

# ENVIRONMENTAL IMPACT ASSESSMENT DRAFT BASIC ASSESSMENT REPORT

ESKOM ERMELO-UITKOMS 88KV LINE  
DEA Ref nr 14/12/16/3/3/1/784  
NEAS Ref DEA/EIA/0001597/2012

## Executive Summary

The affected properties for the project are:

**Route Alternative 1** is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3, 4, 9, 14, 15; Transutu 257 IT portion 0; Jan Hendriksfontein 263 IT portion 6; Witpunt 267 IT portion 9, 22, 34, Witpunt 267 IT (Consolidated to portion 40 of 267 IT) portion 1, Witpunt 267 IT portion 35 and 36; Camden Power Station 329 IT Rem.

**Proposed Route Alternative 2** is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3; Uitkomst 292 IT (Consolidated to portion 18 of 292 IT) portion 3; Camden Power Station 329 IT Rem; Witpunt 267 IT portion 35 and 36.

Both routes are in the Msukaligwa Local Municipality in the Mpumalanga Province.

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# ESKOM ERMELO-UITKOMS 88KV LINE

## ENVIRONMENTAL IMPACT ASSESSMENT DRAFT BASIC ASSESSMENT REPORT

### Executive Summary

#### 1. Background

The proposed project is part of a broader scope of work to improve Eskom's network performance. The existing Distribution networks are exceeding their maximum power transfer capability. Currently the network is experiencing under voltages and is incapable of handling additional loads due to the contingency restraints of the network. As part of its assessment of a range of electricity supply options, Eskom is investigating the feasibility of constructing a new Chickadee 88kV powerline between the Ermelo and Uitkoms Substations.

A Basic Assessment (BA) process for this proposed powerline route is currently being undertaken by Texture Environmental Consultants (DEA Ref 14/12/16/3/3/1/784).

To date, two route alternatives have been identified for investigation. The proposed layout and best route will be determined through environmental and specialist studies as well as public opinion.

The proposed project entails the construction of a new 88kV Chickadee Powerline from the Ermelo substation located in Ermelo Town to the Uitkoms substation (approximately 22 km) in the Msukaligwa Local Municipality in the Mpumalanga Province.

The scope of work includes:

- Identification of potential alternative corridor routes for a 22km 88kV chickadee power line between the existing Ermelo substation to the existing Uitkoms substation;
- The project involves identification of a 100m corridor within which Eskom would be able to locate a 31m servitude for the powerline between Ermelo substation and Uitkoms substation. The servitude is required for maintenance purposes.
- Identification of potential corridors to construct an access/ construction road of 8 meters wide for the line.

The applicant is Eskom Distribution, Mpumalanga Operating Unit, Land Development with contact person Ms. Betty Ngobeni, Environmental Management in Witbank.

#### 2. Locality and Regional Context

The proposed power line corridors are situated in the Mpumalanga Province, to the south-east of Ermelo. Two alternative routes are considered for the power line. The study area for the proposed power line servitudes runs approximately south-east over a distance of 22km and links between the two substations of Ermelo and Uitkoms. Both substations lay mostly between the public roads of the N2 (to the south) and the R65 (to the north), with Uitkoms Substation situated at the east end of Camden Power Station.

##### Property descriptions of Route Alternative 1

The **Route Alternative 1** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3, 4, 9, 14, 15; Transutu 257 IT portion 0; Jan Hendriksfontein 263 IT portion 6; Witpunt 267 IT portion 9, 22, 34, Witpunt 267 IT (Consolidated to portion 40 of 267 IT) portion 1, Witpunt 267 IT portion 35 and 36; Camden Power Station 329 IT Rem.

### Property descriptions of Proposed Route Alternative 2

The proposed **Route Alternative 2** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3; Uitkomst 292 IT (Consolidated to portion 18 of 292 IT) portion 3; Camden Power Station 329 IT Rem; Witpunt 267 IT portion 35 and 36.

Both routes are in the Msukaligwa Local Municipality in the Mpumalanga Province.

### Co-ordinates:

The alternatives for the project are found at approximately:

### Alternative 1 Route (21.13km):

#### Ermelo substation:

Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
26° 30.732' S	29° 58.692' E

250m intervals	Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
1	26° 30.678' S	29° 58.866' E
2	26° 30.620' S	29° 59.002' E
3	26° 30.554' S	29° 59.133' E
4	26° 30.488' S	29° 59.264' E
5	26° 30.439' S	29° 59.403' E
6	26° 30.405' S	29° 59.549' E
7	26° 30.371' S	29° 59.695' E
8	26° 30.337' S	29° 59.840' E
9	26° 30.303' S	29° 59.986' E
10	26° 30.269' S	30° 0.131' E
11	26° 30.234' S	30° 0.277' E
12	26° 30.271' S	30° 0.417' E
13	26° 30.322' S	30° 0.557' E
14	26° 30.374' S	30° 0.696' E
15	26° 30.425' S	30° 0.835' E
16	26° 30.476' S	30° 0.974' E
17	26° 30.528' S	30° 1.114' E
18	26° 30.579' S	30° 1.253' E
19	26° 30.630' S	30° 1.392' E
20	26° 30.681' S	30° 1.531' E
21	26° 30.732' S	30° 1.671' E
22	26° 30.784' S	30° 1.810' E
23	26° 30.839' S	30° 1.946' E
24	26° 30.937' S	30° 2.050' E
25	26° 31.035' S	30° 2.154' E
26	26° 31.133' S	30° 2.257' E
27	26° 31.231' S	30° 2.361' E
28	26° 31.329' S	30° 2.465' E
29	26° 31.427' S	30° 2.569' E
30	26° 31.525' S	30° 2.673' E
31	26° 31.623' S	30° 2.777' E
32	26° 31.721' S	30° 2.881' E
33	26° 31.819' S	30° 2.985' E
34	26° 31.916' S	30° 3.089' E
35	26° 32.014' S	30° 3.193' E
36	26° 32.117' S	30° 3.291' E
37	26° 32.222' S	30° 3.386' E
38	26° 32.326' S	30° 3.482' E
39	26° 32.431' S	30° 3.577' E
40	26° 32.535' S	30° 3.673' E
41	26° 32.640' S	30° 3.769' E
42	26° 32.745' S	30° 3.864' E

43	26° 32.849' S	30° 3.960' E
44	26° 32.954' S	30° 4.055' E
45	26° 33.058' S	30° 4.151' E
46	26° 33.165' S	30° 4.244' E
47	26° 33.273' S	30° 4.335' E
48	26° 33.380' S	30° 4.426' E
49	26° 33.488' S	30° 4.517' E
50	26° 33.596' S	30° 4.608' E
51	26° 33.704' S	30° 4.699' E
52	26° 33.812' S	30° 4.790' E
53	26° 33.920' S	30° 4.880' E
54	26° 34.028' S	30° 4.972' E
55	26° 34.135' S	30° 5.063' E
56	26° 34.243' S	30° 5.153' E
57	26° 34.351' S	30° 5.245' E
58	26° 34.459' S	30° 5.335' E
59	26° 34.567' S	30° 5.426' E
60	26° 34.675' S	30° 5.517' E
61	26° 34.782' S	30° 5.608' E
62	26° 34.890' S	30° 5.699' E
63	26° 34.998' S	30° 5.790' E
64	26° 35.106' S	30° 5.881' E
65	26° 35.212' S	30° 5.975' E
66	26° 35.312' S	30° 6.077' E
67	26° 35.412' S	30° 6.178' E
68	26° 35.511' S	30° 6.280' E
69	26° 35.611' S	30° 6.382' E
70	26° 35.711' S	30° 6.483' E
71	26° 35.811' S	30° 6.585' E
72	26° 35.911' S	30° 6.686' E
73	26° 36.011' S	30° 6.788' E
74	26° 36.112' S	30° 6.884' E
75	26° 36.237' S	30° 6.827' E
76	26° 36.363' S	30° 6.771' E
77	26° 36.488' S	30° 6.715' E
78	26° 36.608' S	30° 6.646' E
79	26° 36.723' S	30° 6.567' E
80	26° 36.839' S	30° 6.488' E
81	26° 36.920' S	30° 6.382' E
82	26° 36.950' S	30° 6.235' E
83	26° 36.980' S	30° 6.088' E
84	26° 37.011' S	30° 5.941' E
85	26° 37.027' S	30° 5.865' E
86	26° 37.051' S	30° 5.848' E

**Uitkoms substation:**

Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
26° 37.051' S	30° 5.848' E

**Proposed / preferred Alternative 2 (22.18km):**

**Ermelo substation:**

Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
26° 30.732' S	29° 58.692' E

250m intervals	Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
1	26° 30.680' S	29° 58.868' E
2	26° 30.618' S	29° 59.002' E

3	26° 30.552' S	29° 59.134' E
4	26° 30.487' S	29° 59.265' E
5	26° 30.439' S	29° 59.405' E
6	26° 30.405' S	29° 59.550' E
7	26° 30.371' S	29° 59.696' E
8	26° 30.336' S	29° 59.841' E
9	26° 30.302' S	29° 59.987' E
10	26° 30.268' S	30° 0.133' E
11	26° 30.234' S	30° 0.278' E
12	26° 30.272' S	30° 0.418' E
13	26° 30.323' S	30° 0.558' E
14	26° 30.374' S	30° 0.697' E
15	26° 30.426' S	30° 0.836' E
16	26° 30.477' S	30° 0.976' E
17	26° 30.528' S	30° 1.115' E
18	26° 30.579' S	30° 1.254' E
19	26° 30.630' S	30° 1.394' E
20	26° 30.682' S	30° 1.533' E
21	26° 30.733' S	30° 1.672' E
22	26° 30.784' S	30° 1.811' E
23	26° 30.840' S	30° 1.947' E
24	26° 30.938' S	30° 2.051' E
25	26° 31.036' S	30° 2.155' E
26	26° 31.134' S	30° 2.258' E
27	26° 31.232' S	30° 2.362' E
28	26° 31.330' S	30° 2.466' E
29	26° 31.428' S	30° 2.570' E
30	26° 31.526' S	30° 2.674' E
31	26° 31.624' S	30° 2.778' E
32	26° 31.721' S	30° 2.882' E
33	26° 31.820' S	30° 2.986' E
34	26° 31.917' S	30° 3.090' E
35	26° 32.015' S	30° 3.194' E
36	26° 32.118' S	30° 3.291' E
37	26° 32.223' S	30° 3.386' E
38	26° 32.328' S	30° 3.482' E
39	26° 32.432' S	30° 3.577' E
40	26° 32.537' S	30° 3.672' E
41	26° 32.642' S	30° 3.768' E
42	26° 32.747' S	30° 3.863' E
43	26° 32.852' S	30° 3.958' E
44	26° 32.956' S	30° 4.053' E
45	26° 33.061' S	30° 4.149' E
46	26° 33.166' S	30° 4.244' E
47	26° 33.278' S	30° 4.190' E
48	26° 33.390' S	30° 4.106' E
49	26° 33.503' S	30° 4.023' E
50	26° 33.616' S	30° 3.940' E
51	26° 33.728' S	30° 3.856' E
52	26° 33.841' S	30° 3.773' E
53	26° 33.959' S	30° 3.801' E
54	26° 34.078' S	30° 3.872' E
55	26° 34.197' S	30° 3.943' E
56	26° 34.288' S	30° 3.859' E
57	26° 34.372' S	30° 3.741' E
58	26° 34.456' S	30° 3.623' E
59	26° 34.541' S	30° 3.505' E
60	26° 34.625' S	30° 3.388' E
61	26° 34.709' S	30° 3.270' E
62	26° 34.794' S	30° 3.152' E
63	26° 34.884' S	30° 3.051' E
64	26° 35.017' S	30° 3.078' E
65	26° 35.150' S	30° 3.104' E

66	26° 35.234' S	30° 3.216' E
67	26° 35.310' S	30° 3.341' E
68	26° 35.386' S	30° 3.466' E
69	26° 35.462' S	30° 3.590' E
70	26° 35.537' S	30° 3.715' E
71	26° 35.613' S	30° 3.840' E
72	26° 35.689' S	30° 3.964' E
73	26° 35.765' S	30° 4.089' E
74	26° 35.841' S	30° 4.213' E
75	26° 35.917' S	30° 4.338' E
76	26° 35.993' S	30° 4.463' E
77	26° 36.069' S	30° 4.587' E
78	26° 36.145' S	30° 4.712' E
79	26° 36.221' S	30° 4.837' E
80	26° 36.297' S	30° 4.961' E
81	26° 36.360' S	30° 5.088' E
82	26° 36.413' S	30° 5.210' E
83	26° 36.505' S	30° 5.320' E
84	26° 36.597' S	30° 5.430' E
85	26° 36.689' S	30° 5.540' E
86	26° 36.761' S	30° 5.667' E
87	26° 36.849' S	30° 5.778' E
88	26° 36.961' S	30° 5.862' E
89	26° 37.027' S	30° 5.865' E
90	26° 37.051' S	30° 5.848' E

**Uitkoms substation:**

Latitude (Degrees Decimal Minutes)	Longitude (Degrees Decimal Minutes)
26° 37.051' S	30° 5.848' E

### 3 Legal Requirements

An application for environmental authorisation is submitted to the National Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act 107 of 1998 (NEMA), and the Environmental Impact Assessment Regulations published in GNR 543/2010 - GNR 546/2010 of 18 June in terms of section 24(5) of the Act.

Relevant to this project is the activities that are listed in Listing Notices 1 and 3. A Basic Assessment (BA) is the procedure designed for Listing Notices 1 and 3, where the impacts of activities are more generally known and can be easily managed. This document constitutes the Basic Assessment Report prepared in support of an environmental authorisation application.

Relevant to this project is the following listed activities:

Listed Activity	Activity/Project Description
GN R544/2010 Item 10 The construction of facilities or infrastructure for the distribution of electricity outside urban areas with a capacity of more than 33kV but less than 275kV.	Construction of the 88KV power line from Ermelo substation to Uitkoms substation
GN R546/2010 Item 4 The construction of a road wider than 4 metres with a reserve less than 13,5 metres. (activity to be confirmed).	Construction of an access or construction road of 8 meters wide.
GN R546/2010 Item 14 The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (activity to be confirmed)	Clearance of indigenous vegetation of a 31m wide servitude x 22 000m of powerline = 682 000m <sup>2</sup> = 6,82ha

#### 4. Study Approach

The approach followed by the consultants was based on the specifications for the undertaking of a Basic Assessment as provided in the document "Companion to the EIA Regulations, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs, 2010".

The study approach followed by the Consultants, in short, entailed the following steps:

- **Preliminary site investigations** to determine the scope of works of the project, and to familiarise with the sites, were done by the EAP and Eskom in November 2012.
- An **application** for a Basic Assessment was submitted to DEA and the project was issued on 10 December 2012 with the following reference numbers: DEA Ref. Number 14/12/16/3/3/1/784 and NEAS Ref Number DEA/EIA/0001597/2012.
- Specialist **ecological input** was obtained to investigate the flora, fauna and the general biophysical environment in an attempt to identify the potential impacts of the project.
- The proposed development is covered by the National Heritage Resources Act which incorporates heritage impact assessments in the Environmental Impact Assessment process. A Phase 1 **Heritage Impact Assessment** was therefore done by a specialist to identify the potential impact on heritage resources. The National Heritage Resources Act 25 of 1999 in addition requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance be protected. Fossil heritage of national and international significance is found within all provinces of the RSA. Therefore a **Palaeontological Assessment** was also commissioned.
- Input from an **avifauna specialist** was obtained to determine the impact of the proposed project on birds.
- During the months of February - April 2013 the EAP, the ecologist, the bird impact specialist and the archaeologist/cultural heritage management consultant conducted additional site investigations.
- The first phase of the **Public Participation Programme (PPP)** commenced in February 2013 and continued until May 2013. It included the identification of key stakeholders, the distribution of **information letters** with a request for comment, as well as advertising of the project in the local press and on site.
- In addition, notification of an **information meeting** on 24 April 2013 was sent to all IAPs on 8 April 2013. The purpose of the meeting was to furnish the landowners and other interested parties with information regarding the extent of the project, the proposed alternatives, the process of negotiations for servitudes, and the extent of the Environmental Impact Assessment Process. Project posters with information and maps of the routes were presented at the meeting. Written comment was requested at the meeting.
- **One-on-one meetings** were conducted with **landowners** to assist in the identification of potential powerline corridors and site locations.
- A **draft Basic Assessment Report** was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (I&APs).
- In addition, An **Environmental Management Programme (EMPr)** was compiled to ensure that
  - mitigation measures are identified and implemented to avoid or minimise the expected negative environmental impact and enhance the potential positive impact associated with the project;
  - the developer, construction workers and the operational and maintenance staff are well acquainted with their responsibilities in terms of the environment;
  - communication channels to report on environment related issues are in place.
- On **20 May 2013** the **draft Basic Assessment Report was submitted** for comment to the following:
  - Regional Department of Water Affairs: Water Resources & Water Quality Management
  - South African Heritage Resources Authority (submitted via SAHRIS)
  - Mpumalanga Department of Economic Development, Environment and Tourism: Environmental Services
  - Mpumalanga Department of Agriculture: Land Use and Soil Management
  - Mpumalanga Department of Mineral Resources
  - SA National Road Agency Ltd
  - Mpumalanga Department of Public Works, Roads And Transport
  - Mpumalanga Department of Rural Development and Land Reform: Land Claims Commissioner
  - Mpumalanga Department of Rural Development and Land Reform: State Land Administration
  - Department of Human Settlements and Traditional Affairs
  - Department of Community Services
  - Agri Mpumalanga/ Mpumalanga Landbou

- Mpumalanga Tourism and Parks Agency
  - Endangered Wildlife Trust
  - Landbou Unies
  - SA Civil Aviation Authority
  - Gert Sibande District Municipality
  - Msukaligwa Local Municipality
  - Eskom Transmission
  - Eskom Distribution
  - Landowners
- The **due date for comment** to the draft Basic Assessment Report is **3 July 2013**. This allows for a comment period of 40 days.
  - Subsequently, a **final Basic Assessment Report (BAR)** will be compiled.

## 5. Project description

### 5.1 Need for the project

The current Environmental Impact Assessment application is part of a broader scope of work to improve Eskom's network performance. The existing Distribution networks are exceeding their maximum power transfer capability. Currently the network is experiencing under voltages and is incapable of handling additional loads due to the contingency restraints of the network. This current project aims in addition to address the requested supply.

### 5.2 Project components

The project components are as follows:

1. Construct a 22km 88kV chickadee power line between the existing Ermelo substation to the existing Uitkoms substation;
2. Obtain a corridor of 100 meters wide within which Eskom will be able to obtain a 31 meters wide servitude for the line between Ermelo substation and Uitkoms substation. The servitude is required for maintenance purposes.
3. Construct an access/ construction road of 8 meters wide for the line and substation.

#### 1. *Construct a 88kV power line between the existing Ermelo substation to the existing Uitkoms substation*

It is proposed to construct a 88kV line between the above substations. The proposed structure for the 88kV power line, is a monopole steel structure. In general, these pylons could be placed 220-350 meters apart, for the length of the line. The pylons for a power line are between 18 to 30 meters high, depending on the terrain and existing land use. The flatter the terrain, the shorter the pylons to be used. The conductor attachment height on a pole is 13m (for 20m intermediate poles) and more for longer poles, depending on the pole length. Ground clearances will adhere to OSH-Requirements of 6.3m and 7.5m.

Strain poles have a planting depth of 2m but intermediate pole planting depths varies between 2.6m (for 20m poles) and 3m (for 24m poles) or more depending on the pole length. The pole is not planted in a slab - The pole foundation is dependant on the soil type and varies in size and consists of a 8:1 good soil:cement mix that are compacted in 200mm layers. A concrete cap of 1.2m x 1.2m is cast around the pole to "seal" the soil around the pole from oxygen - to control oxidation or rust on the pole.

Should the pylons be 21m high above ground then the planting depth of the pylon could be calculated as follows: For a pylon that need to be 21m above ground, the planting depth will be 0.6 meters plus 10% of the height of the pylon above ground = 0.6 meters plus 2.1 meters = pylon is planted 2.7 meters deep. Should stays be needed then the stays will be at a 45° angle to the pylon and planted 21meters from the pylon into the ground.

Where the site is relatively flat, single pylons without stays will be used, except for where the power line has to change direction. Stays will not be used except at turns in the route.

Clearance between phases on the same side of the pole structure is normally around 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase – phase electrocutions of birds on the towers. The length of the stand-off insulators is likely to be about 1.5 meters.



Refer to Appendices C2 and C3 in the BAR for visuals of the monopole steel structure (pylon).

2. *Obtain a 100m corridor within which Eskom would be able to locate a servitude area of 36 meters wide for the line between the existing Ermelo substation to the existing Uitkoms*

Eskom relies on the goodwill of landowners and interested and affected parties to obtain rights of way, or servitudes for power lines. Hence, landowners are consulted during the construction of new power lines and existing landowners are notified when vegetation clearance is due to be performed. Eskom obtains right of way by negotiating a right of way or registering a servitude. The difference between these is detailed below:

*Servitude:* A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. The affected owner normally gets compensated for this right according to market related values. A servitude stays effective even if a property is transferred to another owner. Rights to obtain a servitude is negotiated for 33kV, 88kV and 132kV power lines.

*Way Leave Agreement:* A way leave agreement is a personal right, which Eskom obtained in order to construct its infrastructure, such as rural power lines, upon the affected property. The way leave document contains clauses to the effect that the agreement is also binding on the successors in title. These rights are not registered in the Deed Office and Eskom does not pay compensation for these rights. The argument for this is that Eskom normally obtains way leave agreements only for minor reticulation type of power line projects (11kV and 22kV lines) from which a property owner can benefit by utilising the available energy.

The project involves identification of a 100m corridor within which Eskom would be able to locate a 36m servitude for the powerline between Ermelo substation and Uitkoms substation. A servitude area is generally a no building area, except for Eskom structures. Usually, normal farming activities may continue in a servitude with the exception that no trees may be planted or high structures may be erected. In general, the servitude for Eskom 88kV or 132kV power lines is 36 meters wide, which implies 18 meters on either side of the power line.

*Consideration for servitudes:*

The process of negotiations can commence as soon as the Environmental Impact Assessment recommend the preferred alternative i.e. route, site etc. for the project. After identification of the preferred alternative, a land valuator will be appointed to value the property(ies). The distance/length of the line affecting each property is measured to calculate the area affected by the line. A process of negotiations will follow between landowner(s) and Eskom appointed negotiators. After agreement has been reached, Eskom and the landowner will sign the documents. The valuations will be tabled before an Eskom tender committee for approval. Eskom pays the consideration as determined by the professional evaluator on a before and after basis. Servitude rights for a servitude in general terms will be obtained by means of an "Option to Acquire a Servitude". Interest will be paid according to the laid down principle by the National Treasury Act.

Eskom Distribution has a compensation model that allows for a once-off compensation for the servitude which will be paid upon registration of the servitude. A servitude will be registered which provides Eskom with the rights to construct and maintain a power line on the applicable property. The applicable land is therefore not purchased. All normal activity on the farm/land can continue as usual. For the sake of safety the landowner should not construct any structures in the servitude area underneath the power line. Eskom has the right to enter the servitude 24 hours per day to maintain the line in so much as following the laid down farm access protocol.

Power for rural supply cannot be supplied directly from a 132kV or 88kV line. There is however indirect benefit in the construction of the line for the community, in that the supply would be strengthened with a feed to the substations that feed the rural lines. Eskom strives to follow the shortest route from point A to B due to the fact that the line costs approximately R1 600 000 per kilometer to construct. Objections from landowners/users and site-specific problems will be considered in the finalisation of any route/site.

The option document (referred to above) is a binding document that will reflect all the requirements of the landowner, for example: the negotiated compensation for the servitude; specific access arrangements to his property etc. Negotiations between the landowner and the negotiator will address site-specific requirements such as the positions of the pylons, on the property in question. These agreements/requirements will be noted on a site plan, as part of the option document. Construction may only commence once the environmental authorisation has been issued and the option document has been signed by the affected landowner.

3. *Construct an access road for the new line*

Access to properties for the purpose of construction are as a rule arranged with all landowners. The existing roads will be used as far as possible. Relevant is the fact that the proposed Route Alternative 2 as well as Alternative 1 is adjacent to existing impact, or existing servitude areas, for most of the alignment. New access will therefore only be required at the sections away from the existing servitude areas. Should a temporary construction road be unavoidable, then an area of 8m will be selectively cleared, 4m on either side of the center line of the power line. During construction all vehicle movement must be along existing roads, adjacent to the fences of applicable properties, as far as is feasible.

## **6. Alternatives for the project**

Alternatives for the project have been investigated. The purpose of investigating alternatives is to find the most effective way of meeting the need and purpose of the proposal. This can be attained by enhancing the environmental benefits of the proposed activity, through reducing or avoiding potentially negative impacts.

### **6.1 Activity Alternatives**

#### **6.1.1 Agriculture as alternative activity**

The main agricultural activities presently active in the study area are cultivation, cattle farming, sheep farming and goat farming. Cultivation is predominantly maize and beans in the summer season. Most of which is dry land production. Cattle farming is more prominent than sheep or goats. Most of the land actively used for farming in the study area is grazing for cattle. Goat farming is conducted more on a subsistence basis.

The cultivation of land in the study area is not as intensive as found in many of the main maize producing areas of the country. There is also very little cultivation under irrigation taking place at present. No major pivots were observed in the study area. The main farming activity appears to be cattle farming, although even this is not on the scale of those in major cattle producing areas of the country. It is highly likely that farming in the study area is subdued mainly due to the high activity and presence of open-cast coal mining in the area. Large areas of land belong to mines and have been earmarked for open-cast mining. Notwithstanding, the agricultural potential of the land in the study area was taken into account and basic calculations done.

Most of the land in the study area has low to moderate agricultural potential. Nearly all of the land in the study site has been calculated as being 'moderate potential arable land'. Land just north and east of Camden is calculated as being 'very high potential arable land'. Unfortunately most of these lands are presently being open-cast mined, or earmarked for mining. Therefore, the present agricultural potential is non-existent in those areas.

The dominant crop cultivated in the region of the study area is mielies (maize). Although not on as intensive a scale as other well-known maize producing regions of South Africa. Most of the maize cultivation was dryland production, with little, if any, large scale pivot (irrigated) production. The estimated dryland maize yields for the study area, based on the agricultural potential and soil fertility, is low to moderate (that is 3 to 4 tons per hectare). With higher estimated yields potentials east of the study area being at around 6 tons or higher per hectare.

The dominant agricultural land use in the region at present appears to be grazing for livestock, which is primarily cattle. The average potential carrying capacity of the land in the study area has previously been calculated as approximately 5-7 Ha per Animal Unit (AU) or livestock unit. This is seen as being a low to moderate average. Presently much of the grazing land to the north and north-west of Camden is either being open-cast mined or earmarked for coal mining. Which once again reduces the potential grazing capacity of these lands to non-existent. Should the construction of the power line impact on any agricultural activities, this impact will only be for a limited period during construction. An access road of 8m wide will be cleared to construct the power line. After construction the access road could be revegetated and normal agricultural activities could continue under the power line as usual.

It is therefore submitted that the servitude area will not interfere with any agricultural activities. In addition, Eskom will not own the servitude but will purchase the rights to construct and maintain the line. A change in land use from agriculture to any other land use is not applicable.

## 6.2 NO-GO Alternative

The term '**fatal flaw**' is used in the pre-application planning and screening phases of a project to evaluate whether or not an impact would have a 'no-go' implication for the project. In the scoping and impact assessment stages, this term is not used. Rather impacts are described in terms of their potential significance.

A potential fatal flaw (or flaws) from a biodiversity perspective is seen as an impact that could have a "no-go" implication for the project. A 'no-go' situation could arise if residual negative impacts (i.e. those impacts that still remain after implementation of all practical mitigatory procedures/actions) associated with the proposed project were to:

- a) Conflict with international conventions, treaties or protocols (e.g. irreversible impact on a World Heritage Site or Ramsar Site);
- b) Conflict with relevant laws (e.g. clearly inconsistent with NEMA principles, or regulations in terms of the Biodiversity Act, etc.);
- c) Make it impossible to meet national or regional biodiversity conservation objectives or targets in terms of the National Biodiversity Strategy and Action Plan (BSAP) or other relevant plans and strategies (e.g. transformation of a 'critically endangered' ecosystem);
- d) Lead to loss of areas protected for biodiversity conservation;
- e) Lead to the loss of fixed, or the sole option for flexible, national or regional corridors for persistence of ecological or evolutionary processes;
- f) Result in loss of ecosystem services that would have a significant negative effect on lives (e.g. loss of a wetland on which local communities rely for water);
- g) Exceed legislated standards (e.g. water quality), resulting in the necessary licences/approvals not being issued by the authorities (eg. WULA);
- h) Be considered by the majority of key stakeholders to be unacceptable in terms of biodiversity value or cultural ecosystem services.

### Potential Fatal Flaws for the Project

There are a few sensitive areas within the study area and these have all been addressed in the report. Proper mitigating measures and recommendations have been put in place to either totally avoid these areas, or reduced impacts. The sensitive areas encountered are predominantly linked to watercourses and their existing floodplains and hillslope seepage areas. No highly sensitive areas or habitats were encountered.

From an ecological (or biodiversity) point of view no fatal flaw (or flaws) were found with regards to the go-ahead (go, no-go option) of the project. In other words, if all recommendations and mitigating measures are put in place the project can go ahead in terms of the ecological component of the project.

It is further suggested that to maintain the status quo is not the best option for the macro environment. This project is part of Eskom's implementation of a Master Plan for the extension of electrical infrastructure. Should this application not be approved then the supply to the broader area will be unreliable and this can result in blackouts and major disturbances in energy provision. In the future, new development might cause overloading of the already stressed existing system which can cause major disruptions of power supply to different areas at different times. The No-go option cannot solve the current demand for electricity. The No-Go development alternative is not considered the responsible way to manage the site(s).

## 6.3 Location Alternatives

The project consists of the construction of approximately 22km of 88kV power lines between the existing Ermelo substation and the existing Uitkoms substation. Alternative routes for the power line were considered. Specialist

input was obtained to investigate the impact of the various alternative routes that could accomplish the purpose of the project. The specialist input is summarised as follows:

### 6.3.1 Ecological status report

#### The ecological status report identified the following:

(Refer to the full Ecological Status Report in Appendix D1 of the BAR)

#### Water

The entire study area falls within the primary catchment area of the Vaal Catchment. Major threats to the surface water and the affiliated ecosystems in the region are afforestation and open-cast coal mining. The primary river within the study area is the Witpuntspruit. A few smaller streams such as the Humanspruit flow into the Witpuntspruit, which then flow in a south-east direction and eventually into the Vaal River. The Witpuntspruit is a perennial stream with a moderately sized floodplain. To the north-east of the Ermelo Substation the proposed powerline routes run close to, and parallel with, a tributary of the Klein-Drinkwaterspruit. This small stream runs in a drainage line and stormwater run-off from the surrounding suburbs of Ermelo is channelled into it. No large open wetlands such as endorheic pans, typically of the Mpumalanga Highveld are present within the proposed powerline corridors. However, the powerline corridors do impact on the floodplains of the Witpuntspruit, as well as on a few seepage wetlands close to Uitkoms Substation and Camden Powerstation. No wetlands in pristine condition occur within the proposed powerline corridors of the study area.

#### Natural vegetation

The natural vegetation of the study area is entirely that of Eastern Highveld Grassland, with flat open plains and slight to moderately undulating plains. Some low hills and pan depressions are present, with basically no indigenous woodland component present. The small wetlands found scattered within the study area are those of Eastern Temperate Freshwater Wetlands vegetation. Most of the trees found in the natural vegetation of the study area are aliens and predominantly blackwattle (*Acacia mearnsii*). The Eastern Highveld Grassland is an endangered veldtype, with a very low percentage conserved in statutory reserves.

Floral Species of Conservation Concern: *Gladiolus malvinus*, *Crinum bulbispermum*, *Ilex mitis*, *Gunnera perpensa*, *Asparagus fractiflexus*, *Nerine gracilis*, *Aspidoglossum xanthosphaerum*, *Khadia carolinensis*, *Merwillia plumbea*, *Habenaria barbetoni*, *Crinum bulbispermum*, *Aloe cooperi*, *Gunnera perpensa*, *Eucomis montana*, *Rapanea melanophloeos*.

There are numerous other herbaceous, bulbous geophytes (eg. *Gladiolus*, *Iris*) that are likely to occur in the grasslands and wetlands of the study area. Many of these species are under threat, although not necessary currently registered as Red Data species. It is therefore recommended for sake of ease for contractors to consider all such species as sensitive and avoid disturbing them or erecting pylon supports directly on top of encountered populations.

Red Data Species highly likely to occur in the area: *Alepidea longeciliata*, *Brachycorythis conica* subsp. *Transvaalensis*, *Disa chrysostachya*, *Disa cooperi*, *Disa nervosa*, *Disa versicolor*.

During site visits no terrestrial Red Data faunal species were encountered in the study area, although previously evidence of Pangolin was seen east of the study site. However, due to the habitats in the study area there remains the high potential for certain Red Data species, to be present, especially along ridges and in the open grassy lowlands in the east of the study area. Red Data Faunal Species likely to occur in the area: *Pyxicephalus adpersus*, *Atelerix frontalis*, *Manis temmincki*, *Mellivora capensis*, *Pipistrellus rusticus*, *Python natalensis*.

#### Ecological Sensitivities

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature. Only wetlands are seen as having a high ecological sensitivity and deemed as 'No-Go' zones. Eventhough no wetlands in pristine condition occur in the study area. The wetlands that occur are predominantly hillslope seepages and floodplains associated with the streams and small rivers in the study site. The transformed areas within the study site are not seen as sensitive. These include areas of regularly cultivated lands and rehabilitated opencast mines. Both these 'habitat types' are viewed as 'Go Zones' with Low sensitivity ratings. (Refer to sensitivity maps in Appendices A6-A7)

#### Ecological sensitivities of habitats in study area

Ecological Community	Floristic Sensitivity	Faunal Sensitivity	Ecological Sensitivity	Development Go-Ahead
Cultivated Lands	Low	Low	Low	Go
Rehabilitated	Low	Low	Low	Go
Grassland Plains	Medium	Medium/Low	Medium	Go-Slow
Drainage Lines	Medium	Medium/Low	Medium	Go-Slow
Wetlands	High	High	High	No-Go
Rivers	Medium/High	Medium/High	Medium/High	Go-But
Ridges	Medium/High	Medium/High	Medium	Go-Slow

From an ecological (or biodiversity) point of view no fatal flaw (or flaws) were found with regards to the go-ahead (go, no-go option) of the project. In other words, if all recommendations and mitigating measures are put in place the project can go ahead in terms of the ecological component of the project.

#### Impacts

No proposed impacts on the ecology of the environment were identified as possibly being beneficial. However, the impact of the powerline is calculated as 'low', with the greatest impact (Moderate) being on the floodplains of the streams. The implementation of proposed mitigating measures will reduce potential impacts.

#### Mitigation of impacts

A number of mitigating and management measures have been recommended. The implementation of these measures will significantly reduce the potential impacts the project may have on the natural environment. Measures recommended include some of the following:

- No area for a campsite or temporary storage site should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever, not even alien species.
- No indigenous trees or shrubs outside of the powerline corridor of 8m to be removed.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- An on going programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such a way as to allow the natural grasses and pioneer plants to colonise the disturbed areas. Typically there should not be any, or very little, infestation of weeds under the powerlines where the veld / grass has only been cut. The weeds found in the area typically invade disturbed soils, with the exception of tree species, but these typically invade kloofs, ravines and drainage lines.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under powerlines. All control of weeds to be mechanical in nature. That is, physically cut down, pulled out or mowed over.
- All construction material, equipment and any foreign objects brought into the area by contractors and staff to be removed immediately (within two weeks) after construction.
- Removal of all waste construction material to an approved waste disposal site. And only by an official registered waste removal company.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- No campsite, temporary storage facility, or any other facility to be erected within 500m of a wetland.

#### Recommended route

Line variant recommendations are made on the strength and combination of all the impacts and mitigating actions. As well as on the sensitivities of the various biophysical features, faunal habitats and vegetation types that each proposed route alternative impacts on.

A comparison between the two alternative routes, as to the number of ecologically sensitive units each one potentially impacts on, is shown in the Table below.

**Table: Comparison of Potential Impacts by Alternative Routes**

Ecological Sensitive Units	Alternative Route 1	Alternative Route 2
Areas of High ecological sensitivity	0	0
No-Go areas in close proximity	4	4
No. of river & stream crossings	6	4
No. of major drainage line crossings	13	11
Rocky outcrops in corridor	0	0
Ridges in corridor	0	0
Major Wetlands encountered	2	4
<b>Total impacts per route</b>	<b>25</b>	<b>23</b>

When also taking other general impacts into account there is the issue of the higher potential impact in relation to watercourses by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance.

Taking all of the above issues into account, the Ecological recommended line variant for the proposed project is: *Alternative Route 2*.

#### **Potential water uses**

Certain parts of the proposed powerline corridors run parallel in close proximity to the Witpuntspruit, or within the floodplain of the spruit itself. These areas include most of the medium / high sensitivity areas. There are a few areas where other small streams flowing into the Witpuntspruit converge, creating a larger floodplain. These floodplain areas are classified as wetland types and cannot be avoided by the powerline corridors. There is also a wetland area near to Uitkoms Substation and Camden Powerstation. These areas are seen as potential 'water uses' and it is strongly recommended that a formal Water Use Licence Application (WULA) be completed and submitted for the project.

#### **6.3.2 Bird Impact Assessment**

##### **The Bird Impact Assessment indicated the following:**

(Refer to the full Bird Impact Assessment Report in Appendix D3 of the BAR)

Impacts that could be associated with a project of this nature include:

- collision of birds with the overhead cables;
- electrocution;
- destruction of habitat;
- and disturbance of birds.

Collisions poses the biggest potential risk to avifauna, while habitat disturbance to avifauna is expected to be the second most important impact of this project.

Numerous microhabitats were identified in the broader area which may attract various bird species, with grasslands, cultivated lands, streams, dams and wetlands being areas present on site, most likely to attract sensitive species. The South African Bird Atlas Project data (SABAP1) recorded a total of 18 Red Data species comprising 1 Endangered, 7 Vulnerable and 10 Near-threatened species. The White Stork and Abdim's Stork, which are not listed, but are protected internationally through the Bonn Convention on Migratory species, were also recorded and it was found that only 5 of the 18 red-listed species recorded in SABAP1 had been recorded by SABAP2. Following a site visit, and examination of all available data, the following species were identified as Focal Species for this study: Greater Flamingo, Southern Bald Ibis, Grey Crowned Crane, African Marsh Harrier, Blue Korhaan, Secretarybird and White Stork.

### **Bird micro habitats**

In addition to the description of vegetation, it is important to understand the habitats available to birds at a smaller spatial scale, i.e. micro habitats. Micro habitats are shaped by factors other than vegetation, such as topography, land use, food sources and man-made factors. Investigation of this study area revealed the presence of the following bird micro habitats.

#### *Built-up Residential and Industrial areas:*

These areas have very little value to any sensitive bird species due to their degraded nature and the associated disturbance factor.

#### *Grasslands:*

This is the most prolific microhabitat on site, in line with the vegetation and land use descriptions discussed above. Grasslands, in their true form, represent a significant foraging and/or hunting area for many bird species. Although most of the grassland areas seem to be disturbed to some degree, there may well be patches in the area that attract sensitive species.

#### *Wetlands, Pans and Dams:*

There are a few natural pans/wetlands associated with the habitat type "Eastern Temperate Freshwater Wetlands", as well as farm dams scattered throughout the broader study area. Neither route alternative appears to be affected more than the other by these sensitive micro-habitats.

#### *Rivers or drainage lines:*

The wooded riparian habitat alongside a river may provide habitat for various species. Rivers also represent feeding areas and rivers and drainage lines also represent important flight paths for many species. The Vaal River begins as a series of small streams, one of which is the Witpuntspruit traversing the study area. Numerous smaller drainage lines, some of which do not always carry water are also present on site. However, these drainage lines may still serve as flight paths for several bird species.

#### *Arable and/or cultivated lands:*

Arable or cultivated lands can represent a significant feeding areas for many bird species in any landscape.

#### *Stands of Alien Trees:*

Patches of alien trees were observed and may provide perching, roosting and nesting habitat for various raptor species

### **Focal Species List**

Determining the focal species for this study, i.e. the most important species to be considered, is a four step process. Firstly, the micro-habitats available on site were identified. An analysis of the above existing avifaunal data represents the second step, i.e. which species occur historically in the area at significant abundances. The third step is to identify those species which have a high likelihood of being present on, and/or utilizing, the site, based on the above two steps and are more likely to be impacted upon by the power-line and associated development. In general, large, heavy flying birds are more vulnerable to collision with over-head powerlines, while perching Raptors are more vulnerable to electrocution. The fourth and final step was to consider the species conservation status or other reasons for protecting the species. This involved primarily consulting the Red List bird species (Refer to Bird Impact Assessment report).

*The resultant list of 'focal species' for this study is as follows: Greater Flamingo, Southern Bald Ibis, Grey Crowned Crane, African Marsh Harrier, Blue Korhaan, Secretarybird and White Stork.*

### **Assessment of impacts**

#### **Electrocutions**

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. Electrocution is possible on 88kV power lines, especially where large raptors and vultures feature

prevalently. Fortunately, it is highly unlikely that vultures will occur in the study area and few large raptors were recorded in the SABAP data sets, so *the impact of electrocution is likely to be of Low Significance* for the proposed power line if the proposed mitigations are implemented.

### **Collisions**

In general, large lines with earth wires that are not always visible to birds can have the largest impact in terms of collisions. Most heavily impacted upon are korhaans, bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. Collision of certain large flying bird species such as Southern Bald Ibis, White Stork, Blue Korhaan, Secretarybird, Greater Flamingo and Grey Crowned Crane with the proposed lines is a possibility, and *this impact is predicted to be of Moderate Significance*.

### **Habitat destruction**

During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat. *Habitat destruction along route Alternative 1 is anticipated to be of Moderate Significance, while habitat destruction along route Alternative 2 is anticipated to be of Low to Moderate significance* in this study area.

### **Disturbance**

Similarly, the above mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities. *Disturbance of birds is anticipated to be of Moderate Significance*.

### **Mitigations**

Potential mitigations for the identified impacts are shown in the table below.

#### **Construction Phase**

<i>Impact</i>	<i>Mitigation</i>
Habitat destruction	Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable. It is important to ensure that the construction Environmental Management Plan incorporates guidelines as to how best to minimize this impact.
Disturbance	Strict control should be maintained over all activities during construction. It is difficult to mitigate properly for this as some disturbance is inevitable. <b>During Construction, if any of the "Focal Species" identified in this report are observed to be roosting and/or breeding in the vicinity (within 500m of the power line), the EWT is to be contacted for further instruction.</b>

#### **Operational Phase**

<i>Impact</i>	<i>Mitigation</i>
Collision	Mark the relevant sections of line with appropriate marking devices. These sections of line, and the exact spans, should be finalised by a "walk down" as part of the Environmental Management Programme (EMP) phase, once power-line routes are finalised and pylon positions are pegged.



Electrocution	It is highly recommended that the steel monopole design be used and that this incorporates the standard bird perch. If this is the case then most raptors and birds of high electrocution risk will perch well above the conductors and out of harm's way. In addition it is critical that all clearances between live and earth components are greater than 1.8 meters. If this is the case then the impact of bird electrocution will be very minimal.
Disturbance during routine maintenance.	No nests may be removed, without first consulting the EWT's Wildlife and Energy Program (WEP). During maintenance, <b>if any of the "Focal Species" identified in this report are observed to be roosting and/or breeding in the vicinity, the EWT is to be contacted</b> for further instruction.

## Sensitivity analysis

In general the site has been determined to have moderate sensitivity in terms of avifauna, based on the occurrence of a number of listed species in the study area, as well as the various micro-habitats available to avifauna.

- In terms of collision, the sensitivity appears moderate,
- in terms of electrocution, the area has a low sensitivity.

Two sensitivity zones are therefore identified

- The area within 100m on either side of the Witpuntspruit, as well as all open water bodies and farm dams in the area are classified as *Medium-High Sensitivity*. Within these areas, it is recommended that construction of the power line be avoided, if possible, and any line that is built in these zones will require collision mitigation in the form of bird flight diverters ("flappers").
- All remaining areas on the site are classed as *Low-Medium Sensitivity*. At this stage, some of the more natural undisturbed grassland patches may require mitigation in the form of line marking, but this will be confirmed during the EMP phase of the process.

## Comparison of alternatives

In order to rank these alternatives the below was compiled and the two alignments given a rating on a scale of 1 to 5, with 1 being the least preferred and 5 being the most highly preferred option.

TABLE: Preference rating for the three power line route alternatives.

Line Alternative	Preference Rating
1	4
2	4

As can be seen from the discussions and table above, both routings have equal preference and either is acceptable, with the mitigations proposed.

## Recommendation

In conclusion, the proposed project can be built provided that the various mitigation measures recommended in this report are implemented.

- From an avifaunal perspective, route alternative 2 poses a slightly higher risk of collision, as a section will not follow existing linear infrastructure.
- However, route alternative 1 falls within a "wetland" area along the Witpuntspruit, and is likely therefore to have more of an impact in terms of disturbance to avifauna and habitat destruction.
- Therefore it was found that although both alternatives are acceptable, with the proposed mitigations implemented, neither one was preferred.
- Line marking will be required particularly along streams and near to wetlands, dams and pans, as well as possibly in the less disturbed grassland areas. Avifaunal input in to the EMP (in the form of a site "walk down") is recommended in order to, "fine tune" these sensitive zones, and to identify the spans of line for marking to

mitigate for bird collisions, once the route is chosen and the tower positions have been pegged. Provided that the high risk sections of line are mitigated in the form of marking, the impact should be contained.

- Electrocutions can be successfully mitigated by ensuring that a bird-friendly monopole structure is used.

### 6.3.3 Heritage Impact Assessment

#### **The main findings of the Heritage Impact Assessment are summarised as follows:-**

(Refer to Appendix D2 of the BAR for the full report)

A **Phase I Heritage Impact Assessment (HIA) study** as required in terms of Section 38 of the National Heritage Resources Act (No 25 of 1999) was done.

The Phase I HIA study for the proposed Eskom Project revealed no presence of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) in and near the Eskom Project Area.

- The Highveld region is poor on archaeological sites. Some Late Iron Age sites occur northwest of Ermelo at Tafelkop.
- The town of Ermelo was destroyed during the Anglo Boer War as well as all farmhouses. The area had to be rebuilt after the war.
- No important cultural heritage resources were found near Alternative 1 or Alternative 2 routes.

#### **Recommendation**

- Both Alternative 1 and Alternative 2 are recommended for the proposed 88kV power line between Ermelo substation and Uitkoms substation.
- If archaeological/palaeontological or other types of heritage resources are uncovered during construction/ground clearance activities SAHRA (Mrs Colette Scheermeyer/Mr Phillip Hine, tel: 021 462 4502) and a professional archaeologists/palaeontologist dependent on the finds must be alerted immediately to inspect the finds. A rescue excavation may be required if the identified heritage resource/s is deemed to be significant.

### 6.3.4 Palaeontological Impact Assessment

#### **The main findings of the Palaeontological Impact Assessment are as follows:-**

(Refer to Appendix D4 of the BAR for the full report)

The National Heritage Resources Act 25 of 1999 requires that all heritage resources, that is, all places or objects of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance are protected. **Fossil heritage** of national and international significance is found within all provinces of the RSA. Heritage resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

#### **Summary of findings**

A desktop palaeontological impact assessment scope and study was undertaken and the following is reported:

The geology of the Karoo Supergroup, Ecca Group, Vryheid Formation (Pv) consists of sandstone, shale and coal. The Karoo Supergroup covers large areas of the southern African continent. The largest basin is the area known as the Karoo, but smaller basins are located in the Lebombo area, Springbok flats and Ellisras, and north of the Soutpansberg towards Tshipise-Pafuri and further westward in Namibia.

The sediments of the Ecca Group are lacustrine and marine to fluvio-deltaic. The Ecca Group is known for its coal (mainly the Vryheid Formation) and uranium. The coalfields formed due to the accumulation of plant material in shallow and large swampy deltas. Fossils that may occur are the earliest aquatic reptile *Mesosaurus* and arthropods (Whitehill Formation), marine invertebrates (Prince Albert Formation), bivalves (Volksrust Formation), trace fossils and plants (*Glossopteris*, ferns, horsetails, clubmosses and cordaitales) (Vryheid Formation).

South African coal is bituminous and contains about 85% carbon.

The area between Ermelo and Bethal hosts an exceptional high proportion of Karoo dolerite, barren of fossils. This dolerite is often mined and used as road gravel.

Palaeontological sensitivity is MODERATE. There is evidence of mining activity past and present, mainly coal.

#### **Recommendation:**

- There is no objection to the development of the construction of the new 22km 88kV Chikadee powerline between substations Ermelo and Uitkoms. Preferred choice: Alternative 1 or 2 as both have equal impact and mostly follows the existing HV lines.
- It may be necessary to perform a Phase 1 Palaeontological Impact Assessment to determine whether the planting of pylons will affect fossiliferous outcrops as the palaeontological sensitivity is MODERATE. A Phase 2 Palaeontological Mitigation may be required taken into account the overall palaeontological impact is LOW to VERY HIGH depending on the outcome of the Phase 1 Palaeontological Impact Assessment.
- The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling or blasting SAHRA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures.

## **6.4 Conclusion**

Alternative routes have been investigated for the project. From a heritage, palaeontological, ecological as well as bird impact viewpoint, both Route Alternatives are acceptable, with the proposed mitigations implemented. Although from an ecological viewpoint Alternative Route 2 is slightly preferred.

The final decision between Route 1 or 2 should be made on the accumulative weight of other parameters such as feedback from public participation, land tenure issues, construction costs, etc. **Currently, Alternative 2 is preferred** as the final route alignment due to the above investigations favouring alternative 2.

The **route alternative 1** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3, 4, 9, 14, 15; Transutu 257 IT portion 0; Jan Hendriksfontein 263 IT portion 6; Witpunt 267 IT portion 9, 22, 34, Witpunt 267 IT (Consolidated to portion 40 of 267 IT) portion 1, Witpunt 267 IT portion 35 and 36; Camden Power Station 329 IT Rem.

The **proposed route alternative 2** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3; Uitkomst 292 IT (Consolidated to portion 18 of 292 IT) portion 3; Camden Power Station 329 IT Rem; Witpunt 267 IT portion 35 and 36.

Both routes are in the Msukaligwa Local Municipality in the Mpumalanga Province.

## **7. Impact assessment**

A summary of some of the anticipated **impacts** of the proposed project on the environment (evaluated in the BA Report):

For this project the investigations into these issues confirmed in summary the following:

### **1. Impact on natural habitat**

The proposed activity is the erection and maintenance of small sized (88kV) powerlines. Due to the physical nature (and small footprint) of the powerlines, the overall impact to the natural environment is minimal over the medium- to long-term. This relative to other impacts in the region such as open-cast coal mining, agriculture and urbanisation. The initial (short-term) construction phase will have a higher initial impact on the environment, but this is still seen as being relatively low. The nature of the impact is mainly a number of small (typically 3m by 3m) footprints across the terrain, spaced every 200m to 300m, sometimes further apart. Large construction sites or large earth-moving operations are not required. In other words, the actual, physical disturbances are small and therefore the environment is minimally disturbed and can recover quickly. The aerial-borne lines can have a negative impact on birds and relevant studies are undertaken to address these impacts. Trees and tall shrubs growing directly under powerlines need to be removed and kept permanently so. Due to the open, tree-less nature of the grassland

vegetation of the study area, very few indigenous trees are encountered along the powerline corridors, so this has basically no impact on the vegetation of the study site.

As mentioned, the construction of the power line will have a higher initial impact on the environment, but this is still seen as being relatively low. This impact is associated with disturbance to and/or destruction of the flora and fauna component.

- Potential impacts during the construction phase include the loss of primary vegetation, the loss of potential Red Data flora and fauna, disturbances and the loss of areas with high ecological function. The impacts are discussed under specific headings in this report and are based on the findings of the ecological (flora, fauna and avifauna) specialist assessments.
- During construction the project could cause a significant impact where insensitive clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat. Not only does vegetation removal represent a loss of seed and organic matter, but it is also a loss of protection to plants and small animals. Insensitive vegetation clearance can also cause erosion.
- During the construction phase, it is possible that areas corresponding to the footprint of the proposed pylon structure could provide habitat for threatened or conservation important fauna and floral species.
- Pressure on the natural environment will occur as a result of an influx of labourers into the area that could involve the collection of firewood and medicinal plants, as well as uncontrolled veld fires.
- Various species of indigenous trees and bush on private land are protected by law in terms of the National Forests Act No. 84 of 1998, which stipulates that it is necessary to obtain a permit from the Forestry Branch of the Department of Agriculture, Forestry and Fisheries in order to cut, trim or remove them.
- It was found that Route Alternative 2, based on its low ecological sensitivity, was considered the most suitable alignment.

#### **Mitigation of impact on natural habitat**

- The proposed project requires the construction of a 132kV line. The total servitude width is 31 meters.
- Relatively small, localised areas of natural flora will be affected by the development, which will be restricted to the servitude for the power line and access to it.
- Construction activities in most areas along the Corridors of the power line will be of a short duration and should thus not result in long-term impact on vegetation.
- Of significance are the sites situated closer to ecological habitats such as water courses and wetland areas. Water bodies are potentially vulnerable or endangered by the power line pylons and access roads.
- Impact on these ecologically sensitive areas can be minimised through the correct location of pylons and access roads.
- Mammals, reptiles and small bird species may be impacted during construction, particularly those that are nesting/breeding at the time. Most species are however likely to move away from the area during construction and return when construction is over. Thus it is unlikely that these species suffer any long-term effect.
- Site-specific measures for the specific properties as identified by the ecologist, must be implemented by the Contractor during the construction phase and by Eskom and the maintenance teams during the operational phase. Refer to mitigation measures provided in the Planning phase.
- Work corridor to be limited to 20 metres along the route of the servitudes.
- Ensure that no trees or existing grass strata outside of the servitude corridor be removed to lower any kinetic energy of potential run-off, that disturbed surface areas in the construction phase be restored and lastly that no open trenches or mounds of soils created during construction be left.
- The procedures for vegetation clearance and maintenance within servitudes and on Eskom owned land as prescribed by Eskom must be implemented. Selective bush clearing must take place, i.e. indigenous vegetation, which does not interfere with the safe operation of the structure, should be left undisturbed.
- Where clearing of access for construction is essential, the maximum width to be cleared is 8m, 4m on either side of the alignment for the power line. Clearing for tower positions must be the minimum required for the specific tower.
- Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons.
- Avoid and control unauthorised off-road driving.

- Access roads need to be kept to an absolute minimum.
- Damage can result in habitat modification or erosion as a result of the proposed power line construction activities. This can be avoided in general, by not allowing any construction of any sort to take place within aquatic and riparian habitats encountered, as these habitats are viewed as sensitive.
- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No typical wetlands such as pans or fresh water lakes, occur within the proposed powerline corridors, but some do occur in the area, or in fairly close proximity. Under no circumstances may any activities directly or indirectly related to the powerline project take place within any wetland area.
- Control the removal of medicinal or aesthetic plants.
- The harvesting of wood from drainage lines for warming and cooking must be avoided.
- Floral Species of Conservation Concern: *Gladiolus malvinus*, *Crinum bulbispermum*, *Ilex mitis*, *Gunnera perpensa*, *Asparagus fractiflexus*, *Nerine gracilis*, *Aspidoglossum xanthosphaerum*, *Khadia carolinensis*, *Merwillia plumbea*, *Habenaria barbetoni*, *Crinum bulbispermum*, *Aloe cooperi*, *Gunnera perpensa*, *Eucomis montana*, *Rapanea melanophloeos*.
- There are numerous other herbaceous, bulbous geophytes (eg. *Gladiolus*, *Iris*) that are likely to occur in the grasslands and wetlands of the study area. Many of these species are under threat, although not necessary currently registered as Red Data species. It is therefore recommended for sake of ease for contractors to consider all such species as sensitive and avoid disturbing them or erecting pylon supports directly on top of encountered populations.
- Red Data Species highly likely to occur in the area: *Alepidea longecillata*, *Brachycorythis conica* subsp. *Transvaalensis*, *Disa chrysostachya*, *Disa cooperi*, *Disa nervosa*, *Disa versicolor*.
- During site visits no terrestrial Red Data faunal species were encountered in the study area, although previously evidence of Pangolin was seen east of the study site. However, due to the habitats in the study area there remains the high potential for certain Red Data species, to be present, especially along ridges and in the open grassy lowlands in the east of the study area. Red Data Faunal Species likely to occur in the area: *Pyxicephalus adspersus*, *Atelerix frontalis*, *Manis temmincki*, *Mellivora capensis*, *Pipistrellus rusticus*, *Python natalensis*.

## 2. Social Impact

- The construction of new power lines could potentially impact on landowners if not planned and designed to accommodate the needs of the landowners.
- In addition, the possibility exists that a project might impact also upon residents who are not landowners. Land users or lands rights holders could farm on the portion of land affected by the proposed line or rent a house and not own it. The compensation for the servitude is always paid to the landowner and not to the land user.
- Any possible impact on landowners as well as land users should be identified and accommodated before construction of the route.
- The development on State land allocated to a tribe requires the consent of the Minister of the Department of Rural Development and Land Reform as nominal landowner of the land. In terms of the Interim Protection of Informal Land Rights Holders, 1996 (Act 31 of 1996), the Land Rights Holders must be consulted, must participate in the decision making process, and consent to the development in the form of a tribal resolution.

### Mitigation for Social Impact

The route of power lines should be designed to accommodate the needs of landowners and landusers.

- The design for the power line route and the placement of structures should be accommodating to existing structures in the alignment of the route.
- Routes with evident visual disturbance caused by existing power lines or roads are in general more acceptable than traversing through pristine area.
- For the above reasons the Route alternatives had been proposed adjacent to existing disturbance as far as is achievable. (e.g. from the Ermelo substation the Route Alternatives 1 and 2 follow an existing power line to the Uitkoms substation; Route Alternative 2 deviates just for a small section away from existing powerlines).

- During the course of the EIA, all affected landowners were identified and consulted with regarding the proposed project. Meetings were conducted with the relevant affected landowners to address their specific requirements. All landowners indicated their agreement to the route or their willingness to enter into further negotiations.
- The properties in question (servitudes) will not be purchased and the registered owner will receive compensation for the use of the servitude.
- A negotiator has been appointed by the applicant to consult with land owners/land rights holders. Further negotiations are taking place to confirm the details for the acquisition of the servitudes as well as compensation. The negotiator will confirm the specific requests/requirements with each landowner. These will be stipulated in the final document, an option document. The option document is a binding document that reflects all the requirements of the landowner, for example: the exact positions of the pylons on the property; the negotiated compensation for the servitude; specific access arrangements to the property etc.

### **3. Impact on Grassland Plains**

The Eastern Highveld Grassland is a vegetation type that is endangered and serious efforts need to be made to protect it as best as possible. However, although the study site falls within this grassland type, the study area and the immediate surrounding areas have been largely transformed and disturbed. These disturbances are predominantly in the form of open-cast coal mining, cultivated lands (agriculture), cattle and sheep farming and urbanisation. Furthermore, the nature of the ecological impact of powerlines is relatively low. For these reasons the significance of the impacts are seen as low and can be viewed as neutral.

#### **Mitigation of impact**

- Due to the long distance covered by the powerline corridors between Ermelo Substation and Uitkoms Substation, it may well be necessary to set up temporary storage and accommodation facilities along the route. In such cases, areas of flat, open lands should be selected. Preferably old, previously cultivated lands should be selected that are open and not wooded. In other words, no areas of pristine grassland should be selected.
- No area for a campsite or temporary storage site should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever, not even alien species, as oftentimes contractors do not have the expertise to distinguish between alien and indigenous species.
- Any selected temporary site (Accommodation or storage) needs to be within the 100m powerline corridor.
- No indigenous trees or shrubs outside of the powerline corridor of 8m to be removed, although due to the grassland vegetation of the study area very few occur. Patches of exotic trees (especially blackwattle (*Acacia mearnsii*) within the large 100m corridor may be totally removed. This will also have a positive impact on the grassland environment. The stumps of these trees to be treated with the recommended poisons to prevent budding and regrowth, but no poisons to be applied directly to the surrounding soils.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- The sandy nature of the soils in most of the corridor route makes them susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground surface around all foundation slabs for the pylons needs to be inspected before the start of the summer rain season and within three months after the end of summer for erosion. Any erosion found needs to be fixed immediately and preventative measures put in place to prevent a reoccurrence of the situation.
- All construction material, equipment and any foreign objects brought into the area by contractors and staff to be removed immediately (within two weeks) after construction.
- Removal of all waste construction material to an approved waste disposal site. And only by an official registered waste removal company.
- Care needs to be taken should contractors come across large holes dug in the ground in the grasslands. These potentially could be aardvark or pangolin lares, both are Red Data Species and protected by law. If unsure reposition the necessary pylon at least 20m away from the entrance.
- Only a single, basic vehicle track to be constructed as an access road under pylons. The track is not to pass directly through any wetlands or pan depression, even those directly under the powerline itself.

### **4. Impact on rivers, streams and drainage lines**

*Drainage lines* are generally viewed as sensitive and need to be avoided where possible. There are a number of drainage lines within the study area, some of which are traversed by both route alternatives. Due to the high rainfall, soils, grassland vegetation and flat, low gradient of the terrain, many of the drainage areas remain damp for most of the year. This is more due to the continual seepage of groundwater in the depressions and the slow run-off of the water. Most of the drainage lines are flat, shallow and wide. Atypical of donga-like or deep-walled grassless lines that are found in steep terrain, which results in fast flowing water that erodes and dries quickly. All drainage lines encountered in the powerline corridors need to be traversed with no pylons been erected within them. All drainage lines are calculated as been of medium/high sensitivity.

Higher potential impact in relation to watercourses is expected by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance. Therefore, taking all of the above issues into account, the Ecological recommended line variant for the proposed project is: Alternative Route 2.

*Rivers* are always seen as sensitive and should be avoided, along with their associated riparian vegetation and floodplains. No large, perennial rivers are found in the study area. However, the powerline corridors will need to cross a few small streams in order to link up between Ermelo and Uitkoms Substations. Of particular concern is the Witpuntspruit, which is a small to medium size perennial stream that runs inside of the proposed powerline servitudes. Mitigating measures are necessary, the implementation of which will ensure that almost no negative impact in terms of the ecological environment are felt. Typical of many of the small rivers and streams in the Highveld grasslands, the rivers do not have a very distinctive riparian vegetation zone, especially with regards to trees. Often the trees found along these watercourses are invasive aliens such as weeping willow (*Salix babylonica*) and grey poplar (*Populus x canescens*). As indicated, higher potential impact in relation to watercourses is expected by Alternative Route 1. Although both alternative routes run within the floodplain of the Witpuntspruit, Alternative Route 1 does so over a much greater distance. Therefore, taking all of the above issues into account, the Ecological recommended line variant for the proposed project is: Alternative Route 2.

#### **Mitigation of impact**

- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- Positioning of the foundation slabs for the pylons must be a minimum of 32m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed (main flow) of a river or drainage line. Not even in position of a valid Water Use Licence (WUL).
- No temporary ablution facilities to be placed within 200m of the banks of any of the rivers, streams or drainage lines (even those that are dry during the time of construction)
- Only proper portable, chemical ablution facilities to be used and these to be positioned only within the 31m powerline servitudes.
- Portable ablution facilities only to be serviced by registered companies and on a regular basis. Under no circumstances may any effluent or sewage to be dumped (or buried) in the open veld.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the rivers may be used for drinking, washing or cooking purposes.
- No fishing, capture of any water or land animals, or removal of water plants or other vegetation for food to be allowed.

#### **5. Impact on wetlands**

All wetlands are considered sensitive and those found in the study area are no exception. Due to the high rainfall and undulating grassland plains with pan depressions numerous wetlands can be found in the general area. A number of small water bodies (wetlands) are scattered across the study area, but most of these fall outside the powerline corridors and will also be avoided during the construction and maintenance phases. Corridor routes have

been adjusted to avoid wetlands where possible, but in some instances come within close proximity to some small pans and seasonal waterlogged depressions. The main wetland types impacted upon are the floodplains of the small rivers and streams encountered in the study area. No large, or pristine wetland pans or other typical wetland types such as endorheic or palustrine wetlands are present. Mitigating measures have been put in place to avoid any construction or disturbance of these small water bodies as well. Wetlands are viewed as 'No-Go' zones.

#### **Mitigation of impact**

- No typical wetlands such as pans or fresh water lakes, occur within the proposed powerline corridors, but some do occur in the area, or in fairly close proximity. Under no circumstances may any activities directly or indirectly related to the powerline project take place within any wetland area.
- No campsite, temporary storage facility, or any other facility to be erected within 500m of a wetland.

#### **6. Impact on Birds**

The possible impacts of the proposed construction and maintenance of power lines and substations on birds are the following:

##### **Habitat destruction**

During the construction phase and maintenance of substations and power lines some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation site. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat. *Habitat destruction along route Alternative 1 is anticipated to be of Moderate Significance, while habitat destruction along route Alternative 2 is anticipated to be of Low to Moderate significance in this study area.*

##### **Disturbance**

Similarly, the above-mentioned construction and maintenance activities impact on bird through disturbance, particularly during bird breeding activities. *Disturbance of birds is anticipated to be of Moderate Significance.*

##### **Electrocutions**

Electrocution is possible on 88kV power lines, especially where large raptors and vultures feature prevalently. Fortunately, it is highly unlikely that vultures will occur in the study area and few large raptors were recorded in the SABAP data sets, so *the impact of electrocution is likely to be of Low Significance for the proposed power line if the proposed mitigations are implemented.*

##### **Collisions**

In general, large lines with earth wires that are not always visible to birds can have the largest impact in terms of collisions. Most heavily impacted upon are korhaans, bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines. Unfortunately, many of the collision sensitive species are considered threatened in southern Africa. Collision of certain large flying bird species such as Southern Bald Ibis, White Stork, Blue Korhaan, Secretarybird, Greater Flamingo and Grey Crowned Crane with the proposed lines is a possibility, and *this impact is predicted to be of Moderate Significance.*

#### **Recommendations**

- The proposed construction of the Alternative 1 power line should therefore have a medium habitat transformation impact and the construction of Alternative 2 a low-medium habitat transformation impact from an avifaunal perspective, depending on how much excess vegetation are cleared during the construction of the line. The removal of large trees should be avoided as much as possible.
- Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable. It is important to ensure that the construction Environmental Management Plan incorporates guidelines as to how best to minimize this impact.
- During Construction, if any of the "Focal Species" identified in this report are observed to be roosting and/or breeding in the vicinity (within 500m of the power line), the EWT is to be contacted for further instruction.

#### **Collisions**



- The area within 100m on either side of the Witpuntspruit, as well as all open water bodies and farm dams in the area are classified as *Medium-High Sensitivity*. Within these areas, it is recommended that construction of the power line be avoided, if possible, and any line that is built in these zones will require collision mitigation in the form of bird flight diverters (“flappers”). All remaining areas on the site are classed as *Low-Medium Sensitivity*.
- Mark the relevant sections of line with appropriate marking devices. These sections of line, and the exact spans, should be finalised by a “walk down” as part of the Environmental Management Programme (EMP) phase, once power-line routes are finalised and pylon positions are pegged.

#### **Electrocution**

- It is highly recommended that the steel monopole design be used and that this incorporates the standard bird perch. If this is the case then most raptors and birds of high electrocution risk will perch well above the conductors and out of harm’s way. In addition it is critical that all clearances between live and earth components are greater than 1.8 meters. If this is the case then the impact of bird electrocution will be very minimal.

#### **Disturbance during routine maintenance**

- No nests may be removed, without first consulting the EWT’s Wildlife and Energy Program (WEP). During maintenance, if any of the “Focal Species” identified in this report are observed to be roosting and/or breeding in the vicinity, the EWT is to be contacted for further instruction.

### **7. Risk of Surface and Groundwater Pollution**

- Hazardous materials and construction equipment will be stored at the campsite and used on site. The pollution of groundwater may result from spillages that may occur. In addition, the campsite may accommodate construction workers, in which case solid and liquid effluents will be produced, including sewage and domestic solid waste.
- Therefore diesel, oil and lubricant spills are the main concern in respect of water pollution during construction together with organic pollution caused by inadequately managed facilities at site camps and at the work sites. The above may result in a change in groundwater quality with the associated negative impact on humans and the natural habitat.
- A management plan must be in place to rehabilitate any such spills. Part of the management strategy must further include the proper storage and removal of any by-products and building rubble.
- Relevant to this project is the following:
- A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. The proper implementation and management of mitigating measures are crucial.
- The drainage routes (or lines) are not seen as being of any threat to the power line, but they should be kept in mind during construction and care should be taken to avoid them. Concrete foot supports should not be placed directly in or on the banks of these drainage furrows. Neither drainage nor erosion are seen to be significant threats as long as the proper mitigating measures are implemented.

#### **Mitigation of Surface and Groundwater Pollution**

##### Construction camp

- Encourage the construction contractor to employ local people as far as is reasonably practical and encourage the contractor to transport them daily to and from site. This will reduce solid and liquid waste production and water demand at the site camps.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of the Ermelo and Uitkoms Substations. With the possibility of another one (maximum two) temporary sites within the powerline corridors due to the distance between the substations.
- All construction activities and movement of people and machinery to remain within the designated power line corridor.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the river may be used for drinking, washing or cooking purposes.
- In all cases, abstraction of water for construction purposes will require a permit from the Department of Water Affairs unless pre-existing rights are purchased from landowners. For this project, water tanks will be provided at the construction site.

- Mixing of cement, concrete, paints, solvents, sealants and adhesive must be done in specified areas on concrete aprons or on protected plastic linings to contain spillage or overflows onto soil to avoid contamination of underground water. The use of pre-mixed cement is recommended. No concrete to be allowed to be mixed in the veld.

#### Diesel, hydraulic fluid and lubricants

- Minimize on-site storage of petroleum products;
- Build adequate structures (berms and containment structures) to contain any oil spills which might emanate from transformers;
- Bund storage tanks to 120% of capacity;
- Ensure proper maintenance procedures in place for vehicles and equipment.
- Servicing of vehicles to be in designated areas with appropriate spill management procedures in place;
- Ensure measures to contain spills readily available on site (spill kits).

#### Site camp domestic waste (kitchens, showers)

- Deposit solid waste in containers and dispose regularly at the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). Proof thereof to be kept by contractor.
- A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.
- Dispose of liquid waste (grey water) with sewerage.

#### Site camp sewage

- Minimize on-site accommodation.
- Only proper, certified portable chemical toilets to be used in campsites.
- Only certified, portable chemical ablution facilities to be used and these to be positioned only within the 31m power line servitudes.
- Only certified waste disposal companies to be used to regularly clean and empty portable toilets.
- Under no circumstances may any human waste (sewage) be discarded (or buried) in the open veld.
- No ablution facilities allowed to be placed within 200m of the banks of any river or seasonal stream.
- No ablution facilities allowed to be within 200m of any drainage lines (even during times when they are dry)

#### Site camp inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc)

- Ensure compliance with stringent daily clean up requirements on site.
- Any waste that cannot be recycled will be transported to the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008).

#### Rivers and drainage lines

- Rivers and drainage lines are always seen as sensitive and should be avoided at all cost. A few streams / small rivers (Witpuntspruit, Humanspruit,) along with drainage lines cross the powerline corridors. These need to be avoided in the sense that no pylons may be placed directly within the main stream of any one of these watercourses.
- No temporary or other construction facilities to be erected or stored within 100m of the banks of the rivers, streams or main drainage lines.
- Positioning of any pylons need to be a minimum of 32m (preferably 50m) from the edge of the river banks or outside of the 1 in 100 year floodline, whichever is furthest.
- Positioning of the foundation slabs for the pylons must be a minimum of 32m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed (main flow) of a river or drainage line. Not even if in position of a valid WUL.
- During and after construction, storm water control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. so that export of soil into the watercourse is avoided.

### **8. Impact of erosion**

- During pylon foundation excavation, bush clearing and earth grading will be done in order to provide vehicle access to the pylons. Depending on location, this may encourage soil erosion. This will be localized rather than an extended linear disturbance. Creation of access tracks has the potential to cause soil erosion if not managed correctly. By compacting soil, vehicles kill the grass and prevent future growth. The bare soil therefore becomes

eroded. If in close enough proximity to rivers, erosion or poor management of stockpiles or materials may impact directly on the river in the form of siltation and pollution. This would be significant should it occur in the vicinity of the local streams. These impacts are however expected during the construction phase only.

- The loss of vegetation, erosion is likely to occur as an indirect impact of the development. The footprint of the infrastructure (pylons) is however small and since grass coverage is likely to recur the overall impact of the erosion is manageable.
- Insufficient soil coverage after placing of topsoil, where large surface areas are applicable, could also cause erosion.
- To cause the loss of soil by erosion is an offence under the Soil Conservation Act (Act No 76 of 1969.)
- The management of surface water runoff during construction is important to prevent soil erosion on the site. If construction takes place during the rainy season, sufficient storm water management will be required to manage water runoff.
- In summary, excavation of foundations for pylons, movement of vehicles and people and the run-off from cleared areas can cause erosion.

### **Mitigation of Impact of erosion**

- Rocky ridges are generally seen as sensitive and need to be avoided where possible. There are no typical koppies (rocky outcrops) found within the powerline corridors. There are a few areas where there are bolder-strewn undulating slopes, but these are not the same as koppies or rocky ridges and are not seen as been ecologically sensitive, from either a floral or faunal point of view.
- The routes for both Alternative 1 and Alternative 2 were designed to follow existing power lines and these servitudes can be used as access roads during construction. This will lower the need for clearing of natural vegetation during construction.
- Care should still be taken to avoid any unnecessary disturbance of veld or soil. Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons.
- Access roads need to be kept to an absolute minimum.
- No roads may be cut through riverbanks, stream banks or drainage line banks, as this may lead to erosion and siltation of watercourses and downstream dams. Only existing, proper watercourse crossings may be used during construction and maintenance phases.
- Pro-active measures must be implemented to curb erosion and to rehabilitate eroded areas. All areas susceptible to erosion must be installed with temporary and permanent diversion channels and berms to prevent concentration of surface water and scouring of slopes and banks, thereby countering soil erosion.
- Crossing of dongas and existing eroded areas shall be thoroughly planned prior to the start of construction and movement of construction and delivery vehicles.
- Water diversion berms shall be installed at donga crossings to ensure runoff water on the servitude does not run into dongas and cause an erosion hazard, nor resulting in increased or further erosion.
- Suitable erosion containment structures shall be constructed at donga crossings where required and viable. Specialists shall properly design all structures and drawings shall be available for reference purposes.
- No unplanned / improperly planned cutting of donga embankments is allowed as this leads to erosion and degradation of the natural environment.
- No unnecessary roads or vehicle tracks or driving of vehicles through the veld as this leads to increased denuding of the covered soils, which leads to increased erosion potential.
- Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided.
- No trees or existing grass strata outside of the power line corridor should be removed to lower any kinetic energy of potential run-off.
- Indigenous vegetation, which does not interfere with the safe operation of the substation/ power line, should be left undisturbed.
- The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- Specifications (as identified in the Environmental Management Programme) for topsoil storage and replacement, to ensure sufficient soil coverage as soon as possible after construction activities, must be implemented.

- All cleared areas must be ripped and rehabilitated after construction. The top 200mm layer of topsoil must be removed and stockpiled in heaps not higher than 2m and replaced on the construction areas once the activities have been completed. The affected areas should be replanted with a grass mixture indigenous to the area.
- Neither drainage nor erosion is seen to be significant threats as long as the proper mitigating measures are implemented.

#### **9. Solid Waste**

- It is expected that a certain amount of construction waste will be generated during construction.
- Expected waste could be unused steel, conductor cables, cement or concrete and general waste around the construction site (plastic, tins and paper), which may degrade the environment if not disposed in the correct manner.
- Solid waste might remain on site after the completion of construction. This can cause pollution to the environment and be detrimental to animals.

#### **Mitigation of Solid waste**

- The construction teams should ensure that all waste is removed from the site and that they recycle the items that can be used again. Unusable waste steel and aluminium will be sold to scrap dealers for recycling at the Eskom stores.
- Any waste that cannot be recycled will be transported to the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.
- Proper and adequate containers (rubbish bins) to be put in campsites for the temporary disposal of food waste and general litter generated by construction workers. These containers need to close securely to avoid items (eg. paper and plastic) been blown into the veld, or been pushed over and rummaged through by wild animals. Proper waster management is essential.
- Containers for food and general waste to be removed weekly to avoid bins overflowing their capacity.
- Under no circumstances may any sewage, waste food or general litter be dumped in the veld.
- Stockpiling of construction material should be such that pollution of water resources is prevented and that the materials will be retained in a storm event.
- Once construction is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowner's satisfaction.

#### **10. Impact of labourers**

An uncontrolled influx of temporary labourers with associated squatter and increased crime problems create pressure on the natural environment (placement of snares, removal of trees for firewood, careless waste disposal, etc.). This could be severe resulting in permanent damage to the environment if not mitigated properly.

#### **Mitigation of impact of labourers**

- A small number of construction workers would be on site. A large workforce is thus not expected. Distribution line construction further requires highly skilled individuals but also provide work for semi to lesser skilled labourers. Even if all the required labourers (highly skilled to unskilled) would be sourced from outside the study area (worst case scenario) it is not anticipated that the relatively small construction workforce would have an impact on the population size and density of the local communities within the study area due to the fact that the areas in and around Ermelo is densely populated.
- As all the Route corridors traverse the above mentioned densely populated areas, all the Corridors are rated similar.
- Given the specialists nature of distribution line construction, specialist contractor teams would be appointed by Eskom for the construction phase of the project. These contractor teams would consist of highly skilled specialists, semi-skilled and unskilled workers. The nature, extent and intensity of this impact would thus depend on the number of locals that would form part of the contractor teams and whether construction camps would be set up to house the temporary "outside" workforce within the study area.

- Due to the anticipated size of the construction workforce, it is apparent that the impacts associated with the inflow of temporary workers to the study area is not expected to result in severe negative impacts on the local communities' social networks, even if the majority of the workforce would be from outside the community (worst case scenario). It is furthermore not expected that the inflow of temporary workers would put additional pressure on the current infrastructure and service delivery in the area, as their immediate needs would be provided through the construction camp infrastructure and services provided on site, or by the existing infrastructure and services available in the study area.
- Care should, however, be taken to avoid conflict between the local communities and the "outside" workforce that would be working "inside" densely populated areas such as Ermelo and surrounds. Although the construction period would be of a short duration in any one area, it should be kept in mind that the construction teams could interfere with the social networks and daily living patterns of the residents due to the proximity of the construction area to the existing dwellings. With the construction of the power lines along the last section of all the route (closer proximity to the Uitkoms Substation), construction would be more removed from local towns due to the rural characteristics of the area. The influx of the construction workforce in the low density "rural" areas would thus result in a less intense impact compared to the impact in densely populated areas.
- Mitigation measures to counter impact on the natural environment and limit potential for crime include specifications in terms of control of construction workers (i.e. provision of toilet and cooking facilities, provision of either accommodation facilities or transport facilities, implementation of Environmental Educational Programmes, etc.). Accommodation for labourers must either be limited to guarding personnel on the construction site (with labourers transported to and from existing neighbouring towns) or a separate fenced and controlled area where proper accommodation and relevant facilities are provided.
- Eskom and the contractors should maximise the use of local labour where possible by developing a strategy to involve local labour in the contractor teams and construction process.
- Before construction commences, representatives from the local authority and community-based organisations, as well as neighbouring and/or affected residents should be informed of the details of the construction company (contractor), size of the workforce and construction schedules.
- Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.
- Contractors and temporary employees should behave fittingly at all times.
- Workers should receive fines if they do not adhere to the conditions, rules and regulations.
- Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues.
- A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process.
- Prepare a comprehensive Environmental Management Programme (EMPr) for the control of environmental impacts at the site camps.
- The EMPr is to include specific provision for the management of the following:
  - Site location
  - Solid waste
  - Liquid effluent (sewage)
  - Storm water
  - Litter
  - Nuisance (Noise)
  - Hazardous substances
  - Social pathologies (prostitution, drunkenness, theft)
  - HIV/Aids prevention.
- Develop an HIV/Aids workplace policy.
- Ensure that the contractors develop a comprehensive site camp management plan. This should apply even in the case of the limited accommodation camps recommended above.
- Plan campsites an appropriate distance from any facility where it can cause a nuisance.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of the Ermelo and Uitkoms Substations. With the possibility of another one (maximum two) temporary sites within the powerline corridors due to the distance between the substations.

## **11. Employment Opportunities**

Power line construction does not create large scale job opportunities. For the construction of the proposed distribution lines an estimated average of 65 individuals peaking to 100 individuals would be required. These opportunities would require skilled workers (approximately 10 individuals), semi-skilled workers (approximately 30 individuals) and approximately 20 unskilled labourers. The type of jobs required could include project and construction managers, contract supervisors, construction foremen and general labourers (skilled and semi-skilled). Opportunities for local labour are thus definitely possible (a total of approximately 50 semi-skilled to unskilled jobs), although limited when the population size is taken into consideration. Due to the social character of the population within the study area and specifically Ermelo, any possible job opportunities for locals should still be viewed as a social benefit as the limited number of job opportunities (even temporary) could still have some positive economic impact on select families. The proposed project could further assist with capacity building through on-site training and skills development opportunities.

### **Mitigation**

The following mitigation measures could be implemented to enhance the positive aspects associated with local job creation:

- It is recommended that the contractor employ local semi-skilled and unskilled labour from the study area to avoid conflict between locals and outsiders with regards to the securing of employment.
- Eskom should stipulate in their contracts with the contractors that local labour should be used for e.g. bush clearing, road construction and fencing.
- Ward councillors could assist in determining available local labourers that could be considered for possible employment.
- Eskom should ensure an equitable process whereby minorities and previously disadvantaged individuals (women) are also taken into account.
- It is recommended that Eskom implements a skills audit and develops a skills database.
- Capacity building and skills transfer should immediately commence to ensure that locals are employable.
- It should be ensured that contractors use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible.
- Onsite training should focus on the development of transferable skills (technical, marketing and entrepreneurial skills) to ensure long-term benefits to the individuals involved.

## **12. Local Procurement**

At this stage, no information is available with regards to the material and quantity of material required, as well as for consumables (e.g. fuel for construction vehicles) for the construction of the distribution line. The impact of the project on the procurement of local businesses and previously Historically Disadvantaged South Africans (HDSA's) can therefore not be determined at this stage. It is, however recommended that Eskom commits itself to involving locals (HDSA's and SMME's) in the procurement of capital goods, consumables and services, if these are locally available. Due to the specialised material and equipment used, the intensity of this impact is considered to be of a low magnitude, although moderately probable.

### **Mitigation**

The following mitigation measures are proposed:

- Local procurement should be aimed at as far as possible.
- Local sourcing of materials would assist in providing more economic and employment opportunities for the local people.
- Local procurement could result in indirect economic spin-offs and benefits such as increased income, and expansion of other local economic sectors.

## **13. Local economic benefits**

Local economic benefits during the construction phase would include the temporary employment of local labourers and short term socio-economic spin offs such as increased buying power around the construction sites, and small scale economic advancement of entrepreneurs (e.g. those selling food and goods to the construction workers).

Although the benefits of temporary employment is short lived, it should still be seen as a positive impact due to the high unemployment rates and levels of poverty found in the study area.

### **Mitigation**

The following is recommended to enhance the socio-economic benefits during the construction phase:

- Maximise the use of local labour even if the number of locals that would be employed would be limited.
- Accommodate, but regulate the activities of vendors in the vicinity of the construction areas and at the construction camps.

### **14. Daily living and movement patterns**

The construction timeframe for the distribution line is estimated to be a few months. This process will include site preparations, vegetation clearance (where required), excavations for pylon foundations, assembly and erection of the pylons, and stringing of the line. Heavy construction vehicles would be used to transport material to the construction sites, but due to the limited number of these, the negative impacts on the residents' daily living and movement patterns are expected to be of a low magnitude. Main Corridors that could be negatively affected, even by a limited number of construction vehicles, include the R65, N11 and N2.

The impact on the daily living and movement patterns of private property owners with regards to the possible construction of new access roads would especially be evident in the rural open areas where numerous gravel roads connect to tarred roads. Where construction work has to be undertaken adjacent to private properties it could also have a negative impact on those owners' daily living and movement patterns, especially in the populated areas of Ermelo and so forth.

Impacts on daily living and movement patterns also refer to the increased *noise pollution* during construction activities, especially where construction would take place in close proximity to dwellings and in low ambient noise areas (agricultural land). Right-of-way clearing and construction activities, however, will be short term. Noise will thus only be temporary generated and if construction activities adhere to all relevant legislation in this regard and limit construction activities to normal working hours, the impact is anticipated to be minimal.

The impact of the presence of construction camps on the daily living and movement patterns of residents is discussed in this report. As both of the Route alignments traverse open areas, as well as cut through densely populated urban areas, the anticipated impact on the residents' daily living and movement patterns are anticipated to be similar.

### **Mitigation**

- Property owners that would be affected by the distribution line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation corridors, construction of additional access roads and construction methods to be used.
- Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads are very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion.
- Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows.
- There should be strict adherence to speed limits when using local roads and when travelling through residential areas.
- Access Corridors and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles.
- Limit the movement of construction vehicles to off-peak periods (where possible).
- Limit the movement of construction vehicles in areas where sensitive receptors are situated e.g. schools and pedestrians.

### **Noise mitigation**

- Machinery and vehicles should be in good working order to limit excessive noise pollution.
- Construction hours will be restricted to specific periods which exclude Sundays and public holidays.
- All construction workers will be allowed only for specified day light hours and will be transported from the site by the contractors.

## **15. Impact on Safety and Security**

Safety and security impacts include construction related risks and accidents, vehicular accidents, the perceived increase in crime as a result of outsiders being in the area, a threat to the safety of children or individuals in the area, mortality to stock and other farm animals close to the site, including stock theft and poaching and the possible increased risks of veld fires. This impact would be more severe in the areas where the construction sites are in close proximity to residential neighbourhoods and in areas with high levels of pedestrian movement e.g. in the vicinity of schools.

In terms of safety, it should be noted that the project involves the excavation of land for the structures of the power lines. The excavated area for the pylons could be approximately 3 meters deep by 1,5 meters wide. Excavations and open trenches can act as a trap for children (and also snakes, small mammals and lizards). Blasting could also create a safety risk in terms of flying objects and damage to properties.

### **Mitigation of Impact on Safety and Security**

#### **Safety mitigation measures**

- Personal protective equipment and clothing should be given to workers and enforced to avoid construction related accidents.
- Construction workers should wear clearly identifiable clothing that allows landowners to easily identify contract workers on site.
- It is recommended that Eskom embark on a traffic awareness campaign prior to the construction phase in the high density residential areas focused on schools and pedestrians.
- The movement of construction vehicles through the local communities should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians (individuals walking to and from work and schoolchildren) and to a lesser extent on private vehicular traffic.
- Construction vehicles should keep to the speed limits.
- Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction site and the presence of heavy vehicles.
- The contractor and Eskom should develop safety management plans which should be discussed with construction workers prior to construction.
- Construction workers should preferably not prepare food at the construction sites to limit the risks of veld fires.
- Construction sites should be fenced off to avoid unauthorised entry.
- Local labour should be used as far as possible to limit the influx of an outside work force and potential outside jobseekers.
- Safety and security measures should be discussed with the property owners and local safety and security structures e.g. the local Community Policing Forums.
- During construction, the Contractor should, put up a temporary fence around the campsite and work areas.
- All construction activities should take place within fenced or otherwise demarcated areas.
- All excavated areas for pylons must be fenced and barrier tape must be placed around them to prevent humans and animals from falling into them.
- The contractors must appoint their own guards to safeguard their materials.
- Once construction is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowners' satisfaction.
- Should blasting be deemed necessary, it may only be undertaken by specialists in the field and should be limited to localised areas. All relevant legislation must be adhered to.
- All adjacent landowners have to be informed of the blasting programme prior to any blasting taking place. Contractors must liaise personally with adjacent landowners. All communication in this regard must be documented.
- A Fire Management Plan has to be identified during the pre-construction phase and must be implemented throughout the construction and operational phases of the project.
- No open fires to be allowed in the power line corridors or adjacent areas.
- No open fires to be allowed outside of the substations sites.



- Cooking or fires must be kept to within the demarcated area of the substation. Special care needs to be taken for the prevention of run away veld fires into the adjacent area.
- In the campsite a designated area for camp fires and cooking needs to be made. Should open fires be used then an area of at least 2m by 2m needs to be cleared of any flammable materials such as grass. This is also necessary with the use of portable gas or paraffin burners typically used for cooking.
- No fires to be left unattended or allowed to burn through the night.
- Fire fighting equipment must be readily available on site during welding and cutting operations.
- Branches and other debris resulting from pruning processes should not be left below conductors or in areas where it will pose a risk to infrastructure.
- No fires may be made for the burning of vegetation and waste.
- Fires shall not be made for the purpose of chasing or disturbing indigenous fauna.
- Construction workers should be barred from collecting firewood or any medicinal and protected plant species.
- No firearms should be allowed at the construction sites.

## **16. Impact of dust pollution**

The negative impact of noise and dust, generally associated with construction activities, are temporary, occurring mostly during the construction phase.

### **Mitigation of dust**

#### **Dust mitigation measures:**

- Sweeping of construction sites and clearing of building rubble and debris must take place regularly.
- According to the applicant and their contractors, dust suppression is not required due to the following reasons:
  - The servitude areas receive minimal bush clearance. Indigenous vegetation which does not interfere with the safe operation of the power line is left undisturbed. Further to the above, vegetation is not ploughed, but mowed and therefore no areas are left without vegetation cover.
  - In terms of access roads, existing roads are used and the impact to these roads is insignificant. The reason is that construction material is minimal (a pylon - planted approximately 330m apart, cement - to plant the pylon, and cable - for the overhead wires). Therefore a small number, of construction vehicles deliver the material to the site. Speed of above 30km/hour will not be exceeded. A limited/ insignificant amount of dust is therefore emitted in the atmosphere. In other words, there will be no significant construction, ground-clearing, leveling or grading of soils, moving or compacting of soils which are often associated with other forms of construction, but not with erecting of powerlines.
- Alternative 1 as well as Alternative 2 follows existing power lines and their servitudes can be used as access roads during construction. This will lower the need for clearing of natural vegetation during construction.
- Alternative 2 deviates for a small section south-west towards Uitkoms substation. This small section runs along the fences of properties and clearing of natural vegetation for an access road might be needed. This can increase the possibility of erosion, and possibly dust pollution.

## **17. Impact on cultural heritage resources**

Construction can destroy heritage resources ('national estate') should it occur in or near the proposed project area.

- A **Phase I Heritage Impact Assessment (HIA) study** as required in terms of Section 38 of the National Heritage Resources Act (No 25 of 1999) was done and revealed no presence of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999).
- In addition, a desktop **palaeontological impact assessment** scope and study was undertaken and the following is reported:
  - There is no objection to the development of the construction of the new 20.9km 88kV Chikadee powerline between substations Ermelo and Uitkoms. Preferred choice: Alternative 1 or 2 as both have equal impact and mostly follows the existing HV lines.
  - It may be necessary to perform a Phase 1 Palaeontological Impact Assessment to determine whether the planting of pylons will affect fossiliferous outcrops as the palaeontological sensitivity is MODERATE. A Phase 2 Palaeontological Mitigation may be required taken into account the overall palaeontological impact is LOW to VERY HIGH depending on the outcome of the Phase 1 Palaeontological Impact Assessment.

### **Mitigation of impact on cultural heritage resources**

- Both Alternative 1 and Alternative 2 are recommended for the proposed 88kV power line between Ermelo substation and Uitkoms substation from a heritage as well as a palaeontological impact assessment point of view.
- It may be necessary to perform a Phase 1 Palaeontological Impact Assessment to determine whether the planting of pylons will affect fossiliferous outcrops as the palaeontological sensitivity is MODERATE. A Phase 2 Palaeontological Mitigation may be required taken into account the overall palaeontological impact is LOW to VERY HIGH depending on the outcome of the Phase 1 Palaeontological Impact Assessment.
- If archaeological/palaeontological or other types of heritage resources are uncovered during construction/ground clearance activities SAHRA (Mrs Colette Scheermeyer/ Mr Phillip Hine, tel: 021 462 4502) and a professional archaeologists/palaeontologist dependent on the finds must be alerted immediately to inspect the finds. A rescue excavation may be required if the identified heritage resource/s is deemed to be significant.

### **18. Visual impact**

Visual and aesthetic impacts will result from the construction activities of excavation, erection of pylons and transporting of materials. In most areas the construction activities will however be of short duration.

The visual impact resulting from the construction of power lines can be substantial in a more rural environment. Should sensitive vegetation clearing as proposed in the mitigation measures be exercised then the visual impact resulting from construction of the power line should be of low significance.

### **Mitigation of visual impact**

The following is relevant to this project:

- Impact to the natural habitat as a result of the project is to be expected. Construction could cause a significant impact where clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat.
- It is suggested that any existing servitude roads as well as existing roads must be used during construction of the power line. Alternative 1 and Alternative 2 follow an existing powerline and the servitude thereof can be used for access.
- The procedures for vegetation clearance and maintenance within overhead power line servitudes and on Eskom owned land, updated September 2009 must be implemented. These procedures includes i.e. the following:
  - Where clearing for an access road is essential, the maximum width to be cleared is 8m.
  - Clearing for pylon positions must be the minimum required for the specific tower, not more than a 5m radius around the structure position.
  - Indigenous vegetation, which does not interfere with the safe operation of the power line, should be left undisturbed.

### **19. Loss of agricultural land**

The construction of power lines with the resulting clearance of servitudes could lead to a loss in agricultural land. Route Corridors could traverse land that could be used for agricultural purposes or so-called "open" land. The intensity of the impact on agricultural activities would thus depend on the type of activities undertaken on the properties as well as the location of the distribution line on each of these properties (impact on resource use).

Tower/pylon positions could limit the resource use and productivity of agricultural land and clearing of areas for the pylons could have a short term impact on cultivated land.

In the long term, even if farming activities would be maintained, the negative impacts are not perceived to be severe as most farming activities could continue underneath distribution lines. However, the intensity of the impact on each of the properties should be determined once a preferred corridor has been approved. The size of the property and extent of the agricultural activities also influence the significance of this impact and should thus be considered.

### **Mitigation of impact on Agriculture**

The proposed construction of the power line will not impact significantly on any agricultural activity. The following is relevant to this project:

- The main agricultural activities presently active in the study area are cultivation, cattle farming, sheep farming and goat farming. Cultivation is predominantly maize and beans in the summer season. Most of which is dry land production. Cattle farming is more prominent than sheep or goats. Most of the land actively used for farming in the study area is grazing for cattle. Goat farming is conducted more on a subsistence basis.
- Most of the land in the study area has low to moderate agricultural potential. Nearly all of the land in the study site has been calculated as being 'moderate potential arable land' Land just north and east of Camden is calculated as being 'very high potential arable land'. Unfortunately most of these lands are presently being open-cast mined, or earmarked for mining. Therefore, the present agricultural potential is non-existent in those areas.
- Should the construction of the power line impact on any agricultural activities, this impact will only be for a limited period during construction. An access road of 8m wide could be cleared to construct the power line. After construction, normal agricultural activities could continue under the power line as usual.
- A quantification of possible losses should be done based on a property specific basis once a final Corridor alignment has been determined.
- During the negotiation phase, possible impacts on the use of irrigation equipment should be established. The Corridor alignment in the preferred corridor might then have to be adapted to avoid such equipment.
- Eskom should select towers and construction approaches to have the minimum impact on agricultural practices.
- It is submitted that for this project, the servitude area will not interfere with any agricultural activities.
- In addition, Eskom will not own the servitude but will purchase the rights to construct and maintain the line. A change in land use from agriculture to other land uses is not applicable.
- In addition, in terms of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970), Section 2(a) Eskom is a statutory body and therefore it is not subjected to the provisions of the Act.

## **20. Impact of alien vegetation**

- One of the impacts of concern is the introduction of alien plants and the use of chemical herbicides (weed-killers). This impact needs to be monitored and managed on an ongoing basis.
- The clearing of vegetation during the construction phase will leave bare patches of soil, thereby enhancing the colonisation by ruderal weeds (mostly annual weeds) or declared alien species that will prohibit the natural succession during rehabilitation procedures. Such soil disturbances (as well as the inappropriate handling of topsoil) could enhance the spread of invader taxa to other systems or vegetation units of high sensitivities. Also, increased disturbances along the drainage lines will potentially facilitate the spread of alien invader species along drainage lines.

## **Mitigation of alien vegetation**

- The manner in which the right of way was obtained/registered is an important factor in determining the legal requirements for erosion and weed control.
- The Conservation of Agricultural Resources Act (Act 43 of 1983) places a duty on the land user to control erosion and declared weeds and invader plants. Hence, the standard specifies weed control as a requirement for all power lines: The act defines land user as follows:
- 'land user' means the owner of land, and includes-
  - any person who has a personal or real right in respect of any land in his capacity as fiduciary, fideicommissary, servitude holder, possessor, lessee or occupier, irrespective of whether he resides thereon;
  - any person who has the right to cut trees or wood on land or to remove trees, wood or other organic material from land.
- A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. This places a duty on Eskom to control declared weeds and invader plants.
- Alien vegetation in servitudes shall be managed in terms of Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. In Terms of these regulations, Eskom shall "control" i.e. combat category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas or land owned by Eskom. Due to the nature of alien vegetation, a

programme for alien vegetation control must be implemented. The implementation thereof is recommended as follows:

- An on going programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such a way as to allow the natural grasses and pioneer plants to colonise the disturbed areas. Typically there should not be any, or very little, infestation of weeds under the powerlines where the veld / grass has only been cut. The weeds found in the area typically invade disturbed soils, with the exception of tree species, but these typically invade kloofs, ravines and drainage lines.
- Mechanical control of alien species to be implemented within three (3) months of completion of construction of the powerline. Thereafter every six months.
- Surface area under powerlines (where necessary) to be mowed and not ploughed. Thereby avoiding creating a negative impact of allowing weeds to encroach.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under powerlines. All control of weeds to be mechanical in nature. That is, physically cut down, pulled out or mowed over.
- Disturbance of the soils must be kept to an absolute minimum to limit the potential introduction of alien plants.

## **21. Possible Public Health Hazards**

Concerns are generally raised during public participation with regards to the impact of the “electrical current” on residents. Drawing on the existing body of research, the World Health Organisation has stated that it is becoming increasingly unlikely that exposure to EMFs constitutes a serious health hazard, although it concedes that some uncertainty remains. The 31 m servitude area limits the constant exposure to these EMFs and according to the Eskom regulations no one is allowed to live within the servitude. These health concerns should not be dismissed as irrelevant. As all the Route alignments would traverse for certain sections close to densely populated areas, concerns in this regard remain, should individuals illegally erect dwellings in the servitude area.

### **Mitigation**

- Eskom should undertake regular inspections of the servitude and put a strategy in place, together with the Local Municipality, to deal with illegal “squatting” in the servitude areas.
- The safety exclusion zone should be strictly adhered to.

## **8. Impacts that may result from the Decommissioning and Closure Phase**

It is not envisaged that the power line will be decommissioned. This project is part of the future infrastructure to supply the Eskom Distribution network. Should this application not be approved, this can result in major disturbances in energy provision.

As indicated, it is generally assumed that the decommissioning process is the reverse of the construction process and as such the indicated impacts will also be relevant to decommissioning phase. Appropriate measures to address this should be outlined in the EMP required for decommissioning. This report addresses impacts related to decommissioning- refer to Appendix F: Impact Assessment.

## **9. Cumulative Impacts**

Cumulative effects are caused by the accumulation and interaction of multiple stresses affecting the parts and the functions of ecosystems. For our purpose, cumulative effects are defined as the changes to the environment caused by an activity in combination with other past, present, and reasonably foreseeable human activities.

Bearing in mind that the magnitude, extent and duration of environmental effects depend on the characteristics of a development activity in a particular location.

Currently the proposed power line is located in a developing area with some residential areas, existing substations, power lines, roads, etc. The proposed route follows a corridor of existing disturbance. The cumulative effect for constructing the electricity infrastructure in this will be low.

In time the overall cumulative impact on this area is likely to increase as various mining companies have mineral rights over a significant portion of the immediate area and are likely to expand their mining operations in these sections. It is thus critical that major role players in the region's economy create long term strategic plans that will accommodate and enhance a wide range of economic activities.

Equally important is the need for Eskom to align all the projects that are planned for the area in order to minimise the potential negative impacts and enhance potential positive outcomes. It is therefore crucial for Eskom to liaise very closely with the various municipalities to mainstream Eskom projects into the Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs) of the respective municipalities.

As indicated in the report, the grassland plains within the study area are not seen as floristically sensitive with regards to powerline corridors. Existing impacts relate to cultivated lands, coal mining, cattle farming, urbanisation, general human activity and movement through them.

In spite of the above, the project could cause a significant impact where clearing for construction and access purposes, etc. is required. Insensitive clearing can cause the destruction of habitat. The cumulative impact on this area is likely to increase should various mining companies expand their mining operations in these sections.

It is therefore important that the proposed Eskom project adhere to the stipulated mitigation measures to limit impact to the natural habitat, to surface water, erosion etc.

Should this be implemented, then no cumulative impacts on the ecology of the environment are identified as possibly being beneficial.

As mentioned in this report, due to the physical nature (and small footprint) of the powerlines, the overall impact to the natural environment is minimal over the medium- to long-term. This relative to other impacts in the region such as open-cast coal mining, agriculture and urbanisation. The initial (short-term) construction phase will have a higher initial impact on the environment, but this is still seen as being relatively low.

#### 10. An Environmental Management Plan (EMPr) was compiled to ensure that

- mitigation measures are identified and implemented to avoid or minimise the expected negative environmental impact and enhance the potential positive impact associated with the project;
- the developer, construction workers and the operational and maintenance staff are well acquainted with their responsibilities in terms of the environment;
- communication channels to report on environment related issues are in place.

#### 11. Conclusion and recommendations

- The first phase of the **Public Participation Programme (PPP)** commenced in February 2013 and continued until May 2013. It included the identification of key stakeholders, the distribution of information letters with a request for comment, as well as advertising of the project in the local press and on site.
- In addition, notification of an **information meeting** on 24 April 2013 was sent to all IAPs on 8 April 2013. The purpose of the meeting was to furnish the landowners and other interested parties with information regarding the extent of the project, the proposed alternatives, the process of negotiations for servitudes, and the extent of the Environmental Impact Assessment Process. Project posters with information and maps of the routes were presented at the meeting. Written comment was requested at the meeting.
- One-on-one **meetings were conducted with landowners** to assist in the identification of potential powerline corridors and site locations.
- A **draft Basic Assessment Report** was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (I&APs).
- In addition, An **Environmental Management Programme (EMPr)** was compiled to ensure that
  - mitigation measures are identified and implemented to avoid or minimise the expected negative environmental impact and enhance the potential positive impact associated with the project;

- the developer, construction workers and the operational and maintenance staff are well acquainted with their responsibilities in terms of the environment;
- communication channels to report on environment related issues are in place.
- On **20 May 2013** the **draft Basic Assessment Report was submitted** for comment to the following:
  - Regional Department of Water Affairs: Water Resources & Water Quality Management
  - South African Heritage Resources Authority (submitted via SAHRIS)
  - Mpumalanga Department of Economic Development, Environment and Tourism: Environmental Services
  - Mpumalanga Department of Agriculture: Land Use and Soil Management
  - Mpumalanga Department of Mineral Resources
  - SA National Road Agency Ltd
  - Mpumalanga Department of Public Works, Roads And Transport
  - Mpumalanga Department of Rural Development and Land Reform: Land Claims Commissioner
  - Mpumalanga Department of Rural Development and Land Reform: State Land Administration
  - Department of Human Settlements and Traditional Affairs
  - Department of Community Services
  - Agri Mpumalanga/ Mpumalanga Landbou
  - Mpumalanga Tourism and Parks Agency
  - Endangered Wildlife Trust
  - Landbou Unies
  - SA Civil Aviation Authority
  - Gert Sibande District Municipality
  - Msukaligwa Local Municipality
  - Eskom Transmission
  - Eskom Distribution
  - Landowners
- The **due date for comment** to the draft Basic Assessment Report is **3 July 2013**. This allows for a comment period of 40 days.
- Subsequently, a **final Basic Assessment Report (BAR)** will be compiled.

Alternative routes have been investigated for the project. From a heritage, palaeontological, ecological as well as bird impact viewpoint, both Route Alternatives are acceptable, with the proposed mitigations implemented. Although from an ecological viewpoint Alternative Route 2 is slightly preferred.

The final decision between Route 1 or 2 should be made on the accumulative weight of other parameters such as feedback from public participation, land tenure issues, construction costs, etc. **Currently, Alternative 2 is preferred** as the final route alignment due to the above investigations favouring alternative 2.

The **Route alternative 1** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3, 4, 9, 14, 15; Transutu 257 IT portion 0; Jan Hendriksfontein 263 IT portion 6; Witpunt 267 IT portion 9, 22, 34, Witpunt 267 IT (Consolidated to portion 40 of 267 IT) portion 1, Witpunt 267 IT portion 35 and 36; Camden Power Station 329 IT Rem.

The **proposed Route alternative 2** for the line is on the farms Nooitgedacht 268 IT, Van Oudshoornstroom 261 IT portion 86, 27, 57, 75, 9, Rem, 12, 4, 17, 5, 1; Jan Hendriksfontein 263 IT portion 3; Uitkomst 292 IT (Consolidated to portion 18 of 292 IT) portion 3; Camden Power Station 329 IT Rem; Witpunt 267 IT portion 35 and 36. Both routes are in the Msukaligwa Local Municipality in the Mpumalanga Province.

It is concluded that the construction of the proposed Ermelo-Uitkoms Project will have an overall positive impact on the socio-economic environment should the necessary mitigation measures be implemented. It is proposed that **Alternative 2** be considered for the construction of the lines.