation, the quarry operation and Dwars River mine located close to site).</li> <li>• The powerline corridor connecting to substation Alternative site 1 is likely to have the smallest footprint on natural areas as it follows an existing powerline for much of its extent.</li> <li>• It is easier to access as it is located in proximity to an R577 and Richmond Road.</li> <li>• No residential communities are situated near this site.</li> <li>• Area is already disturbed therefore relatively minimal impacts on birds.</li> <li>• According to the Vegetation Assessment Report substation site is situated in an area classified as having “No Natural Habitat Remaining” and therefore have little conservation value.</li> </ul>	<ul style="list-style-type: none"> <li>• The powerline corridor is ±26km long.</li> <li>• The Dwars River national heritage site is situated between the loop in and loop out lines associated with alternative substation site 1. These lines are in close proximity (approximately 200 metres) to instigate a potential direct or indirect impact to the site.</li> <li>• Alternative substation site 1 has a small temporary stream located on the study site and is also located within 500 m of the perennial Dwars River.</li> </ul>

	<ul style="list-style-type: none"> <li>• According to the Vertebrate Assessment Report, no ecologically sensitive areas or systems that warrant special conservation attention were identified on the Senakangwedi B substation sites 1, 2 or 3, or notionally along the proposed routes of the power lines connecting them.</li> </ul>	
<p>Substation site 2</p>	<ul style="list-style-type: none"> <li>• The powerline corridor covers the shortest route/distance of ±21.5km and traverses fewer properties than Alternatives 1 and 3.</li> <li>• Alternative substation site 2 is located directly adjacent a regional road (R577) providing easy access to site.</li> <li>• No riparian or wetland conditions occur on the proposed site.</li> <li>• According to the Vegetation Assessment Report, the corridor traverses large portions of “Least Concern” as well as “No natural habitat remaining”. However, “Important” and “Highly Significant” areas are also traversed - these areas correspond greatly with mountainous areas.</li> </ul>	<ul style="list-style-type: none"> <li>• The Alternative substation site 2 is located about 1km away from the Nokaneng/Kalkfontein Village.</li> <li>• Archaeological stone walled sites were noted at the Alternative substation 2 site.</li> </ul>



Substation site 3	<ul style="list-style-type: none"> <li>• No sites of heritage significance were identified.</li> <li>• No residential communities are situated near this site.</li> </ul>	<ul style="list-style-type: none"> <li>• Alternative corridor 3 is approximately ±26.2km, almost the same as Alternative corridor 1.</li> <li>• It will traverse a potentially sensitive mountainous area north of the proposed Alternative substation site 3.</li> <li>• The Alternative substation site 3 is located adjacent to a nature reserve;</li> <li>• It does not have adequate access roads.</li> <li>• A small temporary stream is located on the site.</li> </ul>
No-go Alternative	<ul style="list-style-type: none"> <li>• None of the envisaged impacts will occur; and</li> <li>• No expenditure.</li> </ul>	<ul style="list-style-type: none"> <li>• No construction cost but greater economic disadvantage.</li> <li>• The mines will be deprived of a much needed essential service, particularly given the already existing problem with energy supply countrywide.</li> <li>• Although the proposed project is needed for provision of electricity in the mines, if the project does not take place, more power cuts occurrences can be expected in the area as the current electricity capacity is not enough for the GTLM and the mines, hence the need for the project.</li> </ul>

## 10 IMPACT ASSESSMENT METHODOLOGY

The assessment of impacts will largely be based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed decommissioning activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts will be assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in **Table 14** below will be used to conduct the evaluation. The nature of each impact was to be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it.

Table 14: Methodology used in determining the significance of potential environmental impacts

### STATUS OF IMPACT

The impacts are assessed as either having a:  
negative effect (i.e. at a 'cost' to the environment),  
positive effect (i.e. a 'benefit' to the environment), or  
Neutral effect on the environment.

### EXTENT OF THE IMPACT

- (1) Site (site only),
- (2) Local (site boundary and immediate surrounds),
- (3) Regional (within the City of Johannesburg),
- (4) National, or
- (5) International.

### DURATION OF THE IMPACT

The length that the impact will last for is described as either:

- (1) immediate (<1 year)
- (2) short term (1-5 years),
- (3) medium term (5-15 years),
- (4) long term (ceases after the operational life span of the project),
- (5) Permanent.

### MAGNITUDE OF THE IMPACT

The intensity or severity of the impacts is indicated as either:

- (0) none,
- (2) Minor,
- (4) Low,
- (6) Moderate (environmental functions altered but continue),
- (8) High (environmental functions temporarily cease), or
- (10) Very high / Unsure (environmental functions permanently cease).

### PROBABILITY OF OCCURRENCE

The likelihood of the impact actually occurring is indicated as either:

- (0) None (the impact will not occur),
- (1) improbable (probability very low due to design or experience)
- (2) low probability (unlikely to occur),
- (3) medium probability (distinct probability that the impact will occur),
- (4) high probability (most likely to occur), or
- (5) Definite.

### SIGNIFICANCE OF THE IMPACT

Based on the information contained in the points above, the potential impacts are assigned a significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and magnitude (**M**) and multiplying this sum by the probability (**P**) of the impact.

$$S=(E+D+M)P$$

### THE SIGNIFICANCE RATINGS ARE GIVEN BELOW

- (<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- (30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area).

## 11 DESCRIPTION AND COMPARATIVE ASSESSMENT OF ALL ALTERNATIVES IDENTIFIED DURING THE EIA PROCESS

The identification of alternatives is an important component of the EIA process. Consideration of alternatives focused mostly on route alternatives as compared to activity alternatives. The various alternatives have been assessed in terms of both environmental acceptability as well as economic feasibility.

The selection of the preferred alternative is based on several factors:

- Specialists' recommendations;

- Environmental constraints;
- Technical feasibility;
- Economic cost-benefit analysis;
- Best practicable environmental option i.e. the option that provides the most benefit or causes the least damage to the environment at a cost acceptable to society in both the long and short term; and
- Optimisation of existing infrastructure, such as access roads.

## 11.1 COMPARATIVE ASSESSMENT

Following the public participation process, the undertaking of specialist studies and impact assessment of the proposed routes a comparative analysis was made as depicted in **Table 15** below.

Table 15: Comparative Assessment of Alternatives

	Corridor 1	Corridor 2	Corridor 3
Distance	±26km Similar to Alternative corridor 3.	±22km Shortest route therefore minimal disturbance.	±26.2km Longest Route, Least preferred.
	Least Preferred.	Preferred.	Least Preferred.
Ecological	The substation Alternative 1 site was found to be of low sensitivity because it is ecologically most transformed.	Alternative substation site 2 is of high and medium sensitivity.	Alternative corridor 3 is the longest route and will traverse a potentially sensitive mountainous area north of the proposed substation Alternative 3 site.
	Preferred.	Satisfactory.	Least Preferred.
Agricultural	This corridor is least preferred because it is located on an Ae27 land type with high occurrence of high potential Hutton soil.	Land type <b>Dc31</b> contains a wide mixture of soils, with a spread of agricultural potential and it is located on an area where there is less area covered with high potential Hutton soil.	Same as 1.

	Least Preferred	Preferred	Least Preferred
Heritage	These lines are in close proximity $\pm 200\text{m}$ to instigate a direct or indirect impact to the national Dwars River Heritage site.	Archaeological stone walled sites were noted in this proposed area.	No sites of heritage significance were identified on the footprint during the survey.
	Least Preferred.	Least Preferred	Preferred
Avifauna	Alternative substation site is located within close proximity to a wetland system as well as an area that is heavily impacted upon by the surrounding mines and the existing Uchoba substation. In addition, this site is also surrounded by a well-established road network enabling ease of access during construction and operational activities.	Alternative substation site 2 has also undergone some form of transformation and subject to existing disturbance from the surrounding homesteads.	Alternative substation site 3 has also undergone some form of transformation and subject to existing disturbance from the surrounding pastoral activities respectively. Site 2 is also located adjacent to a heavily utilised district road.
	Preferred.	Satisfactory	Least Preferred
Socio Economic	Alternative 1 is the socially preferred option as it is relatively close to an existing substation and there are a number of mine tailings facilities in the area.	This alternative is located about 1km from Nokaneng Village.	Alternative corridor 3 interferes with the sense of place as it particularly stretch across the landscape the longest.
	Preferred.	Least Preferred.	Least Preferred.

## 12 SUMMARY OF FINDINGS AND RECOMMENDATIONS BY SPECIALISTS

Seven specialist studies were undertaken during the EIA process and are listed in **Table 16** below. The contact details of the specialists are also included in the table.

Table 16: Specialists and Contact Details

Specialist Studies	Organisation	Specialist	Contact Details
Archaeological Impact Assessment	Vhubvo Archaeo-Heritage Consultants	Munyadziwa Magoma	Tel: 012 771 3488 Fax: 086 566 8079 <a href="mailto:munyadziwam@gmail.com">munyadziwam@gmail.com</a> 83 Eden Village 746 Ciliaris Road Dorandia Pretoria North, 0182
Vegetation Assessment	Dimela Eco Consulting	Antoinette Eysell	Cell: 083 642 6295 <a href="mailto:Antoinette@dimela-eco.co.za">Antoinette@dimela-eco.co.za</a> or <a href="mailto:DimelaEcoConsulting@gmail.com">DimelaEcoConsulting@gmail.com</a>
Wetland Impact Assessment	Limosella Consulting	Antoinette Bootsma	Cell: 083 4545 454 <a href="mailto:antoinette@limosella.co.za">antoinette@limosella.co.za</a> P.O Box 32733 Waverly, Pretoria 0135
Social Impact Assessment	Neville Bews and Associates Social Impact Assessors	Dr Neville Bews	Tel: 011 867-0462 Cell: 082 557-3489 Fax: 086 621-8345 <a href="mailto:bewesco@netactive.co.za">bewesco@netactive.co.za</a> P.O. Box 145412 Bracken Gardens

			1452
Vertebrate Impact Assessment		Ignatius Lourens Rautenbach (SACNASP No. 400300/05)	Tel: 012 3334112 Cell: 082 3351288 <a href="mailto:naasrauten@mweb.co.za">naasrauten@mweb.co.za</a> 45 Helgaard Street 45, Kilner Park, Pretoria, 0186.
		Alan Charles Kemp (SACNASP No. 400059/09)	
		Jacobus Casparus Petrus van Wyk (SACNASP No. 400062/09)	Tel: 012 345 2787 Cell: 0824108871 <a href="mailto:jcpvanwyk@absamailco.za">jcpvanwyk@absamailco.za</a> P.O. Box 25085 Monument Park Pretoria, 0105
Avifaunal Study	Wildskies Ecological Services	Jon Smallie	C: 082 444 8919 F: 086 615 5654 E: <a href="mailto:jon@wildskies.co.za">jon@wildskies.co.za</a>
Land Types and Agricultural Potential Study	Agricultural Research Council	Garry Paterson	Tel: 012 310 2601 Cell: 083 556 2458 Fax: 012 323-1157 <a href="mailto:garry@arc.agric.za">garry@arc.agric.za</a> Private Bag X79, Pretoria 0001.

## 12.1 ARCHAEOLOGICAL IMPACT ASSESSMENT

Munyadziwa Magoma of Vhubvo Archaeo-Heritage Consultants was appointed to undertake the Phase 1 Archaeological Impact Assessment study for the proposed project.

The Archaeological Impact Assessment Report indicates that Iron Age people preferred to settle in the rich alluvial soils close to rivers. As such considering that Alternative substation site 1 is located 600m away from a

river the specialist recommended that a walk-down survey of this site be undertaken in order to ensure that no chance archaeological/ and or graves are compromised/ or disturbed by the project.

It was observed that section of Alternative substation site 2 had been bulldozed and cleared, and this had caused a significant damage to the noted archaeological sites. The disturbance has further been instigated by sample points, probably conducted for prospecting of minerals. Archaeological stone walled sites were also noted in this proposed area. These sites date to the Late Iron Age, and are the results of Iron Age groups. Consequently, these sites and clusters of sites have high significance and are protected by Section 35 of the National Heritage Resources Act (No 25 of 1999). The Archaeological Impact Assessment Report further indicated that, should the DEA authorize this site for construction, detailed mapping, extensive recording of the structures and destruction permit must be obtained.

Although Alternative substation site 3 was covered with vegetation during the site visit, no sites of heritage significance were identified during the survey, however, a thorough walk-down of the site is recommended prior to commencement of the proposed project.

**The Archaeological Impacts Assessment concluded that Alternative substation site 3 is the preferred site. Further, a walk-down must be undertaken prior to commencement of the construction of the proposed activities in order to ensure that all archaeological materials, if any, are managed appropriately.**

## 12.2 VEGETATION ASSESSMENT

Antoinette Eysell of Dimela Eco Consulting was appointed to undertake the Vegetation Assessment for the proposed project.

The vegetation Assessment Report has covered all three Alternative substation sites as well as the powerline corridors. The project area is situated in the Savana Biome; the substation alternative sites are situated within the Sekhukune Mountain Bushveld, while the most northern extent of the proposed power lines are situated within the Sekhukhune Plains Bushveld. The Sekhukhune Plains Bushveld is classified as Endangered, while the Sekhukhune Mountain Bushveld is of no conservation concern. However, these vegetation types include a number of plants endemic to the region which lead to local sensitivities where these and threatened plant species occur. In addition, all three the proposed substation sites, as well as the bulk of the powerline routes



are situated within the Sekhukhune Mountain lands Ecosystem which is listed as an Endangered Ecosystems in terms of Section 52 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 32689,2009).

The extent of the study area was historically situated within the Mpumalanga Province and thus included in the Mpumalanga Biodiversity Conservation Plan (MBCP). However, the study area has since been moved into the Limpopo Province, for which no provincial conservation plan is available yet. Therefore, as best practise, the report refers to the extent of the area that the proposed development is situated in, in relation to the MBCP. As classified in the MBCP, all three of the substation alternative sites are located in areas that are of 'Least Concern' or have 'No Natural Habitat' remaining. On the other hand, the proposed power lines will have an impact on some areas that are classified as 'Important and Necessary' as well as 'Highly Significant' in reaching conservation targets.

A list of fifteen plants of conservation concern that could occur within the area of the proposed development was compiled using various sources. Refer to **Table 5** above. Suitable habitat for the majority of these species exist along the proposed powerline corridors, while one Declining species, *Drimia altissima* was confirmed to occur at the substation Alternative 2 site. In addition to these species, provincially protected plants as well as nationally protected trees were confirmed to occur on the substation sites as well as along the proposed corridors. None of these plants may be removed or damaged without authorisation from the provincial conservation authority.

The substation Alternative 1 site was found to be of low sensitivity, while the substation Alternative 2 and 3 sites were of high and medium sensitivity. The areas of sensitivity were found to be more or less comparable. Alternative corridor 1 aligns for much of its extent with an existing powerline. This corridor also connects with the only substation site of low sensitivity (Substation Alternative 1). Alternative corridor 2 is comparable to Alternative corridor 1. However, this corridor connects to a substation site that was classified as being of high sensitivity. Alternative corridor 3 and will traverse a potentially sensitive mountainous area north of the proposed substation Alternative 3 site.

**In light of the findings discussed above, the Vegetation Assessment concluded that Alternative corridor 1, with the substation Alternative 1 site is the preferred route, whereafter the Alternative 2 corridor, with the substation Alternative 2 site is the second preferred route.**

### 12.3 WETLAND IMPACT ASSESSMENT

Antoinette Bootsma of Limosella Consulting was appointed to undertake the Wetland Assessment Impact for the proposed project.

The Wetland Assessment Report has covered all three proposed Alternative substation sites as well as the powerline corridors. During the Wetland Assessment, two perennial riparian areas were recorded, namely the Steelpoort River and the Dwars River. These riparian areas are linked to numerous smaller tributaries. The majority of the tributaries are temporary (ephemeral or episodic) streams with only a few being perennial. Numerous artificial dams were also recorded throughout the study area and especially in the mining areas. Both proposed Alternative substation site 1 and proposed Alternative substation site 3 have small areas of temporary streams located on the site.

As indicated above, the proposed Alternative substation site 3 is located adjacent to a nature reserve without adequate access roads; it is thus not the preferred substation site. Alternative substation site 1 is located within 500 m of the perennial Dwars River. Further, a small temporary stream is located on the at Alternative substation site 1 and therefore this alternative is not preferred

Wetland conditions are associated with numerous of the perennial rivers and temporary streams recorded in the region of the study area. The current proposed powerline routes cross perennial rivers or temporary streams a total of 37 times. It is important to note that this figure is for all the routes combined. It is likely that once the final powerline route is chosen the amount of crossings will be less.

**The Wetland Assessment study concluded that Alternative substation site 2 is the preferred alternative because it is located directly adjacent a Regional road and no riparian or wetland conditions occur on this site, although a small temporary stream is located south of the study site.**

### 12.4 SOCIAL IMPACT ASSESSMENT

The Social Impact Assessment was undertaken by Dr. Neville Bews of Dr. Neville Bews and Associates Social Impact Assessors.

The report indicates that the Limpopo economy relies heavily on agricultural and to a lesser degree on mineral resources. With a number of new ventures being planned by Limpopo Province and the Department of Trade and Industries (Gabara, 2013; Masondo, 2013), it is important that the security of power supply is retained in the area. In this regard the project is necessary to ensure the economic growth of the area. Notwithstanding this, however, it is also important to involve the community in the planning process and to use local labour as far as is possible. Where relevant, landowners must be consulted with regard to the placing of towers and access to their properties during construction and maintenance.

**The Social Impact Assessment Study concluded that Alternative 1 is the socially preferred option as it is relatively close to an existing substation and there are a number of mine tailings facilities in the area.**

## 12.5 VERTEBRATE IMPACT ASSESSMENT

The Vertebrate Impact Assessment was undertaken by Ignatius Lourens Rautenbach, Alan Charles Kemp and Jacobus Casparus Petrus van Wyk.

Following the assessment, the specialists deduced findings and further made recommendations for Alternative substation sites 1, 2 and 3 as well as the powerline corridors. Alternative substation site 1 is dominated by a dense stand of tall grass and a sparse stand of scrub, especially towards the north-west. The typical arid plains woodland of the area has obviously forcibly been removed. The substrate consists of compacted clayish soil hard enough to discourage the construction of tunnels by burrowing animals. Ecologically, the site is judged to be severely compromised and its conservation rating is therefore considered to be “Very Low”.

Alternative substation site 2 consists of ecologically disturbed and arid plains woodlands that regressed to predominantly isolated *Acacia burkei* trees. In places, dense stands of immature *Aloe castanea* were recorded. A slight rocky rise fails to offer rupicolous habitat for creatures partial to nooks and crannies amongst rocks. A small portion of the site has been tilled in the past but is now ecologically reclaimed by a dense stand of *Euclea* plants growing on compacted red sandy soil. The conservation status of the site is rated as “Low”. Although the flora of the site has not been displaced, it has been over-utilized.

Alternative substation site 3 is located immediately east of a protected property that is game-fenced. The poor basal cover and substandard stand of trees on the proposed site for the new substation is in stark contrast to the well-developed woodland within the protected area. This site is heavily grazed by cattle; clearly without management considerations. The conservation status of this site is rated as “Low” and is judged to be in a downward spiral. The terrestrial and arboreal habitats of this site have been over-utilized by cattle grazing and fires.

All charismatic mammals (such as elephants, buffaloes, rhinos, lions, leopards, hyenas) have long since been extirpated for sport or to favour cattle farming. It is concluded that 58 species of mammals are still part of the present-day mammal species assemblage on the six farms, or within one kilometre either side of the proposed power line route.

The presence of persistent species such as aardvark, porcupines, springhares, baboons, vervet monkeys, warthogs and kudu was not confirmed, but considering the extent of the district and the excellent connectivity, it can be assumed that they are at least occasional vagrants onto the site.

No ecologically sensitive areas or systems that warrant special conservation attention were identified on Alternative substation sites 1, 2 or 3, or notionally along the proposed routes of the power lines connecting them. Consequently, with the present level of understanding there is no reason to redirect the proposed routes. It is furthermore not foreseen that any Red Data species in the area will ultimately be displaced or even unduly affected by the intended development.

The proposed routes for the new power lines were as far as possible carefully plotted to avoid sensitive areas. Within the level of insight in the current phase in the decision-making process, no new sites or routes are recommended that will improve on the alternatives evaluated above.

**The Vertebrate Assessment concluded that of the three sites proposed for the construction of the new substation, Alternative substation Site 1 is recommended, since it is ecologically already the most transformed. However, no ecological objection will be raised should Sites 2 or 3 be selected.**

## 12.6 AVIFAUNAL STUDY

Jon Smallie of Wildskies Ecological Services conducted the Avifaunal study.

From an avifaunal perspective, a fairly wide diversity of species (approximately 295 species) could be found in the broader area within which the project falls. However, most of the site is already relatively highly impacted upon by extensive mining and industrial activity, human settlement, pastoral activities and existing road and power line networks and the likelihood of these species utilizing the site is considered to be low in most cases. This is particularly true of the Red List species, only a handful of which have any chance of frequenting the site.

Further, due to the already disturbed nature of most of the site, the likelihood of many of the Red List species (Table 8 above) frequenting the site has been judged to be low. As a result, the impacts of the proposed project could be more important for the common bird species, which are generally more tolerant of human disturbance and hence more likely to regularly make use of this site.

Furthermore, taking the above information into account, it is the specialist's opinion that given the presence of existing disturbance and habitat degradation, it is anticipated that the proposed substation and associated power line infrastructure can be constructed with acceptable levels of impact on the resident avifauna.

Although the proposed Alternative substation site 1 is located within close proximity to a wetland system, it is also located in an area that is heavily impacted upon by the surrounding mines and the existing Uchoba substation. In addition, this site is also surrounded by a well-established road network enabling ease of access during construction and operational activities.

Similarly, substation sites 2 and 3 have also undergone some form of transformation and subject to existing disturbance from the surrounding homesteads and pastoral activities respectively. Alternative substation site 2 is also located adjacent to a heavily utilised district road.

**From the information provided above, coupled with the specialist's knowledge and experience of bird interactions with electrical infrastructure it can be concluded that Alternative substation site 1 presents itself as the preferred substation site.**

## 12.7 LAND TYPES AND AGRICULTURAL POTENTIAL STUDY

The Land Types and Agricultural Potential Study was undertaken by Garry Paterson of ARC.

The study indicates that most of the alternative sites for the proposed substations and power lines fall within land type Dc31 i.e. mixed soils, with structureless soils and duplex soils with smaller portions of the proposed power lines in the north and west falling in land type Ae27 i.e. high base status, red structureless soils, often deep. Only a very small portion of the infrastructure crosses either of the other two land types.

Land type Dc31 contains a wide mixture of soils, with a spread of agricultural potential. For this reason, it is difficult to compare the three substation sites. All three sites are located on areas of natural vegetation, with little or no indication of any cultivation. In addition, the occurrence of eroded areas (gullies) throughout the area, which are associated with the Valsrivier and Swartland duplex soils, also indicates the variable nature of the soils occurring.

**The Land Types and Agricultural Potential study recommended that Alternative substation site 2 is the preferred alternative and Alternatives substation sites 1 and 3 are equally the least preferred. Furthermore the specialist recommended that a more detailed soil investigation, where the soils on each site, as well as those along the proposed powerline routes, are surveyed using a soil auger to produce a soil map of each site.**

### 13 DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section of the final EIA Report describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the consultant's opinion after numerous visits to the site and previous detailed assessments and experience on similar undertakings. Refer to **Table 17** below, for the potential impacts identified.

Table 17: Environmental Potential Impact Identified

Issue	Rating	Description
Employment	Positive-No mitigation required	Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.
Air Pollution	Neutral	The only potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project it is anticipated that if not mitigated the impact may be local in extent, and short term. Mitigation measures such as regular dust suppression can reduce the impact to become site specific.
Visual Impact	Negative	<p>The visual impact of the proposed Senakangwedi B substation and power lines would be at its maximum at distances of 500m or less. However, the visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1 km is approximately a quarter of the impact viewed from 500m, and at 2km, is one eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km.</p> <p>The visibility of the proposed structures and infrastructure would be a function of several factors, including: landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale.</p> <p>The proposed activity will indeed change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the</p>



		<p>nearby roads, however, it must be noted that there are already existing overhead power lines located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the site and the exact location of the station the impact can be considered definite, long term, local in extent but low in significance.</p>
Fauna	Negative	<p>As indicated above, the proposed project will traverse several properties where fauna exists. The species richness on the campus of the Senakangwedi B substation will be displaced, the impact may be local and insignificant.</p> <p>Considering the insignificant extent of the substation campus and the relatively narrow and linear servitude co-incidentally transformed towards rank grassland, it is not expected that any endangered species' conservation will be put at risk.</p> <p>Other than endangered species, no sensitive species or sensitive areas are flagged. The project will not substantially change the reigning ecological character of the general area. Further, the proposed project will not significantly impact negatively on the assemblages and conservation of the general area.</p>
Flora	Negative	<p>The most significant impact of power lines are expected to occur during the construction phase, whereas the new towers and power lines, once in use, have relatively contained impacts on the vegetation and can be successfully mitigated to limit or even negate the negative impacts.</p> <p>The greatest threat to the rehabilitation of disturbed areas, are potential of invasive plant species to colonise the disturbed soil and spread into adjacent and natural areas. If remedial measures and monitoring is properly employed, the vegetation that will be disturbed during construction could rehabilitate well over time,</p>

		and long term impacts on vegetation and faunal habitats could thus be minimal. Furthermore, where existing roads or servitudes are employed during construction and implementation, the impacts of these when compared with extensive agriculture, rural settlements or urbanization, can be considered as medium to low.
Surface Water	Negative	<p>The proposed routes cross perennial rivers or temporary streams a total of 37 times. A development like this has several impacts on the surrounding environment and on wetlands. The development changes habitats, the ecological environment, infiltration rate, amount of runoff and runoff intensity of the site, and therefore the water regime of the entire site if not properly managed.</p> <p>An increased volume of storm water runoff, peak discharges, and frequency and severity of flooding is therefore often characteristic of transformed catchment.</p>
Noise	Low	<p>A noise disturbance is classified in terms of the Noise Control Regulations as a noise that cause the ambient noise level to rise above the designated zone level. The World Bank in the Environmental Health and Safety Regulations has laid down the following noise level guidelines which indicates the following ranges:</p> <ul style="list-style-type: none"> <li>• Rural areas - 45 dBA for the daytime and 35 dBA for the night time period;</li> <li>• Residential area – 55 dBA for the daytime and 45 dBA for the night time period; and</li> <li>• Industrial area – 70 dBA for the day- and night time periods.</li> </ul> <p>The difference between the actual noise and the ambient noise level and the time of the day and the duration of the activity, will determine how people will respond to sound and what the noise impact will be. In order to evaluate such, there must be uniform guidelines to evaluate each scenario. The SANS 10103 of 2008 has laid down sound pressure levels for specific areas.</p>

		<p>An increase in noise level is expected due to construction, which might have an impact especially on the surrounding Nokaneng/ Kalkfontein village if Alternative substation site 2 is considered. Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours, during which noise will not be of such a big concern to surrounding residents. According to the SANS 10103 acceptable noise levels at day time is 35 – 45dBA depending on the area. Given the nature of the project, it is highly unlikely that the stipulated noise levels will be exceeded at any given time. During the operational phase, the impact of noise will also be reduced to almost insignificant levels, given the nature of the proposed project.</p> <p>Noise has been identified as a potentially low impact aspect. The noise impact may be local during construction and site specific during operations.</p>
Land Use	Negative	<p>The proposed study area has varying land uses ranging from to small scale farming to mining. The primary uses identified are game and livestock farming as well as limited crop farming. The proposed project may have a considerable impact particularly during construction while the extent and severity of the operational impact will be greatly reduced as the land uses will continue.</p>
Bird Population	Negative	<p>Due to its size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in Southern Africa are electrocution of birds (and other animals) and birds colliding with power lines. With proper mitigation measures implemented, these potential impacts will be reduced to acceptable levels.</p> <p>For the proposed project, major risks to wild and domestic birds may be caused by the proposed facilities are disturbance by construction activities (temporary), on-going disturbance during operation phase (semi-</p>

		permanent), collision wires, collision with supporting power line and electrocution on associated power line.
Waste	Negative	Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers campsite or from litter left around the work area by the construction staff.
Soil Erosion	Negative	Movement of heavy machinery across the land as well as vegetation clearance may cause destabilisation of soils which then become susceptible to erosion. Continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.
Heritage	Negative	The heritage significance of each site has been assessed in terms of the National Heritage Resources Act, 1999 (No 25 of 1999). A Phase 1 Archaeological Impact Assessment has been conducted and identified two significant sites areas located near substation alternative 1.  It is recommended that an archaeologist conduct a walk-down survey of the site.
Servitudes	Neutral	Existence of servitudes needs to be taken into consideration in the design and layout of the proposed project. Regulations pertaining to servitudes needs to be taken into consideration. There are existing lines in the area which will be taken into consideration. Potential impacts on this servitude will be investigated during the EIA phase.

Surface and Ground Water Pollution	Neutral	<p>The proposed alternatives cross rivers, streams and dams. The impact on water could lead to a decrease in quality and possible contamination of surface and ground water. This could result from fuel and sewage spillages. The impact on water is site specific but can be local or regional if proper measures are not put in place.</p> <p>There may be a need to apply for water use licences with Department of Water Sanitation (DWS) formerly known as Department of Water Affairs (DWA) considering the number of crossings and proximity of the line to surface water bodies. Further, DWS recommended that licences applications for activities that trigger Water Uses be submitted.</p>
Social Environment	Negative	<p>The construction phase may have an impact on the surrounding residents if not properly managed. It could result to disturbance of residents as a result of construction related activities. The potential increase in traffic may pose a safety risk to surrounding residents, particularly scholars. Other social related issues may include theft. This impact will be local.</p>
Climate	Neutral	<p>Local climate conditions do not appear to be of a significant concern to the proposed project. The stretch between the Greater Tubatse areas is highly mountainous, hence prone to lightning. Measures will have to be put in place during the design of the structures to ensure diversion. In a broader scale the project will have no impact on the local and/or global climate change.</p>
Topography		<p>The topography of the study area is flat to undulating; this may pose design challenges particularly in the highly mountainous area.</p>

## 14 ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT

### 14.1 IMPACTS THAT ARE LIKELY TO RESULT FROM THE PLANNING AND DESIGN

This Section must be read in conjunction with Section 10 above. It is important to note that the impacts identified are similar for Alternative substations sites 1, 2, 3 as well as the power line corridors.

#### Direct Impacts

##### 14.1.1 Employment Creation

Job creation and investments into the project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment Creation	No	Positive	3	2	8	4	(30-60) Medium
	Yes						
Corrective Actions	No mitigation measures have been identified.						

Direct Impacts: None Identified.

Cumulative Impacts: None Identified.

#### No-go Alternative

Direct Impacts: The no-go alternative would result in the additional employment opportunities not occurring, further, if the proposed project does not proceed, none of the impacts identified will occur (including positive and negative impacts).

Indirect Impacts: None identified

Cumulative Impacts: None identified

## 14.2 CONSTRUCTION PHASE IMPACTS

This Section but be read in conjunction with Section 10 above. It is important to note that the impacts identified are similar for Alternative substations sites 1, 2, 3 as well as the power line corridors.

### Direct Impacts

#### 14.2.1 Change in land-use

The proposed study area has varying land uses ranging from mining to small scale farming. The primary uses identified are game and livestock farming as well as limited crop farming. The proposed project may have a considerable impact particularly during construction while the extent and severity of the operational impact will be greatly reduced as the land uses will continue.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Change in Land-use.	No	Negative	1	4	6	4	(30-60) = Medium
	Yes	Negative	1	4	2	2	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Activities must be restricted to the demarcated construction site.</li> <li>• Care must be taken to ensure that land is not contaminated and destroyed as a result of construction activities; and</li> <li>• Where damaged, land must be rehabilitated immediately to return it to its previous/original state.</li> </ul>						

**14.2.2 Impact on Biodiversity**

During construction phase, some of the vegetation occurring on site will need to be cleared. Subsequently all three of the substation alternative sites are located in areas that are of ‘Least Concern’ or have ‘No Natural Habitat’ remaining. On the other hand, the proposed power lines will have an impact on some areas that are classified as ‘Important and Necessary’ as well as ‘Highly Significant’ in reaching conservation targets. A list of fifteen (15) plants of conservation concern that could occur within the area of the proposed development was compiled, refer to Table 6 above.

The fauna expected to occur on site include species such as aardvark, porcupines, springhares, baboons, vervet monkeys, warthogs, kudus as well as the south African python. No ecologically sensitive areas or systems that warrant special conservation attention for fauna were identified on the Senakangwedi B substation sites 1, 2 or 3, or notionally along the proposed routes of the power lines connecting them.

With regards to Avifauna, a fairly wide diversity of species (approximately 295 species) could be found in the broader area within which this site falls. However, most of the site is already relatively highly impacted upon by extensive mining and industrial activity, human settlement, pastoral activities and existing road and power line networks and the likelihood of these species utilizing the site is considered to be low in most cases.



Impacts that can be expected on biodiversity include:

- Vegetation clearing which could result in loss of vegetation from the construction footprint; and
- Loss of habitat for animal species from the construction footprint.

Effort must be made to minimize the disturbance to the surrounding vegetation. It is anticipated that the loss of biodiversity for the proposed site and its surroundings will be of a medium negative significance due to the scale of the proposed development. Implementation of the recommended corrective measures will ensure that this impact has a low level of significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Biodiversity.	No	Negative	1	5	6	4	(30-60) = Medium
	Yes	Negative	1	5	2	2	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• An independent Environmental Control Officer (ECO) must be appointed to monitor the development activities and compliance to the Environmental Management Programme;</li> <li>• Vegetation clearing should be limited to areas that will be occupied by the development footprint;</li> <li>• The identified threatened species must be rescued and replanted in a suitable area;</li> <li>• Where possible large trees should be left intact;</li> <li>• Special care will be needed in the crossing of the streams;</li> <li>• Hunting and killing of fauna for any reason should not be allowed;</li> <li>• No fauna to be hunted or killed on the site;</li> <li>• The ECO must to be informed if any endangered species are observed during construction; relevant specialists should be called;</li> </ul>						

- Only indigenous plant species should be planted in areas where rehabilitation is required; and
- Prevent the establishment and spread of alien invasive species and weeds during the construction phase.

### 14.2.3 Fauna and Avifauna

The construction phase will require some of the vegetation to be cleared. This destruction of habitat will have site specific impact and given the length of the lines it's most likely going to be local. Although the construction phase will be short term, the impact will be long term as maintenance and bush clearing will continue during operational phase.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Habitat destruction and alteration during construction	No	Negative	2	4	3	4	(30-60) = Medium
	Yes	Negative	1	4	3	4	(30-60) = Medium
Disturbance of Bird during construction	No	Negative	1	2	4	3	<30 = Low
	Yes	Negative	1	2	4	2	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Standard Construction best practice must be followed;</li> <li>• Care must be taken if any breeding sensitive species are encountered close to the servitude;</li> <li>• Key sensitive areas must be avoided as far as practically possible; and</li> <li>• Certain sections of the proposed power lines must fitted with line marking devices in order to mitigate for bird collision.</li> </ul>						

### 14.2.4 Flora

Approximately fifteen (15) plants of conservation concern could occur within the area of the proposed development, therefore the proposed project could potentially impact on the identified species of conservation concern if mitigation measures are not put in place. The impact associated with this will be site specific, and of medium significance. With proper mitigation the impact can be reduced to low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Flora	No	Negative	1	5	6	4	(30-60) = Medium
	Yes	Negative	1	5	2	2	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• A temporary fence or demarcation must be erected around the construction area (include the servitude, construction camps, areas where material is stored and the actual footprint of the development) to prevent access to sensitive environs;</li> <li>• Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area;</li> <li>• No open fires are permitted within naturally vegetated areas;</li> <li>• Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas;</li> <li>• Maintain as much vegetation cover as possible;</li> <li>• Runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil;</li> <li>• Construction workers may not remove flora and neither may anyone collect seed from the plants without permission from the provincial conservation authority;</li> </ul>						

- Ideally, an on-site ecologist should be present when excavation takes place to ensure that any uncovered species of conservation concern are protected from destruction. Note that the species could be dormant until favourable conditions arise;
- Environmental audits be undertaken by an independent party during this construction period, especially in sensitive areas;
- Where possible, construction activities must be restricted to previously disturbed areas;
- A suitably qualified person (botanist / horticulturist) should survey the final route alignment and pylon footprints within the growing season of the plants (summer months, preferably between November and February), in order to confirm whether these plants will be impacted upon, prior to the finalisation of the route and commencement of construction;
- Implement a Plant Rescue and Rehabilitation Plan: Where the plants of conservation concern are deemed to be under threat from the construction activity, the plants should be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation after the construction (Note, these plants may only be removed with the permission of the provincial authority);
- Any disturbance to protected tree species (e.g. pruning) nor removal of such trees can only be undertaken once a permit authorising the contractor to do so has been granted by the Department of Agriculture, Forestry and Fisheries (DAFF);
- The construction staff must be trained on the sensitivities involved along the route as well as the potential sensitive species they could encounter;
- Construction workers must not tamper or remove these plants and neither may anyone collect seed from the plants without permission from the local authority;
- Cordon off the sensitive vegetation that house the protected plant species and the plants of conservation concern and protect from construction activities and vehicles;
- Slight deviations of access road / pylon alignments must be permitted, so as to avoid plant populations of conservation concern (DWAFF, 2005);
- Alien invasive species within the study area and in specific areas along the powerline corridor should be removed prior to construction-related soil disturbances;

- All alien seedlings and saplings must be removed as they become evident for the duration of construction;
- Manual / mechanical removal is preferred to chemical control; and
- All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO.

#### 14.2.5 Soils and Erosion

Much of the soils within the corridors comprise dispersive soils and the area is prone to erosion in the event of good rainfall. Furthermore, the removal of surface vegetation will expose the soils, which in rainy events could cause sedimentation in nearby watercourses. In addition, indigenous vegetation communities are unlikely to colonise eroded soils successfully and seeds from proximate alien invasive trees, or unpalatable shrubs that reduce grazing capacity, can spread easily into these eroded soil. The movement of heavy machinery will result in soil compaction that will modify habitats, destroy vegetation and inhibit re-vegetation. The impact could be local in extent and of low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on soils and erosion management.	No	Negative	2	2	6	2	<30 = Low
	Yes	Negative	1	1	4	1	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Care should be taken to place towers adequately away from water causes or their banks;</li> <li>• Implementation of anti-erosion measures such as the construction of berms to reduce the water velocity is essential;</li> <li>• Foundation excavations for each structure must be inspected by a competent person during construction;</li> <li>• Erosion must not be allowed to develop on a large scale before taking action;</li> </ul>						

- No construction / activities should be undertaken within the moist soils until a Water Use License is granted by the Department of Water and Sanitation (DWS);
- Make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas;
- Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005);
- Runoff from roads must be managed to avoid erosion and pollution problems;
- Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover;
- Runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil;
- All areas susceptible to erosion must be protected and it must be ensured that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas;
- A temporary fence or demarcation must be erected around the works area to prevent water runoff and erosion of the disturbed or heaped soils into wetland areas;
- Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed; and
- Construction equipment and vehicles will only be allowed on designated routes.

#### 14.2.6 Impact on Traffic

During construction phase, increase in traffic is likely to result from delivery of construction materials to the construction site. The proposed routes crosses a number of regional roads such as the R577, therefore, there is a likelihood that during stringing some traffic disruption would occur. However, construction

techniques are available that will keep this disruptions to a minimal level. The impact of increased traffic can be considered negative short term and medium in significance. With the implementation of proper mitigation measures, it can be reduced to low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Traffic.	No	Negative	2	3	6	4	(30-60) = Medium
	Yes	Negative	2	2	4	3	<30 = Low.
Corrective Actions	<ul style="list-style-type: none"> <li>The delivery of construction material and equipment should be limited to off-peak traffic times (including weekends) prevailing on the surrounding roads; and</li> <li>Delivery vehicles must comply with all traffic laws and by laws.</li> </ul>						

**14.2.7 Heritage Impact**

Heritage sites of significance were identified along the proposed corridors during the site assessment. Consequently an impact of high significance can be expected during the construction phase. With the implementation of mitigation measures as proposed by the Heritage specialist the impact may be reduced to Low.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on heritage artefacts.	No	Negative	4	5	6	4	(30-60) = Medium
	Yes	Negative	1	1	2	3	<30 = Low.

Corrective Actions	<ul style="list-style-type: none"> <li>• A walk-down must be undertaken prior to commencement of construction work so that all the graves, heritage sites and artefacts are identified and managed appropriately;</li> <li>• Should heritage or archaeological artefacts be discovered during construction or operational phases, all work must stop at the affected area and SAHRA must be contacted.</li> </ul>
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**14.2.8 Air Pollution**

Construction activities on the site will lead to land clearing and disturbance to the soil resulting in dust creation. The one direct potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Further, movement of construction vehicles also represents temporary, but important sources of particulates and dust deposition that can be respired. Given the nature and magnitude of the proposed project it is anticipated that minor dust will be generated from the construction activities. The potential impact on air quality will be short term and can be controlled. Proper implementation of recommended corrective measures will reduce the impact to become insignificant and of very low probability. It is therefore anticipated that this impact will be limited and of low negative significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Air Pollution.	No	Neutral	2	1	4	4	<30 = Low.
	Yes	Neutral	2	1	3	3	<30 = Low.

Corrective Actions	<ul style="list-style-type: none"> <li>• Unnecessary clearing of vegetation must be avoided.</li> <li>• All exposed surfaces subjected to dust generation must be managed with appropriate dust suppression methods including amongst others, the use of water tankers etc.;</li> <li>• Vehicles speed limit should be imposed to reduce potential dust;</li> <li>• Unnecessarily exposed surfaces should be rehabilitated after the construction period;</li> </ul>
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- The amount of exposed soil at a particular time must be limited;
- Vehicles transporting load beds must be covered to prevent them from being blown by wind when transported;
- Regular dust suppression must be implemented by means of spraying water on the affected areas;
- Air quality must be regularly monitored and reported on throughout the construction phase; and
- Targets must be set for the management of air quality during construction.

### 14.2.9 Surface and groundwater pollution

Given the existence of several stream crossings along the transect routes there is a risk that construction material may pollute the surface and/or ground water on site. Substances such as cement residue, bio fuels, and paints must be adequately controlled. In addition exposed surfaces during construction would provide a source of sediments to be taken up by storm water and resulting in down-stream sedimentation of water resources. Care must be taken during construction to prevent leaks and spillage of materials that may detrimentally affect water quality (especially fuels and chemicals). Adequate measures must be put in place to prevent runoff of construction debris to nearby streams or water bodies. If construction takes place during the rainy season, storm water will have to be managed appropriately to reduce the possibility of construction debris being washed off. This impact is of medium negative significance and can be reduced to a low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and ground water pollution.	No	Negative	3	3	6	3	(30-60) = Medium
	Yes	Negative	2	2	4	2	<30 = Low.
Corrective	<ul style="list-style-type: none"> <li>• Adequate measures must be taken during construction to manage storm water runoff;</li> </ul>						

<p>Actions</p>	<ul style="list-style-type: none"> <li>• Storage of fuel on site must be in bunded areas. The bund area must be able contain 110% of the stored fuel;</li> <li>• Care must take not to spill fuels or oil during service or re-fuelling of construction equipment;</li> <li>• In the event of a spillage of a hazardous substance the requirements of the EMPr must be implemented;</li> <li>• Construction in and around watercourses must be restricted to the dryer winter months;</li> <li>• A temporary fence or demarcation must be erected around the works area to prevent access to sensitive environs. The works areas generally include the servitude, construction camps, areas where material is stored and the actual footprint of the tower/pylon;</li> <li>• Prevent pedestrian and vehicular access into the wetland and buffer areas as well as riparian areas;</li> <li>• No vehicle access is allowed within watercourses;</li> <li>• Access roads and bridges should span the wetland area, without impacting on the permanent or seasonal zones;</li> <li>• Manage of on-site water use and prevent storm water or contaminated water directly entering the watercourse;</li> <li>• The amount of vegetation removed should be limited to the least amount possible;</li> <li>• Rehabilitation plans must be submitted and approved for rehabilitation of damage during construction and that plan must be implemented immediately upon completion of construction;</li> <li>• Possible leaks and spills of hazardous substances into the ground should be avoided at all times;</li> <li>• In the event of a spillage of a hazardous substance the requirements of the EMP must be implemented;</li> <li>• Obtain Water Use License as appropriate and ensure compliance with the conditions; and</li> <li>• No activities should take place in the watercourses and associated buffer zone. Where the above is unavoidable, only a pylon footprint and no access roads can be considered. This is subjected to authorization by means of a water use license.</li> </ul>
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**14.2.10 Waste Management**

The inhibition of sites by human beings always results to waste generation. A variety of waste material will be produced during the construction phase. The

Contractors must adhere to all recommended measures and provide adequate waste skips and bins on the site. Waste must be regularly removed from site and disposed of at appropriate waste disposal sites. With mitigation measures implemented, this impact can be kept at a Low Significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste Management.	No	Negative	2	3	8	2	<30 = Low.
	Yes	Negative	1	2	6	2	<30 = Low.
Corrective Actions	<ul style="list-style-type: none"> <li>• No waste will be buried on site or incorporated into the foundation trenches;</li> <li>• The work force must be encouraged to sort waste into recyclable and non-recyclable waste;</li> <li>• Waste bins/skips must be water tight, appropriately labelled and placed on a bunded surface;</li> <li>• No burning of waste is allowed on site;</li> <li>• Waste must be regularly removed from site and disposed of at a registered waste disposal facility and safe disposal certificates will be filed appropriately; and</li> <li>• Where permits are required, it must be obtained from the relevant authority.</li> </ul>						

**14.2.11 Noise Pollution**

The study area consists of a nature reserve, mining areas as well as farms which are used for agriculture, game as well as for residential purposes. It must be noted that there is only one residential area (Nokaneng/Kalkfontein Village) within the study area. This village is located about 1km from Alternative substation site 2. Major sources of noise are the movement of vehicles on the R555 and other nearby roads as well as the smelter located across the road from the existing Senakangwedi substation.

Construction process is likely to result in an increase in noise levels due to construction vehicles, machinery which can be a nuisance during the construction. The level of noise and the distance it will travel will depend entirely on the prevailing construction activities within the site which will include

groundwork, foundations, hauling of building material to and from specific area assembling of equipment. The additional noise will be local, short term in duration and low in significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Noise Pollution	No	Negative	2	1	4	3	<30 = Low.
	Yes	Negative	1	1	2	2	<30 = Low.
Corrective Actions	<ul style="list-style-type: none"> <li>• All construction equipment and vehicles used during construction must be appropriately maintained;</li> <li>• Surrounding residents should be notified in advance of construction schedules;</li> <li>• Working hours must be restricted to daytime only (7am – 5pm);</li> <li>• Where there is a need to for construction work to take place outside these time frames, the Contractor will, with the approval of the ECO, communicate with the I&amp;As; and</li> <li>• Selecting equipment with lower sound power levels which is in accordance with the Health and Safety Regulations.</li> </ul>						

**14.2.12 Safety and Security**

The proposed Alternative substation site 3 is located close to a game farm that may be a home to an array of wild animals including predators, therefore, the safety and security of the construction workforce is a concern. Further, people and animals in the area may be at risk as a result of on-site activities (e.g. falling into holes, being knocked over by vehicles etc.). The presence of the construction workforce within these private properties is a potential risk to the surrounding landowners in terms of safety, crime and security. The significance of the potential impacts without the corrective actions (adequate safety measures in dangerous areas) is considered to be of high significance. The implementation of corrective actions could reduce the impacts to a low level of significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Safety and Security.	No	Negative	3	2	8	5	>60 = High.
	Yes	Negative	1	2	6	3	<30 = Low.
Corrective Actions	<ul style="list-style-type: none"> <li>• Liaison with landowners prior to entering their properties;</li> <li>• Access to the construction site should be controlled;</li> <li>• Warning signs should be placed on site to make people aware of the dangers;</li> <li>• No-go area should be clearly demarcated, marked and visible;</li> <li>• Landowners must be kept abreast with movements in and around their properties;</li> <li>• Health and Safety standards and guidelines must be implemented;</li> <li>• The construction site must be delineated and properly fenced off particularly near the game farm. Fencing must be inspected weekly and ensure it is properly maintained by the contractor until completion;</li> <li>• Provide strategically distributed crossing points to secure existing access routes currently used by the public;</li> <li>• It must be ensured that personnel undertaking the construction work do so when conditions are safe (i.e. no work at night, no work during unfavourable weather conditions, etc.);</li> <li>• The construction team should be clearly visible and identifiable so that they can be differentiated from ordinary members of the public;</li> <li>• There should be warning signs that are clear and visible on the site;</li> <li>• Construction vehicles should be fitted with warning signs and devices to warn personnel in case of dangerous manoeuvres (e.g. reversing);</li> <li>• No construction personnel may be allowed to stay overnight on site except for the security personnel;</li> <li>• The construction site must be clearly demarcated and indicated by barrier tape and/or proper fence;</li> <li>• The access gate to the construction site must be closed at all times; and</li> </ul>						

- No hunting of any form shall be allowed on site.

### 14.2.13 Fire Hazards

There may be an increase in the risk of veld fires as a result of construction activities and these would result from activities such as smoking and cooking food, storage of fuel and other flammable solvents on site. These uncontrolled fires on site could cause damage to infrastructure, the biophysical environment and impact on the working environment. This impact is considered to be of medium significance. Should the recommended mitigation measures be implemented, the significance of the impact will be even lower and negative.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Fire Hazards	No	Negative	2	2	4	4	(30 – 60) = Medium.
	Yes	Negative	2	2	4	2	<30 = Low.
Corrective Actions	<ul style="list-style-type: none"> <li>• Camp sites and laydown areas will not be allowed within the game farm and sensitive area;</li> <li>• Areas where flammable substances are kept must have proper warning signs on display (e.g. highly flammable, No smoking etc.) to warn personnel of risks associated with such areas;</li> <li>• No burning of waste and cooking will be allowed on site;</li> <li>• Contracting personnel must be well versed in the relevant existing fire and safety management procedures and activities on site;</li> <li>• Implement fire hazard sensitive on- and offloading procedures;</li> <li>• Designate a site safety official and ensure that personnel are adequately trained regarding fire hazards and procedures;</li> <li>• Fire fighting equipment (fire beaters, fire extinguishers etc.) must be made available on site; and</li> <li>• Strategically placed emergency access points along servitude at times when access is restricted to ensure that landowners</li> </ul>						

and emergency services are able to respond to any outbreak of a fire.

#### 14.2.14 Visual impact

The proposed activity will indeed change the visual character of the site particularly considering that the proposed site is located in an area that is sloping; the elevated points of the site can be viewed from the nearby roads, however, it must be noted that there are already existing overhead power lines located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the site and the exact location of the station the impact can be considered definite, long term, local in extent but low in significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Negative	2	2	6	4	(30 – 60) = Medium.
	Yes	Negative	1	2	4	3	<30 = Low.

Corrective Actions

Access Roads

- Make use of existing access roads where possible;
- Where new access roads are required, the disturbance area should be kept to a minimum. A two track dirt road will be the most referred option;
- Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation;
- Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centers of floral endemism and areas where vegetation is not resilient and takes extended periods to recover;
- Maintain no or minimum cleared road verges;

- Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas;
- If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road in order to reduce the visible extent of the cleared corridor; and
- Provide strategically distributed crossing points to secure existing access routes currently used by the public.

#### Construction Camp and Laydown Area

- If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas;
- Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors;
- Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and  
Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade material of no less than 2m height.

#### Cleared Servitudes

- Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation; and
- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.



### 14.2.15 Employment Creation

The proposed development will have the capacity to produce considerable employment opportunities during the construction phase, the job opportunities will however, be limited as the construction is put out to tender and Contractors who usually have their own skilled workforce are appointed to undertake the construction activities. The construction activities will also result in a demand for equipment, building material and labour. The use of local labour would have a positive impact on the local economy and promote skills transfer. The significance of this impact is anticipated to be medium positive.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment Creation	No	Positive	3	4	6	3	(30-60) = Medium
	Yes						
Corrective Actions	<ul style="list-style-type: none"> <li>• Ensure the prioritisation of locals as and when opportunities arise;</li> <li>• Create opportunities for the employment of women;</li> <li>• Where possible use labour intensive methods of construction; and</li> <li>• Go beyond the minimum wage rate and invest in local staff.</li> </ul>						

### 14.2.16 Influx of Job Seekers

Construction activities will require a well-established work force. The workmanship required may not necessarily be available from the local communities and result in workers being sourced from other communities. In addition there may be a likelihood of migrant workers (including unskilled labourers) moving into the area in search of employment. These workers could have an impact on the social structures present in the local communities due to the lengthy period of construction.

- The threat of HIV/Aids and other STI’s may also have an impact on the local community resulting from an influx of migrant labourers to the areas surrounding the site.
- Increased risk of criminal activities due to influx of workers.
- Social instability on existing families

With the implementation of the recommended mitigation measures the significance of the impact can be reduced from medium negative to low negative

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Influx of Job Seekers.	No	Negative	3	4	4	3	(30-60) = Medium
	Yes	Negative	2	3	2	2	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Ensure that employment procedures and policies are communicated to local stakeholders, especially community representative organisations and ward councillors;</li> <li>• Raise awareness amongst construction workers about local traditions and practices;</li> <li>• Ensure that the local community communicates their expectations of construction workers’ behaviour with them;</li> <li>• Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control of the workforce;</li> <li>• Make condoms and other forms of contraceptives readily accessible to workers;</li> <li>• Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Where possible, construction workers could also be issued with identification tags to enable them to be visible and distinguishable within the community;</li> </ul>						

- An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole; and
- If feasible, a voluntary counselling and testing programme should be introduced during the construction phase and continued during operations. This should be undertaken in conjunction with the existing VCT programmes within the region.

### 14.2.17 Resettlement

The proposed power line may warrant resettlement of family dwellings and graves, however this will only be determined once the route has been approved and during pegging. Resettlement exposes affected people to a range of risks which include landlessness, homelessness, joblessness, economic and social marginalisation, increased morbidity and mortality, food insecurity loss of access to common property resources. The resettlement impact on communities does at times yield positive benefits, however from a social perspective it can be viewed as a high negative impact which is long term but with proper mitigation in place the impact can be reduced to medium.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Resettlement.	No	Negative	2	5	6	5	>60 = High
	Yes	Negative	2	5	4	4	(30-60) = Medium
Corrective Actions	<ul style="list-style-type: none"> <li>• Involuntary resettlement should be avoided, or minimised where unavoidable;</li> <li>• Where resettlement is unavoidable, resettlement plans and activities should be seen and executed as development programmes;</li> <li>• Resettled persons should be provided with sufficient investment resources and opportunities to share in project benefits;</li> </ul>						

- Displaced persons should be meaningfully consulted, and should participate in the planning and implementation of resettlement programmes;
- Displaced persons should be compensated, prior to the move, for their losses at full replacement cost;
- Resettled persons should be assisted with the move and provided with support during the transition period; and
- Eskom’s resettlement standard must be put in place to ensure minimal impact.

**14.2.18 Impact on Agriculture**

The proposed transmission line will have a negative impact on the agricultural potential, however, the isolated nature of transmission towers will result in a minimal impact on the soil and furthermore agricultural activities can continue next or underneath the line. The overall impact on agriculture without mitigation is medium; however with proper mitigation in place the impact will be low in significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Impact on Agriculture	No	Negative	2	4	4	4	(30-60) = Medium
	Yes	Negative	1	4	2	3	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Construction activities must only take place at authorised site;</li> <li>• Effort must be made to avoid areas where overhead sprayers are used; and</li> <li>• Disturbance must be reduced to the footprint of the construction activities.</li> </ul>						

Indirect Impacts: None Identified

Cumulative Impacts: None identified

Direct Impacts: Should the proposed development not occur, none of the identified impacts will result.

Indirect Impacts: The threat of HIV and spread of STI's is one of indirect impact associated with the development however; the No-go alternative would remove the need for construction workers and thereby remove the associated social impacts identified above.

Cumulative Impacts: None identified.

### 14.3 OPERATIONAL PHASE

Direct Impacts

#### 14.3.1 Bird collision, Electrocutions and Faulting

Direct interactions occur when birds collide with power lines, possibly because they fail to see the wires as they are focusing on something that lies beyond, e.g. a perch or food source. Birds might also be killed by striking power lines support structures. The likelihood of birds colliding with power lines depends on various aspects. Bird collision and electrocution at substation yard has been rated as low for this project, while faulting which is caused by bird on power lines was rated medium. With proper mitigation in place, the potential impact of faulting is one that can be reduced to low significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Bird Faulting	No	Negative	1	4	4	4	(30-60) = Medium
	Yes	Negative	1	4	3	2	<30 = Low

Bird Collision	No	Negative	2	4	4	2	(30-60) = Medium
	Yes	Negative	2	4	4	2	<30 = Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Installation of bird guards to reduce faulting.</li> <li>• Installation of mitigation devices to insulate different live components, recommended to fit this only if electrocution occurs after construction.</li> </ul>						

### 14.3.2 Visual Impact

A negative visual impact is expected during the operational phase as the towers will be intruding on existing landscape views. This may impact on the game farm as well the residential area. The impact will be definite, local in extent, long term and of high significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Negative	2	5	6	5	>60= High
	Yes	Negative	2	5	6	5	>60= High
Corrective Actions	<ul style="list-style-type: none"> <li>• None Identified.</li> </ul>						

### 14.3.3 Impact on Economy

The construction of the proposed transmission line has become necessary as part of Eskom's strategy to upgrade the country's existing electricity

infrastructure. The proposed project is beneficial as it will allow for load growth in the region. It is envisaged that the proposed project would ensure reliable supply to industry, predominantly the mines in the area; this will indirectly benefit communities as reliable electricity will result in uninterrupted production and therefore growth in industry, which could potentially yield additional jobs. The overarching impact will be positive economic spinoffs, which benefit the community, the region and country at large.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Positive	3	4	6	5	>60= High
	Yes	Positive	3	4	6	5	>60= High
Corrective Actions	<ul style="list-style-type: none"> <li>Regular maintenance of the facility should be done continuously to ensure uninterrupted supply of energy;</li> <li>Ensure that the project is run in a responsible manner and that the environment is adequately protected from negative impacts;</li> <li>Put adequate monitoring systems in place throughout the duration of the project and beyond; and</li> <li>Ensure that the value of the project is balanced against cost related to both the negative environmental and social impacts on the region.</li> </ul>						

#### 14.3.4 Employment Creation

The proposed development will have the capacity to produce considerable opportunities of employment only during the construction phase. During operation, employment opportunities will arise as a result of the actual maintenance work required to keep the facility running. The significance of this impact is anticipated to be low and positive.

Issue	Corrective	Impact Rating Criteria	Significance
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	Measure	Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Positive	1	4	6	2	<30= Low
	Yes	Positive	1	4	6	2	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>Employment of locals should be encouraged during operational phase.</li> </ul>						

Indirect Impacts: None identified.

Cumulative Impacts: Cumulative impact of power lines on bird species will be significant if not managed, since the species already suffer from significant power line mortalities.

#### No-Go Alternative

Direct Impacts: None of the impacts identified for the proposed activity will occur (including positive and negative impacts) if the proposed activity does not proceed.

Indirect Impacts: None identified

Cumulative Impacts: None identified.

#### 14.4 DECOMMISSIONING PHASE



On-going maintenance and upgrades, where necessary, will be carried out. Decommissioning will be subjected to an EIA, however potential impacts are assessed hereunder.

## Direct Impacts

### 14.4.1 Dust Generation

Decommissioning of the facility and other infrastructure may lead to an increased amount of airborne particles in the local atmosphere as the infrastructure is dismantled and transported to the disposal site. The significance of this impact will be of low negative significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Dust Generation	No	Negative	2	1	4	4	<30= Low
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>Personnel must be well versed in the relevant existing waste management procedures and activities on site; and</li> <li>This will include sorting of waste types and correct disposal to either recycling facilities, local registered waste disposal sites, and in extreme cases to registered hazardous waste disposal sites.</li> </ul>						

### 14.4.2 Loss of Flora

The disturbances created during the decommissioning phase will likely lead to a loss of floral species within the development footprint. However, due to the fact that no sensitive species were recorded on site, it is anticipated that the loss of flora within the development footprint will not result in a disruption to the ecological functioning of the site and surroundings. Due to the loss of species diversity within the development footprint, it is recommended that the disturbed

areas be rehabilitated with indigenous species as far as possible and that a weed eradication program is implemented to curb the spread of weed species following decommissioning. It is anticipated that the impact on loss of flora (natural vegetation) will be of low negative significance.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Loss of Flora	No	Negative	2	1	4	4	<30= Low
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Only designated routes will be used; and</li> <li>• Disturbed areas will be rehabilitated with indigenous species.</li> </ul>						

#### 14.4.3 Surface and Ground Water Pollution

During the decommissioning phase spillages from construction vehicles and machinery may occur when existing facility is removed from the site. Potential sources of pollution to this resource result from surface and sub-surface activities that could possibly leak and or spill hazardous substances onto the surface that are then transported to the groundwater body through the underlying soils. It is anticipated that the significance rating can be reduced to low with the implementation of mitigation measures.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and Ground Water Pollution.	No	Negative	2	1	6	4	(30-60)= Medium
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>• Drip trays must be placed underneath parked construction equipment;</li> <li>• Adequate spill kits must be provided on site;</li> </ul>						

	<ul style="list-style-type: none"> <li>• Possible leaks and spills of hazardous substances into the ground should be avoided at all times; and</li> <li>• In the event of a spillage of a hazardous substance the requirements of the EMPr must be implemented.</li> </ul>
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#### 14.4.4 Soil Erosion

The clearing of vegetation, as well as the exposing of soil during decommissioning of the facilities may lead to erosion of these surfaces due to rain and wind. It is anticipated that the significance of this impact can be reduced from medium negative to low negative significance with the implementation of the recommended mitigation measures.

Issue	Corrective Measure	Impact Rating Criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Soil Erosion	No	Negative	2	1	6	4	(30-60)= Medium
	Yes	Negative	2	1	4	3	<30= Low
Corrective Actions	<ul style="list-style-type: none"> <li>• No unnecessary clearing of vegetation will be allowed;</li> <li>• Construction vehicles and machinery to be driven on designated roads; and</li> <li>• Areas cleared of vegetation must be re-vegetated with indigenous vegetation.</li> </ul>						

#### No-Go Alternative

<p><u>Direct Impacts:</u> None of the impacts identified for the proposed activity will occur (including positive and negative impacts) if the proposed activity does not proceed.</p> <p><u>Indirect Impacts:</u> None identified</p> <p><u>Cumulative Impacts:</u> None identified</p>
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## 15 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND KNOWLEDGE GAPS

### 15.1 ASSUMPTIONS

- It is assumed that technical data supplied by the client was correct and valid at the time of compilation of specialist studies and the final EIA report.
- It is assumed that all information provided by the client is true and correct.
- It is furthermore assumed that the alternatives presented by the client are feasible.

### 15.2 LIMITATIONS

#### 15.2.1 Public Participation Process

Given the magnitude of the project and the various extent and portions of farms in the area of which some are private and not easily accessible, it is likely that some I&APs were not reached. However, efforts were made as part of the process to advertise on local media as well as placing of notices at noticeable places within the communities.

#### 15.2.2 Literature reviews is viewed as correct

The compilation of the reports was based on various literature reviews which are viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed although concerted efforts were made to attain as much information as possible.

#### 15.2.3 Heritage Study

It is possible that the Phase 1 HIA may have missed heritage resources in the project area, as some heritage sites may occur in thick clumps of vegetation while others may lie below the surface of the earth and may only be exposed once development commence.

#### 15.2.4 Vegetation Assessment

Vegetation studies should be conducted during the growing season of all plant species that may potentially occur. In the absence of guidance documents for biodiversity assessment in Limpopo, the Mpumalanga guidelines were used as best practise. According to the Mpumalanga Minimum Requirements for Biodiversity Assessment (Mpumalanga Tourism and Parks Agency, 2008):

*“A floristic (plant) survey must be conducted during the growing season of all species that may potentially occur (this may require more than one season’s survey in order to identify flowering species) with two (2) visits undertaken (November & February). Visits during other seasons will be determined by the flowering and fruiting times of species that do not occur during the summer.”*

However, only one season survey was undertaken on the 27th of March 2014. Much of the vegetation on Alternative 3 and Alternative 2 was grazed and many grass species dormant. A portion of the substation Alternative 3 site was burnt at the time of the site visit. In addition, due to mining activities in proximity to Alternative 1, no access could be gained to the site. Surrounding vegetation and aerial images, as well as historical land use were used to describe the vegetation on Alternative 1.

### **15.2.5 Wetland Assessment**

Furthermore, the assessment of wetlands is based on environmental indicators such as vegetation, that are subjected to seasonal variation as well as factors such as fire. Although background information was gathered, the information provided in this report was mainly derived from what was observed on the study site at the time of the field survey.

Although a site visit was conducted, the current phase of the project predominantly reflects wetland and riparian areas identified during a desktop study to determine likely problem areas along the proposed lines and to indicate where possible a shift within a 2 km corridor as provided by Eskom. Based on information gathered during the site visit and aerial imagery the alternative substation sites were considered and the substation likely to have the least impact on wetlands/riparian areas was chosen. A follow-up detailed site visit should be conducted once the final routes have been established to determine the Present Ecological State (PES) and the Ecological Categories (EC) of the wetlands and riparian areas.

### **15.2.6 Vertebrate Assessment**

The vertebrate Specialists have sufficient experience and ample access to information sources to confidently compile lists of biota such as presented to support conclusions and suggested mitigation measures based on site visits. In instances where doubt exists, a species is assumed to be a possible occupant (viz. Suncus species and pythons); -this approach renders the conclusions to be robust. In instances where the possible occurrence has significant ecological implications, an intensive survey is recommended. In view of the latter, it is highly unlikely

whether an intensive survey to augment this site visit will add significantly to the data base and the additional costs are unlikely to warrant the effort. However, a third investigation phase is recommended, namely a 'walk-through' of the finalized preferred site and finalized power line routes.

### 15.2.7 Archaeological Impact Assessment

Some of the sections of the corridors were not assessed due to access challenges. Hence, a walk-down is recommended prior to commencement of construction activities.

## 16 A REASONED OPINION AS TO WHETHER THE ACTIVITY SHOULD OR SHOULD NOT CONTINUE

The draft Scoping, final Scoping, draft EIA, final EIA Reports and associated public participation process were performed as dictated by the requirements of the NEMA and associated regulations.

The proposed corridors have been under detailed assessment, the primary objective been to assess the suitability of the proposed study area for the intended use from an environmental perspective. This thorough investigation was furthermore enhanced by input from ecologists, archaeologist, wetland specialist, social impact assessor, avifauna and agricultural specialist.

The findings of the investigations from specialists input from interested and affected parties and findings of the EAP have been comprehensively documented in this report together with the specified recommendations. Based on the investigations, no fatal flaws or highly significant impacts that would impede the proposed development or necessitate redesign or termination of the project have been identified.

Based on the reasons highlighted above it is recommended that **Alternative 1** be approved and all management and mitigation measure put in place to reduce the environmental impact and particularly the wetland, heritage, and agriculture.

The no-go alternative was assessed and consideration of this option will have even greater social and economic consequences particularly if the security of electricity supply is compromised. Therefore, given the various developments, both industrial and residential taking place across the country the need to secure a dependable

electricity supply is of national importance. Should the no-go alternative be considered, the following impacts will be take occur:

- Visual Impact
- Impact on agriculture

Impacts of high significance include the following:

- Safety and security and
- Resettlement

With mitigation measures proposed as well as recommendations made by the specialist the impacts are manageable.

## **16.1 OPERATIONAL PHASE**

Negative impacts identified for the operational phase include bird electrocution, visual impact, noise surface and ground water solution. With proper mitigation in place the impacts are considered to be of low significance. The positive impacts associated with the operational phase include job creation for the locals and most importantly reliable power supply.

## **16.2 DECOMMISSIONING PHASE**

It must be noted that decommission will not take place in the foreseeable future, however, negative impacts that have been identified with the decommission phase include dust generation, loss of flora and potential surface and ground water pollution. However, if decommissioning were to take place it will have a negative impact due to job losses and waste generation and will be subjected to the relevant regulations and approvals.

## **17 FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME**

The Final Environmental Management Program is attached as Appendix J.

## 18 ENVIRONMENTAL IMPACT ASSESSMENT

This Final Environmental Impact Report (EIR) serves to primarily assess the likely impact the development may have on the surrounding environment and to provide recommendations regarding available alternatives, mitigation and management measures. The process aims at providing mitigation measures for the negative impacts identified as well as enhancing the positive impacts.

The EIR presents the relevant information to the Competent Authority for the purposes of decision making. In making a decision regarding this application the key findings must be considered as well as the other information contained within this report. The suggested mitigation measures must also be considered and compliance therewith should form a condition of any decision made to proceed with the development. In addition these conditions should be incorporated into a Construction Phase EMPr which serves to guide and inform sustainable environmental practices during the construction process. The complete identified management and mitigation measures are listed in the EMPr. These measures include those listed in this report.

### 18.1 PLANNING AND DEVELOPMENT PHASE

Impacts associated with the planning and development phase of the proposed activity includes the creation of job opportunities for skilled engineers and planning professionals. This positive impact will be definite and short term in duration. No significant negative impact has been associated with this phase and the proposed activity.

### 18.2 CONSTRUCTION PHASE

The positive impacts identified for this phase include job creation and a positive economic outlook for the mining community, the province and the country at large, these impacts will be enhanced in order to maximize the benefits. The negative impacts associated with the construction phase of the proposed activity can be regarded as being of low to medium significance. These include the following:

- Impact on biodiversity
- Impact on fauna
- Impact on traffic
- Impact on ground and surface water
- Fire
- Visual Impact



- Impact on agriculture

Impacts of medium to high significance include the following:

- Safety and security
- Resettlement

With corrective measures in place as well as implementation of recommendations made by the specialist none of the identified negative impacts are considered to be a fatal flaw.

### **18.3 OPERATIONAL PHASE**

No significant negative impact can be associated with the operational phase of the proposed activity. However, possible impact on avifauna due to electrocution and collision as a result of the proposed powerline has been identified as well as visual impact. Positive impact includes enhanced and improved operations for the mine and a positive benefit for the country at large in terms of GDP.

### **18.4 DECOMMISSIONING PHASE**

The decommissioning phase of the proposed activity will not take place in the foreseeable future. However, if decommissioning were to take place it will have a negative impact due to job losses, dust generation, potential soil erosion, waste generation and surface and ground water pollution.

## **19 CONCLUSION AND RECOMMENDATIONS**

The Environmental Impact Assessment was performed as dictated by the NEMA and associated regulations as well as the EIA regulation of June 2010.

The alternative routes have been scrutinized and detailed assessment conducted; the primary objective being to assess the suitability of the site for the intended use as well as to assess the impact of the proposed development on the environment. This report has comprehensively addressed the baseline environment which formed the backdrop of the impact assessment. Information provided has been supported by Specialist studies that were undertaken. The findings of the investigations, comments from affected and interested stakeholders are

documented in this report together with the specified recommendations. Based on the investigations, no critical flaws that would impede the development have been identified.

No fatal flaws or highly significant impacts were identified during the Scoping and EIA phases of the project that would necessitate substantial redesign or termination of the project. The main impacts have been discussed and mitigation measures have been identified that will serve to mitigate the scale, intensity and significance of the impacts that have high or medium rating. The final EMPr contains more detailed mitigation measures.

The mitigations measures and recommendations made in the following specialist studies must be adhered to:

- Social Impact Assessment;
- Flora Assessment;
- Fauna Assessment;
- Land Types and Agricultural Potential;
- Avifauna Assessment;
- Wetland Assessment; and
- Archaeological Assessment.

Further, the following is recommended by the EAP:

- That given all the reasons discussed above Alternative 1 is supported.
- That a final walkthrough of the approved corridor must take place to identify sensitivities and assist in identifying areas that require conservation
- That all necessary permits from the national and/or provincial heritage resources be obtained as recommended by the Heritage Specialist.
- That all necessary permits and licenses required by any Act, Policy, Law or By-Law be obtained prior construction.
- That the Environmental Management Programme attached hereto be a living document that guides the construction and operational phases of the proposed project.
- An integrated waste management approach be implemented that is based on waste minimisation and must incorporate reduction, reuse, recycling and disposal where appropriate.

- That necessary Water Use Licenses must be obtained as applicable from the Department of Water and Sanitation.
- Excessive wash-down of soil shall be prevented and the disturbed areas shall be rehabilitated on an ongoing basis to prevent erosion.
- The applicant shall ensure that fluids are stored and handled properly in a concrete to cement lined with berm walls to avoid any seepage into the ground water resources and also to ensure that the design of the storage area is such that any leakages or spillages can be contained.
- The applicant will provide the Department of Water and Sanitation with the quality and estimated quantity of the water that will be used for dust suppression during the developmental phase of the proposed project.
- As per Section 19(1) of the NWA, the applicant will ensure that any pollution incident(s) (of a water resource) originating from the proposed project shall be reported to the Regional Office of the DWA within 24hours.
- Issues of landownership must be dealt with prior to construction.
- Detailed geological studies of the preferred route must be undertaken to determine the exact location of sinkholes and dolomites so as to ensure recommendation of appropriate foundation.
- The National Environmental Management principles must be adopted and strict adherence maintained.
- The proposed line must be placed as close as possible to the existing powerline.
- Sensitive seepage zones and wetlands must be avoided for tower placement. This must be identified by an ecologist during the walk down assessment.
- The applicant must ensure that the following takes place with regard to the power line to reduce the identified impacts
  - Sections of the power line crossing adjacent to dams, rivers, drainage lines and watercourses are marked with bird flappers on the earth wires to reduce the impact on avifauna.
  - Where power lines runs parallel to riverine, riparian and wetland areas, the design should be in accordance with the requirement of the National Water Act, 1998 (Act 36 of 1998).
  - The identified areas of red data floral and other sensitive vegetation are avoided at all times.
  - The spans between the towers must be increased to the maximum necessary to meet technical and safety requirements in order to limit the impact on sensitive areas.
  - Specialist report must inform the nature and positioning of the power lines to ensure that no sensitive environments are impacted upon.
- The undertaking of this EIA has fully complied with the requirements of the NEMA and associated regulations. It is therefore recommended that the proposed project proceed.

## 20 REFERENCES

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