Lidwala
Environmental & Planning Services

Eskom Holdings SOC Limited

Eskom

Environmental Impact Assessment for the Proposed 1x400kV Tabor-Bokmakirie (Nzhelele) and 4 X 250MVA 400kV/132kV Nzhelele Main Transmission Station, Limpopo Province

DRAFT ENVIRONMENTAL IMPACT REPORT

DEA EIA Reference Number:
14/12/16/3/3/2/317

NEAS Ref Number:
DEA/EIA/0001132/2012

LDEDET Ref Number:
12/1/9/E-V178

Date:
March 2013

Report Version:
Draft 1

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DOCUMENT DESCRIPTION

Client:	Eskom Holdings SOC Limited
Project name:	Environmental Impact Assessment for the Proposed 1x400kV Tabor-Bokmakirie (Nzhelele) and 4 X 250MVA 400kV/132kV Nzhelele Main Transmission Station, Limpopo Province
Report type:	Draft Environmental Impact Report
Lidwala Project number:	11040KNK
Document number:	Document 1
Authority Reference:	DEA - 14/12/16/3/3/2/317 NEAS - DEA/EIA/0001132/2012 LDEDET - 12/1/9/E-V178
Version:	Draft
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Please note that the maps included in the text are also included as A3 maps in Appendix Q

EXECUTIVE SUMMARY

1 INTRODUCTION

1.1 Project Background

The Eskom Conversion Act, 2001 (Act No. 13 of 2001) establishes Eskom Holdings (SOC) Limited (Eskom) as a State Owned Enterprise (SOE), with the Government of South Africa as the only shareholder, represented by the Minister of Public Enterprises. The main objective of Eskom is to "provide energy and related services including the generation, transmission, distribution and supply of electricity, and to hold interests in other entities".

Electricity cannot easily be stored in large quantities and in general must be used as it is generated. Therefore, electricity is generated in accordance with supply-demand requirements. Eskom Holdings (SOC) Limited (Eskom) is responsible for the provision of reliable and affordable power to South Africa. Eskom's core business is the generation, transmission (transport), trading and retail of electricity. Eskom currently generates approximately 95% of the electricity used in South Africa. In terms of the Energy Policy of South Africa "energy is the life-blood of development". The reliable provision of electricity is critical for industrial development and related employment and sustainable development in South Africa.

Eskom Transmission Division plan to strengthen the Northern Grid in the areas north of the Soutpansburg with a new 400kV powerline between the Tabor Main Transmission Substation and the newly approved Bokmakirie (Nzhelele) Substation.

The Polokwane Customer Load Network (CLN), including the Tabor and Spencer power corridor, remains susceptible to voltage instability and is the weakest part of the Northern Grid network due to being operated beyond its reliability power transfer limit. In addition to this, the Polokwane CLN, i.e., Tabor and Spencer 275 kV and 132 kV network is susceptible to low voltages regardless the approved and commissioned network strengthening in year 2010 below:

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

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

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

The combined transformation capacity at Tabor and Spencer MTS end state of 846MW exceeds the installed and the approved transformation capacity of 712 MW. In addition to

this, the low voltages and thermal constraints in the 132 kV Distribution network for both existing and planned network remains.

The Tabor and Spencer 275/132 kV transformation recorded peak in year 2010 was 280 MW and 210 MW, respectively. The exceeded Tabor 275/132 kV transformation firm will be restored once the Witkop-Tabor 400kV line and the 1st 500 MVA 400/132 kV transformer have been commissioned.

The Spencer 275/132 kV transformation firm capacity of 234 MW will be exceeded by 40 MW in year 2015. Therefore, compromising the network reliability by violating the set Grid Code N-1 transformation criteria.

The lengthy Tabor and Spencer 132 kV Distribution networks stretching 200 km from Polokwane to 50 km away form the Mussina border-post result in low voltages and thermal constraints during N-1 transformation and line contingencies in year 2011 and beyond.

The expected Tabor and Spencer 132 kV load growth is located 100km north of Tabor and 70 km from Spencer, therefore, the Transmission outreach constraint will cap the load growth.

Following the findings after an assessment of the Tabor and Spencer 400 kV, 275 kV and 132kV network constraints for the 20 year horizon, Grid Planning proposes the following:

- Establish 4 x 250 MVA 400/132 kV Nzhelele Main Transmission Station (MTS) (**this project**)
- Construct Tabor–Nzhelele 130 km 400 kV line (**this project**),
- Construct Borutho–Nzhelele 250 km 400 kV line (**being undertaken concurrently by Nzumbululo Heritage Solutions**), and
- Commission all the associated infrastructure by year 2017.

The proposed servitudes for the Tabor-Nzhelele and Borutho 400 kV lines are likely to be more challenging to acquire due to the Mapumgubwe mountain range which the lines will have to be built through to feed into the Nzhelele MTS. However, the planned commissioning date, i.e., 2017 take into account the EIA approval processes and challenges.

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

1.2 Description of the Study Area

The study area falls within the Limpopo Province between the Tabor Substation located just south of the Capricorn Toll Plaza approximately 67km north of Polokwane to the proposed new Bokmakirie (Nzhelele) substation approximately 45km south of Musina.

The regional location of the proposed project is indicated in **Figure 1**.

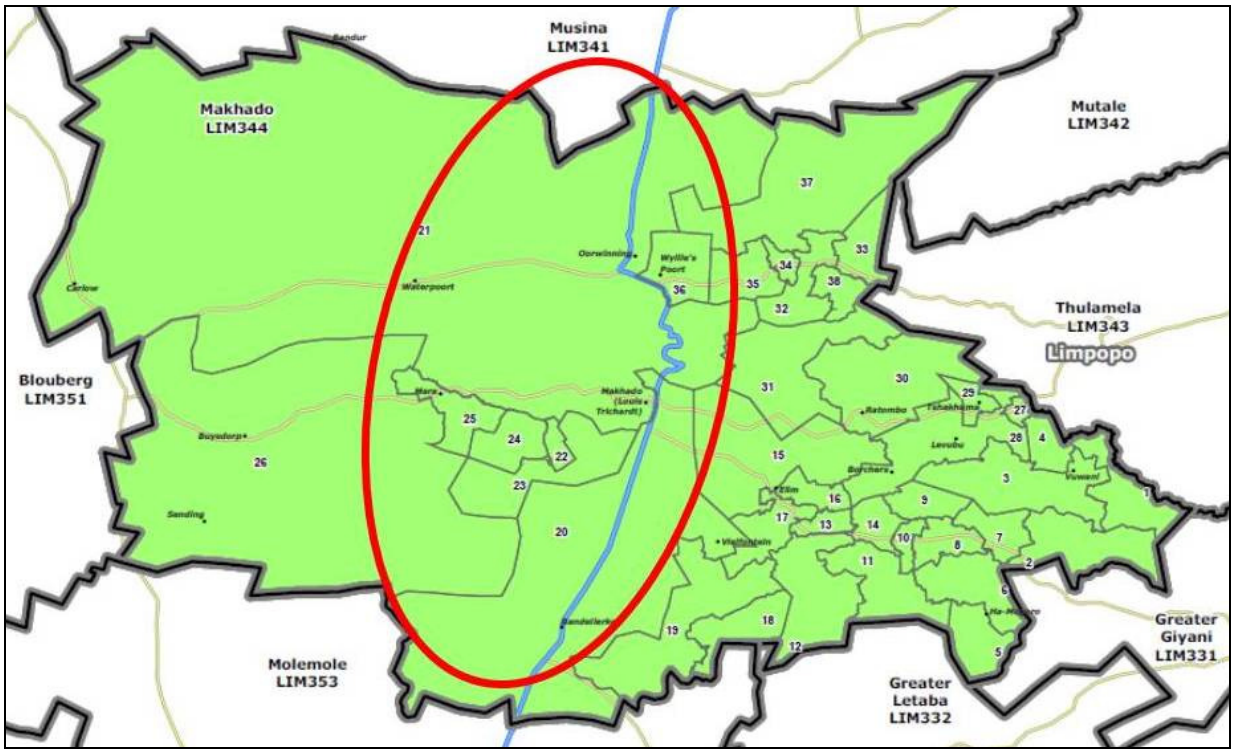

Figure 1: The location of the study area within the Makhado Local Municipality

Due to the fact that the EIA is a linear development, the Tabor- Nzhelele 400 kV power line EIA study area is a shown as a sphere starting and ending at the two specified substation (**Figure 1**). The study area is approximately 83 kilometres in length and includes a total of 94 different farms divided into 204 farm portions along the length of the various alternative alignments.

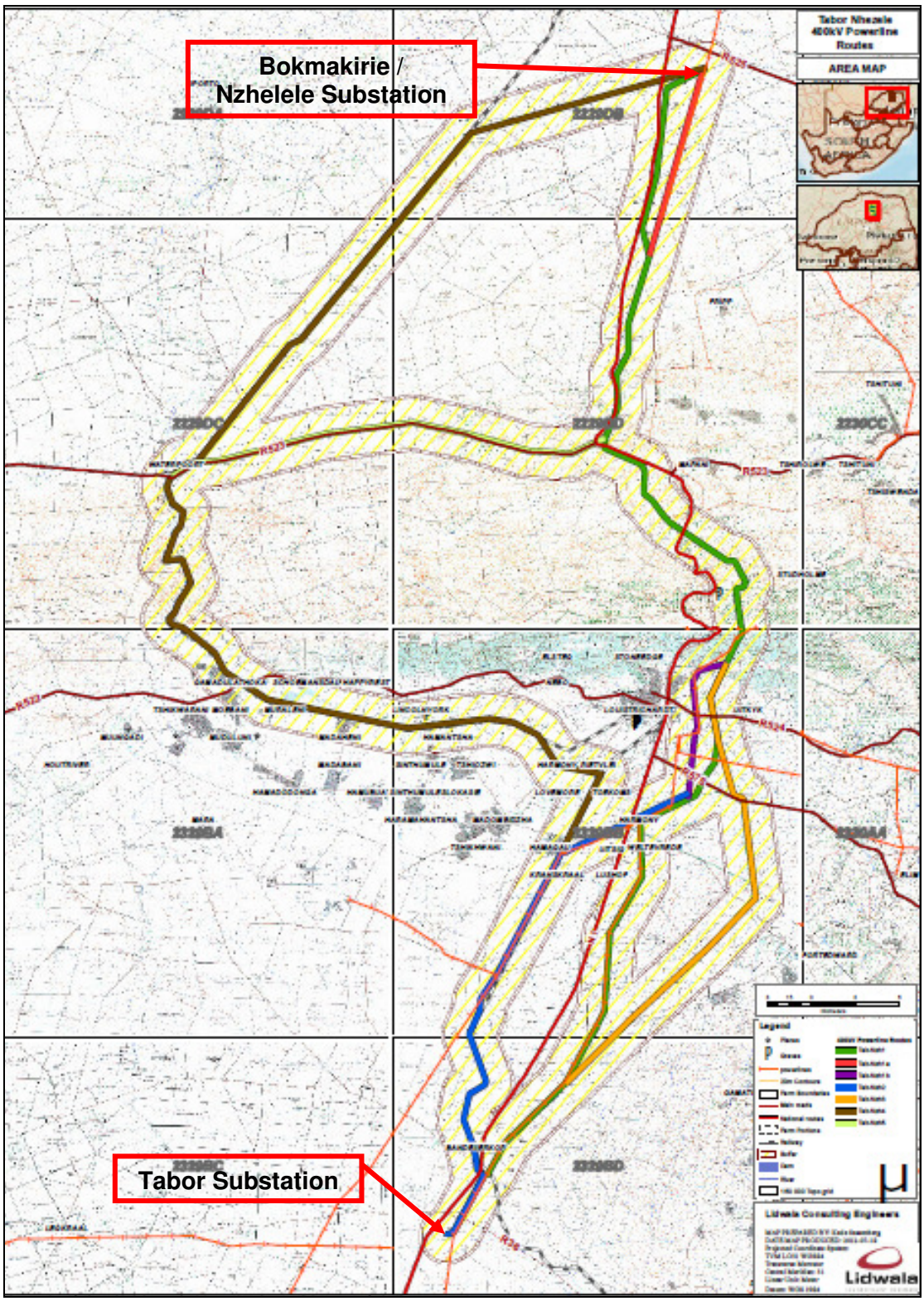

Figure 2: Proposed Alternative Alignments within the Study Area

2 PROCESS TO DATE

The Environmental Impact Assessment (EIA) process for the proposed project is comprised of two main phases, namely the Scoping phase and Impact Assessment phase. This report documents the tasks which have been undertaken as part of the Impact Assessment phase of the EIA. These tasks include the public participation process and the documentation of the issues which have been identified as a result of these activities.

To date, tasks that have commenced include the:

- Identification of stakeholders or I&APs;
- Notification and advertisements;
- Background Information Documents; and
- Ongoing consultation and engagement

Lidwala undertook the Scoping Phase of the project between **March** and **August 2012**. The public review of the Draft Scoping Report ran for a period of **40 calendar days** from **31 May to 9 July 2012**. The responses and comments from I&APs on the draft Scoping Report were captured in the Final Environmental Scoping Report. The final Environmental Scoping Report was submitted to DEA for review and acceptance on **24 August 2011** together with the Final Plan of Study for Environmental Impact Assessment (POS for EIA). The Final Scoping Report and POS for EIA were accepted by the DEA on **2 November 2012**.

The relevant authorities required to review the proposed project and provide an Environmental Authorisation were consulted from the outset of this study, and have been engaged throughout the project process. The National Department of Environmental Affairs (DEA), is the competent authority for this Project. The Department of Water Affairs (DWA), and the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) are noted as key commenting authorities.

The Impact Assessment Phase of an EIA serves to assess the potential impacts of a proposed project. The Environmental Impact Assessment Phase has been undertaken in accordance with the requirements of sections 24 and 24D of the National Environmental Management Act (NEMA) (Act 108 of 1998), as read with Government Notices R 543 of the 2010 EIA Regulations. The objectives of the EIA Phase are to:

- Ensure that the process is open and transparent and involves the Authorities, proponent and stakeholders;
- Address issues that have been raised during the preceding Scoping Phase;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance of each impact; and
- Formulate mitigation measures.

The draft Environmental Impact Report has been made available for review for a period of **40 days** from **7 March 2013** to **18 April 2013** at public locations within the study area, which are readily accessible to I&APs.

3 SUMMARY OF THE LEGISLATION CONTEXT

The legislative framework applicable to this project is diverse and consists of a number of Acts, Regulations and Treaties which must be complied with. A summary of the key legislation is provided hereunder.

Legislation	Sections
The Constitution (Act No 108 of 1996)	Chapter 2
	Section 24
	Section 32
	Section 41
The Promotion of Administrative Justice Act (Act 3 of 2000)	-
Promotion of Access to Information Act (Act 2 of 2000)	-
National Environmental Management Act (No 107 of 1998)	Section 2
	Section 24A &24D &24(5)
	Section 28
National Environmental Management: Biodiversity Act No 10 of 2004	-
National Environmental Management: Protected Areas Act No 57 of 2003	-
National Environmental Management: Waste Act (No 59 of 2008)	Section 16
	Section 26
	Section 27
The Conservation of Agricultural Resources Act (No 43 of 1983)	Section 6 & R1048 of 25 May 1984
National Heritage Resources Act (No 25 of 1999)	-
National Forest Act No 84 of 1998	Section 15
National Water Act No 36 of 1998	Section 19
	Section 20
	Section 21
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32
	R1651 of 20 September 1974
Occupational Health and Safety Act (No 85 of 1993)	Section 8
	Section 9
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947)	Sections 3 to 10

Legislation	Sections
Limpopo Environmental Management Act (No 7 of 2003)	Chapter 13 (sections 89-93)
Makhado Local Municipality: Environment: Inflammable liquids and substances By-law	Chapter 7
Drainage By-laws LA. 78 dated 5 January 1994	The whole

A full legal review was undertaken during the EIA phase of the project.

4 DESCRIPTION OF THE BASELINE ENVIRONMENT

The terrain morphology of the study area is broadly described as slightly undulating to strong undulating plains with high mountains. The study area (86 x 26 km) is divided into three zones, each of which presents different topographical characteristics, i.e. a northern section, the Soutpansberg, and a southern section**.**

The study area could be considered a subtropical climate. The winters are characterised by mild afternoons and cool evenings. Winters usually last from June to August. Summers experience warm and often humid temperatures with the occasional afternoon thunderstorm. Most of Louis Trichardt's rainfall occurs in the summer months, from November to March. The last few years have seen some water restrictions put in place by the municipality mainly due to drought in the area and lack of maintenance of the town's water supply system by the municipality.

The dominant vegetation type in the south of study area is "Makhado Sweet Bushveld". A large element of "Tzaneen Sour Bushveld" lies to the east of the route alternatives. As one moves north of Makhado (Louis Trichardt), and in to the mountains, the dominant vegetation type is "Soutpansberg Mountain Bushveld". Elements of "Soutpansberg Summit Sourveld" and "Northern Mistbelt Forest" are also present in the mountains. The patches of Afromontane forest, up to 30–40 m tall, are found in valleys and moist basins, especially where south-facing. On the lower and middle slopes, sourish mixed bushveld dominates. The mountain peaks are covered with scattered clumps of Protea bushes. The eastern portion of the Soutpansberg has been extensively afforested with commercial timber plantations. Parts of the range are also used for subtropical fruit farming, mainly avocados, mangos, nuts and citrus. The eastern portion holds various forest reserves, including Timbadola Forest Reserve, Entabeni State Forest, Klein Australië Forest Reserve, Goedehoop Forest Reserve, Roodewal Forest Reserve and Hanglip State Forest, and the private Buzzard Mountain Retreat, 20 km west of Louis Trichardt. Most of these protected areas are partly afforested and partly covered by indigenous vegetation.

North of the Soutpansberg, as one descends towards the Limpopo River, the area is dominated by "Musina Mopane Bushveld" while patches of "Limpopo Ridge Bushveld" are also present.

The archaeology of the Soutpansberg covers the time period from about 1 000 000 years ago to the beginning of the historical/colonial period in the area at about 1840.

The total population of Makhado is estimated at 495 261 and is growing at about 1.4% per annum. It is composed of 54.25% female and about 45.75% male persons. The local population has a youthful age structure and the immediate significance of this young age structure is that the population will grow rapidly in future and this implies a future high growth rate in the labour force. At present the local economy is unable to provide sufficient employment opportunities to meet the needs of the economically active population

5 ALTERNATIVES

a) No-Go Alternative

In the context of this project, the no-go alternative implies that the powerlines linking the Tabor substation to the new Bokmakirie (Nzhelele) Substation in order to strengthen the northern grid or that the expansion of the Bokmakirie substation to accommodate the new 400kV infrastructure will not be constructed.

The no-go alternative can be regarded as the baseline scenario against which the impacts of the powerlines are evaluated. This implies that the current biophysical and socio-economic conditions associated with the proposed routes will be used as the benchmark against which to assess the possible changes (impacts) to these conditions as a result of the powerlines.

In most cases, the no-go alternative will imply that the identified negative impacts of proceeding with the project will not be incurred. Conversely, selection of the no-go alternative will also result in the benefits (including the potential economic development and related job creation, and increased security of electricity supply for the northern areas of the Limpopo Province) of the project not being realised.

The 'no go' alternative has, however, been investigated in the EIA phase as an alternative as required by the EIA Regulations.

b) Tower Design Alternatives

There are several tower design options available for use in the transmission line development, as described below. A variety or combination of tower designs are likely to be utilised for construction of the lines, depending on the characteristics and needs of the land and communities concerned. These can include:

- compact cross rope suspension tower
- cross rope suspension tower

- guyed suspension tower
- self supporting strain tower
- self supporting tower

The final tower design alternatives will be decided based on a walk down of the proposed corridors, and upon discussion with the relevant parties involved. The various tower designs can all be utilised for 400 kV powerlines.

In some cases particular towers are more appropriate for use, such as:

- Self supporting strain towers are always utilised on a turn or before and after particularly long spans, especially where mountainous terrain is concerned.
- The compact cross rope suspension and guyed suspension towers are preferred when grazing land or game farming occurs due to the small footprint area of the base of the tower.
- The self supporting tower is preferred on areas where crop farming occurs, due the fact that there are no guy ropes, which can make ploughing difficult

c) Access Roads

A formal section of access road is proposed to be constructed through the farms Clydesdale and Vlakfontein. Two sections of the road have been identified to be paved with a suitable surfacing material, such as bitumen or concrete, in order to reduce erosion due to the steepness of the slopes. This road is proposed not only as an access road for the proposed 400kV line alternative but also required for the existing 132kV line. Due to the fact that this road was proposed as a result of a direct request from the landowners, for use during the maintenance of the existing 132kV powerline, there are no alternatives and will require establishment even in the event that the proposed parallel 400kV alignment is not considered preferred. **Figure 3** gives an indication of the proposed route that has been investigated during the detailed studies.

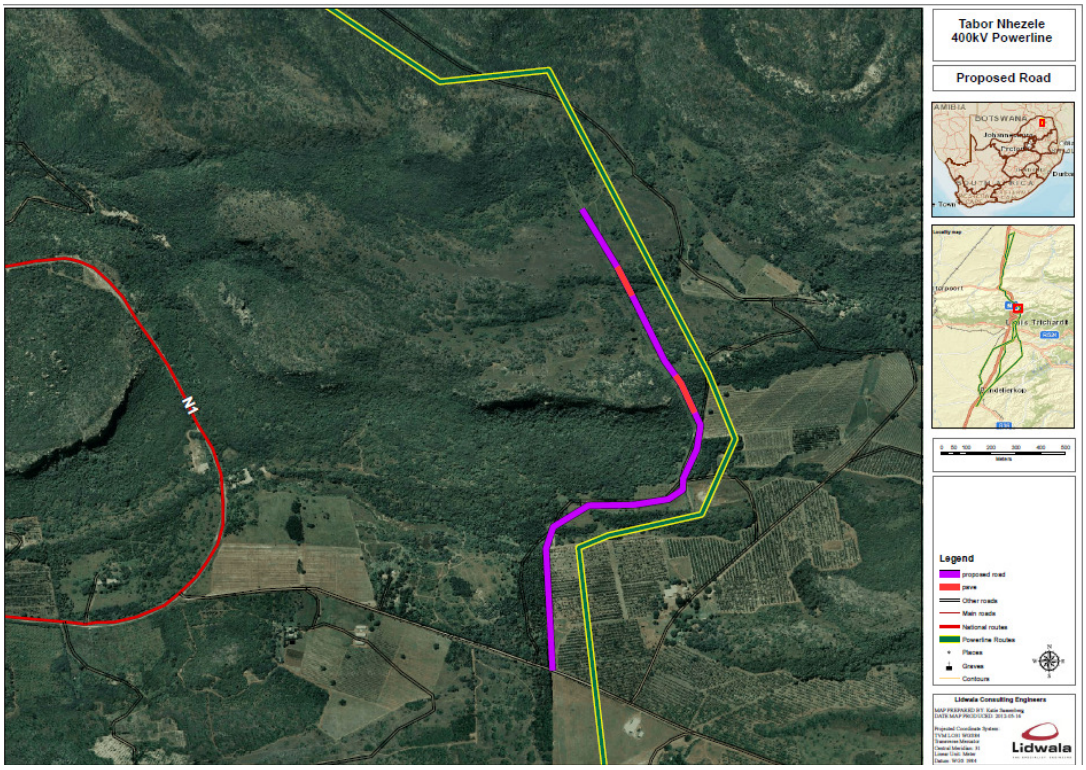

Figure 3: Proposed formal access road

In addition to the above access road a further 5 km of access road is proposed to be constructed between the N1 and the proposed new Nzhelele substation. **Figure 4** gives an indication of the proposed route that has been investigated during the detailed studies.

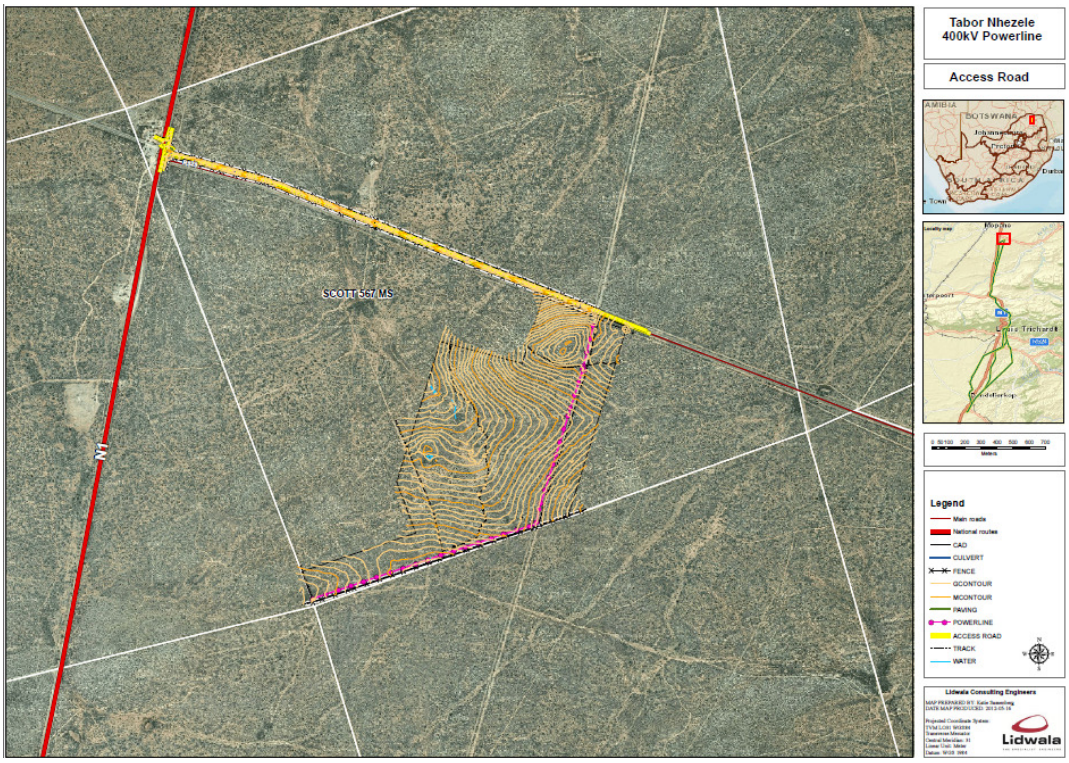

Figure 4: Proposed formal access road to the proposed new Nzhelele substation

d) Substation

The full scope of work for the substation includes:

- Expansion of Bokmakirie (Nzhelele) Substation with 4 X 250MVA 400KV/132KV transformers and associated infrastructure, including:
    - Terrace the Nzhelele 400kV yard for and end-state of 4x 400kV feeder bays,
    - Terrace the Nzhelele 132kV yard for and end-state of 8x 132kV feeder bays,
    - Establish the control building, telecommunication infrastructure, oil dam,

Although the Bokmakirie Substation is not yet built, it has received an Environmental Authorisation for the building of a Distribution size (2 ha) substation for the new 132 kV powerline that was recently established. The Bokmakirie Substation will be built on the Farm Scott 567MS Portion 2.

This project requires the expansion of the Bokmakirie Substation to allow for both the Tabor – Nzhelele Powerline and well as the Barutho – Nzhelele Powerline. The Bokmakirie Substation will need to be increased to a size of 25 ha to accommodate the above-mentioned infrastructure (**Figure 5**).

Due to the fact that the activities involved are expansion activities, there is no alternative site for the substation.

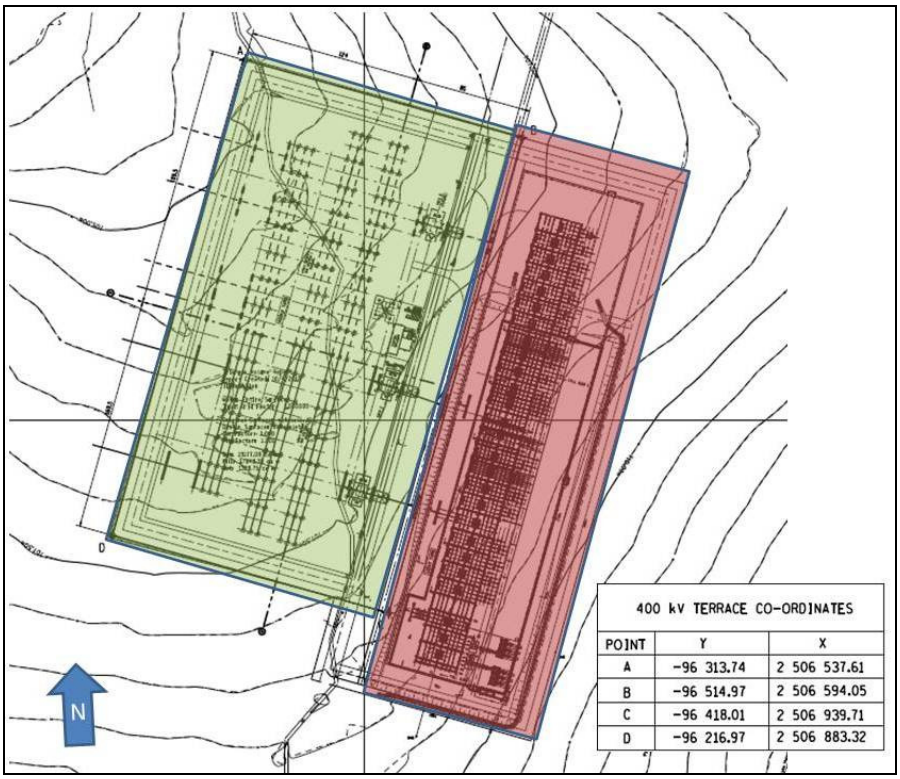

Figure 5: Proposed Nzhlele Transmission Substation expansion footprint versus the approved Bokmakirie Distribution Substation expansion footprint

e) Corridor Alternatives

The proposed powerline includes:

- One 400 kV powerline from the Tabor substation to the Bokmakirie (Nzhelele) substation.

Once the most suitable corridor(s) have been recommended and authorised, the exact alignment of the powerlines within the corridor(s) will be finalised.

Table 1 provides the summary of various sections of the five alternatives as illustrated in **Figure 6.**

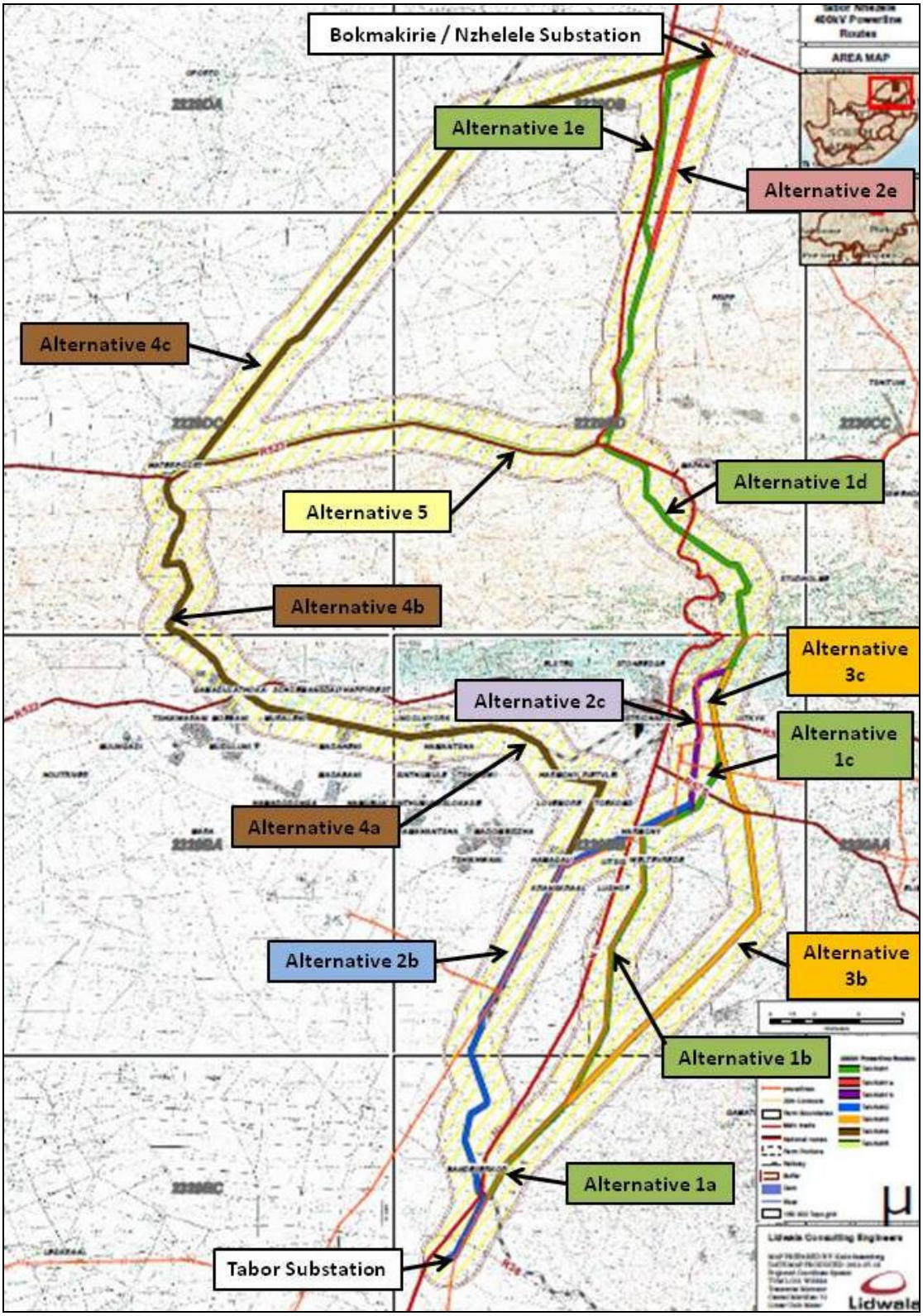

Figure 6: A map indicating the various sections of each alternative as described in Table 1

Table 1: Alternative Summary

Issue	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Length	93km	95km	95km	119.3km	126.1km
Number of Bend points	50	54	42	±32	±40
Number of Transmission Line Crossings	0	0	0	0	0
Number of Distribution Line Crossings	5	8	5	unknown	unknown
Number of National Road Crossings	2	4	2	2	2
Number of Railway Crossings	1	1	1	4-5	4-5
Land Use	Game farms, Agricultural, residential, veld	Game farms, Agricultural, residential, veld	Game farms, Agricultural, residential, veld	Game farms, Agricultural, residential, veld	Game farms, Agricultural, residential, veld
Topography	Flat and Undulating (including mountainous section north of Louis Trichardt)	Flat and Undulating (including mountainous section north of Louis Trichardt)	Flat and Undulating (including mountainous section north of Louis Trichardt)	Flat and Undulating (including mountainous section northwest of Louis Trichardt)	Flat and Undulating (including mountainous section northwest of Louis Trichardt)
Access	Good	Good	Fair	Fair	Fair

6 IMPACT ASSESSMENT

6.1 Alternative 1

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented.

The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented.

The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Visual
    - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
    - Increase in the voltage stability
    - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
    - No more backlogs in electricity Connections
    - The inadequate provision of electricity to services such as health facilities will cease
    - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. No impacts were assessed as having a high significance before the implementation of mitigation measures.

6.2 Alternative 1a

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Heritage

- Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Visual
  - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
  - Increase in the voltage stability
  - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
  - No more backlogs in electricity Connections
  - The inadequate provision of electricity to services such as health facilities will cease
  - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. No impacts were assessed as having a high significance before the implementation of mitigation measures.

6.3 Alternative 1b

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Visual
    - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
    - Increase in the voltage stability
    - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
    - No more backlogs in electricity Connections
    - The inadequate provision of electricity to services such as health facilities will cease
    - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. No impacts were assessed as having a high significance before the implementation of mitigation measures.

6.4 Alternative 2

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Visual
    - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
    - Increase in the voltage stability
    - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
    - No more backlogs in electricity Connections
    - The inadequate provision of electricity to services such as health facilities will cease
    - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. No impacts were assessed as having a high significance before the implementation of mitigation measures.

6.5 Alternative 3

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are

implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of pristine habitat
- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of protected flora
    - Destruction of pristine habitat
    - Vegetation clearance
- Visual
    - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
    - Increase in the voltage stability
    - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
    - No more backlogs in electricity Connections
    - The inadequate provision of electricity to services such as health facilities will cease
    - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate

mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of pristine habitat

6.6 Alternative 4

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of protected flora
    - Destruction of pristine habitat
    - Vegetation clearance
    - Treat to biodiversity
- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of protected flora
    - Destruction of pristine habitat
    - Vegetation clearance
    - Threat to biodiversity
    - Soil erosion
- Visual
    - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
    - Increase in the voltage stability
    - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
    - No more backlogs in electricity Connections
    - The inadequate provision of electricity to services such as health facilities will cease
    - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of protected flora
    - Destruction of pristine habitat
    - Vegetation clearance
    - Threat to biodiversity

6.7 Alternative 5

During the **construction phase**, the majority of impacts identified were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Flora
    - Destruction of protected flora
    - Destruction of pristine habitat
    - Vegetation clearance
    - Treat to biodiversity
- Heritage
    - Destruction of Heritage sites and features

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The majority of the impacts identified, associated with the **operational phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
  - Destruction of protected flora
  - Plant encroachment
  - Threat to biodiversity
- Visual
  - Visual exposure to the Powerline Servitude, Conductor Cables and Towers, as well as the Nzhelele Substation

After the implementation of mitigation measures the intensity levels of all impacts reduced.

The following **positive** impacts were assessed to be of high significance:

- Social
  - Increase in the voltage stability
  - Increase of electricity supply making it available for agriculture, tourism and other industries. The increase in electricity can also allow for the undertaking of other activities that may have been that may not have been possible prior to the improved electricity supply
  - No more backlogs in electricity Connections
  - The inadequate provision of electricity to services such as health facilities will cease
  - Electricity will be available to numerous rural settlements that do not have this service

The majority of impacts identified associated with the **de-commissioning phase** were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented. The following **negative** impacts were assessed to be of high significance in the event that mitigation measures are not implemented as required:

- Flora
  - Destruction of protected flora
  - Destruction of pristine habitat
  - Vegetation clearance
  - Threat to biodiversity

6.8 No-Go Alternative

In general, no impacts were identified to be associated with the No-Go Alternative, due to the fact that in the event that the transmission line is not constructed, no impacts will occur as the status quo will remain.

However, a number of **negative** impacts were identified to be of High significance from a social point of view in the event that the powerline is not constructed:

- Social
    - No increase and assurance of electricity supply making it unavailable for agriculture, tourism and other industries as well as allowing for the undertaking of other activities that may not have been possible before. The absence of an increase in electricity may also hinder the undertaking of other activities that may only be possible with electricity supply
    - Continuation of the inadequate provision of electricity to critical services such as health facilities
    - Continuation of the unavailability of electricity in numerous rural settlements
    - Continuation of backlogs in electricity connections
    - No increase in the voltage stability

6.9 Cumulative Impacts

The majority of **cumulative impacts** identified and associated with the project were considered to be of low to medium significance in the event that the appropriate mitigation measures are implemented.

The following **negative** impacts were assessed to be of High significance in the event that mitigation measures are not implemented as required:

- Flora
    - Plant encroachment
    - Soil erosion
- Fauna
    - Loss of faunal habitat
- Visual
    - Increased visual exposure to Power Line Infrastructure
- Social
    - Poaching of game impacting on the loss of game and in turn affecting the tourism industry of the Municipality and that of the country at large

With regards to the proposed new powerline a total of two (2) cumulative impacts were assessed as having a high significance before the implementation of mitigation measures.

After the implementation of mitigation measures the intensity levels of all impacts were reduced.

7 ROUTE PREFERENCE RANKING

In order to identify which of the alternative routes is deemed preferred, the specialists were requested to rank the alternatives routes according to a route ranking methodology. The route preference rating system is applied to each discipline, and the rating of each site was conducted according to the following system:

1 = Not suitable for development / No-Go (impact of very high significance - negative)
2 = not preferred (impact of high significance - negative)
3 = acceptable (impact of moderate significance - negative)
4 = Preferred (impact of low or negligible significance - negative)

While each specialist study was required to have the Route Preference as an outcome, how they evaluated each route varied from discipline to discipline and the description of their specific approaches are outlined in each specialist report (refer **Appendix J to P**).

The route preference results for each route from each specialist study were entered into a matrix and added together. The route with the highest value is then considered the most preferable. **Table 2** shows the final route preference matrix.

Table 2: Final Route Ranking Matrix

Study	Alt 1	Alt 1a	Alt 1b	Alt 2	Alt3	Alt 4	Alt 5
Fauna	3	3	4	4	3	2	3
Avifauna	3	3	3	4	2	1	1
Flora	4	4	4	4	1	2	1
Soils and Agricultural Potential	4	3	4	3	3	2	3
Social	4	3	1	3	3	2	3
Visual	3	3	3	3	2	2	2
Heritage	3	3	3	3	3	2	2
Total	**24**	**22**	**22**	**24**	**17**	**13**	**15**

From the above route raking assessment, it is clear that the preferred route would involve a combination of Alternatives 1, 1a, 1b and 2. Alternative 3, 4 and 5 are not deemed to be acceptable. It can be noted that Alternative 1 and 2 have the same final value, however, Alternative 2 was identified as the more preferred route in the south due to the fact that the individual scores for biodiversity issues (i.e. flora, fauna and avifauna) were higher for Alternative 2 than for Alternative 1. Alternative 2 also does not cut through the Ben Lavin Nature Reserve. The final route is shown in **Figure 7** below.

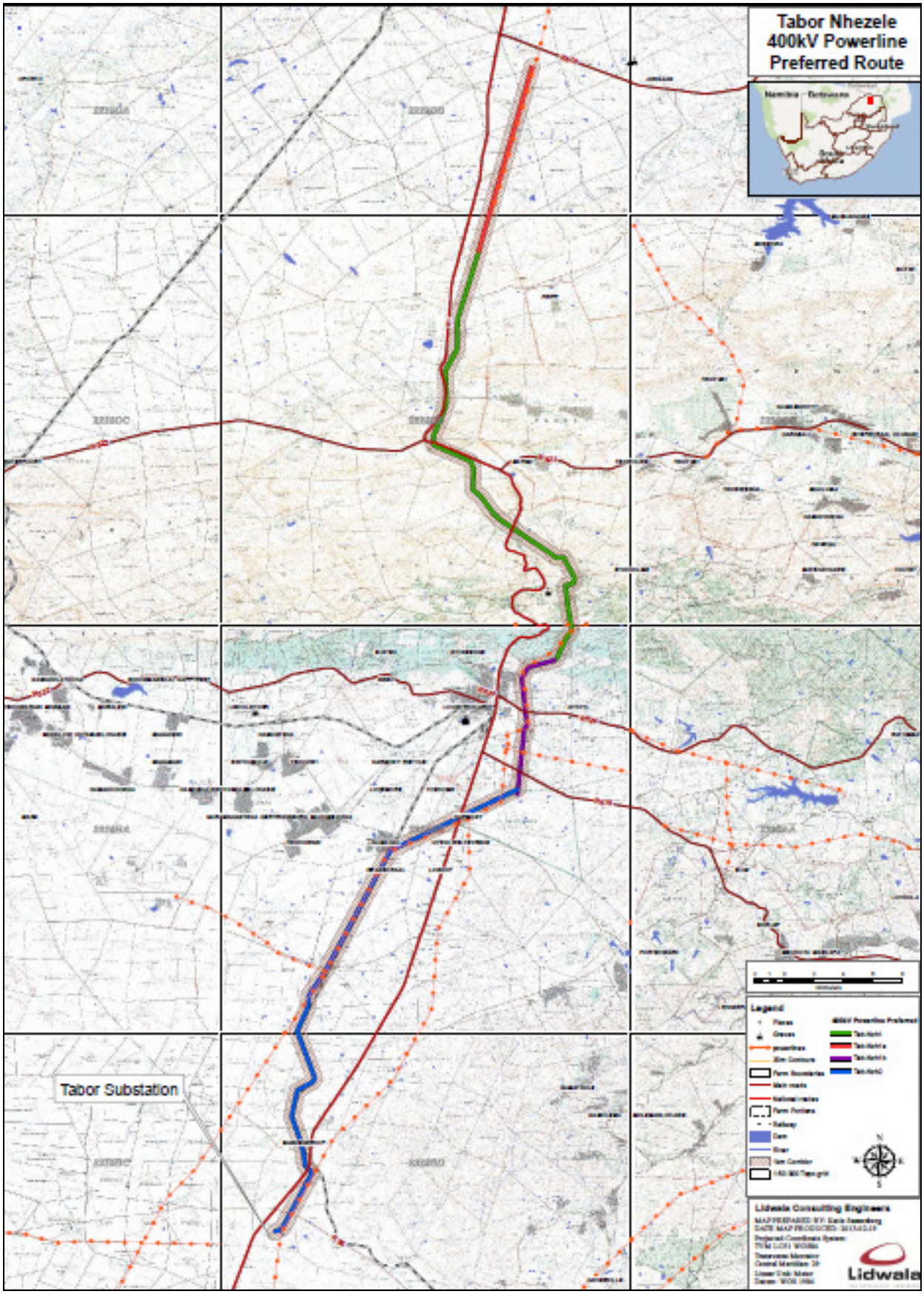

Figure 7: Final Preferred Route

8 CONCLUSIONS AND RECOMMENDATIONS

In the view of the environmental assessment practitioner, that once final, the information contained in this report and the documentation attached thereto will be sufficient for the National DEA to make a decision in respect of the activities applied for with respect to the proposed new 400 kV Powerline between the Tabor and Nzhelele Substations.

This EIA provides an assessment of both the benefits and potential negative impacts anticipated as a result of the proposed new powerline. The findings of the assessment conclude that identified significant impacts can be addressed with relevant mitigation measures, therefore, in the view of the EAP, no environmental fatal flaws should prevent the proposed project from proceeding.

In order to achieve appropriate environmental management standards and ensure that the findings of the environmental studies are implemented through practical measures, the recommendations from this EIA have been included within a Preliminary Construction and Operational Environmental Management Programme (EMPR) which has been included in **Appendix E.** It is recommended that this EMPR is updated once the final alignment of the powerline has been identified and surveyed. A final walk-down of all proposed tower positions, by all relevant specialists, must be undertaken and tower specific recommendations and mitigation measures included into the update EMPR. This EMPR will then form part of the contract with the contractors appointed to construct and maintain the proposed infrastructure. The EMPR would be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPR for key life cycle phases (i.e. construction and operation) of the proposed project is considered to be fundamental in achieving the appropriate environmental management standards as detailed for this project.

It is also recommended that the process of communication and consultation with the community representatives and landowners is maintained after the closure of this EIA process, during the construction and operational phases associated with the proposed project.

Eskom Holdings SOC Limited

Environmental Impact Assessment for the Proposed 1x400kV Tabor-Bokmakirie (Nzhelele) and 4 X 250MVA 400kV/132kV Nzhelele Main Transmission Station, Limpopo Province

Draft Environmental Impact Report

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