

**ENVIRONMENTAL IMPACT ASSESSMENT
FOR ESKOM'S NORTHERN KWAZULU-NATAL
STRENGTHENING PROJECT**

DISTRIBUTION POWERLINES

DRAFT BASIC ASSESMENT REPORT – APRIL 2018



**ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT:
132 KV DISTRIBUTION POWERLINES**

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT BASIC ASSESSMENT REPORT

Title: Draft Basic Assessment Report for Eskom's Northern KwaZulu-Natal
Strengthening Project: 132 kV Distribution Powerlines

Main Author: T Calmeyer

Specialists: B Shinga (Public Participation), I Aucamp (Social), S Aucamp (Social),
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Rowe (Soils and Agricultural potential), K Bremner (Wetlands) and
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Reviewed by: S O'Beirne

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Project Name: Eskom's Northern KwaZulu-Natal Strengthening Project: 132 kV Distribution
Powerlines

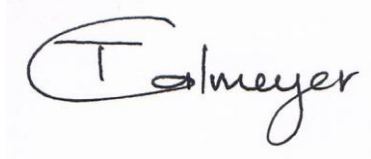
Status of report: Draft

NAKO ILISO Project Number 1600048

Date: April 2018

NAKO ILISO

Approved for NAKO ILISO by:



Clint Koopman

Chief Executive Officer

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PURPOSE OF THE DRAFT BASIC ASSESSMENT REPORT

Eskom Holdings SOC Limited (Eskom) has commissioned an Environmental Impact Assessment (EIA) to investigate the potential environmental impacts of the proposed project to strengthen the supply of electricity to Northern KwaZulu-Natal (KZN). The proposed project consists of the new Iphiva 400/132 kV Substation near the town of Mkuze in KZN, which will be integrated into the 400 kV Transmission network by the approximately 127 km Normandie-Iphiva, the 107 km Iphiva-Duma 400 kV Transmission powerlines and approximately 165 km of 132 kV Distribution powerlines that will link into the Iphiva Substation. The EIA is being undertaken by NAKO ILISO as an independent Environmental Assessment Practitioner (EAP) and is being done in terms of the National Environmental Management Act (No 107 of 1998), in particular Regulations GN. R982, R983, R984 and R985 promulgated in December 2014, as amended. This document deals with the 165 km of Distribution powerlines. Separate applications and associated reports have been compiled for the other components of the project.

The environmental studies are required to address the potential impacts associated with the proposed project and provide an assessment of the project in terms of the biophysical, social and economic environments. It is this assessment, which aids both the environmental authorities (in this case the National Department of Environmental Affairs (DEA)) and the proponent (i.e. Eskom) in making decisions regarding the future of the project.

In keeping with environmental legislation, it is the responsibility of the EAP to ensure that the public is provided the opportunity to participate meaningfully in the environmental investigation process. This includes identification of issues and review of reports. Accordingly, Interested and Affected Parties (I&APs) have been invited to review the Draft Basic Assessment Report to verify that their contributions are captured and correctly understood, and have been adequately assessed.

The comments received during this period will be incorporated into the Final Basic Assessment Report, which will be submitted to the DEA who will decide whether the project should be authorised or not, and if so, then on what conditions.

DRAFT BASIC ASSESSMENT REPORT DISTRIBUTION

The Draft Basic Report will be distributed to key stakeholders and left in the following public place from 26 April to 29 May 2018:

Area	Venue	Address	Contact Details
Pongola	Pongola Public Library	61 Martin St, Pongola, 3170	Tel: 034 413 1540
Mkuze	Ghost Mountain Inn	Fish Eagle Street, Mkuze	Tel: 035 573 1025

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KEY STAKEHOLDER AND AUTHORITIES MEETINGS

The Draft Basic Assessment Report will be presented at Key Stakeholder and Authorities Meetings as listed in the table below:

AREA	DATE	VENUES	DATE & TIME
Pongola	Wednesday, 09 May 2018	Pongola Country Club	10:00 – 12:30
Mkuze	Thursday, 10 May 2018	Ghost Mountain Inn	10:00 – 12:30

Focus Group Meetings

Focus group meetings will be held as follows:

Meeting Type and Target Audience	Day, Date and Time	Area	Venue & Physical Address
Public Meeting: Comondale Farmers Association	Monday 07 May 2018 15h00 – 17h30	Between Paulpietersburg and Piet Retief	Comondale Farmers Association
Public Meeting: Moolman Farmers Association	Tuesday 08 May 2018 10h00 – 12h30	Piet Retief	TWK Agri 11 De Wet Street Piet Retief

Advertisements announcing the availability of the Draft Basic Assessment Report were placed in the following newspapers:

No	Publication	Insertion Date	Language
1	Excelsior News	27-Apr-18	English
2	Ilanga	26-Apr-18	Zulu
3	Mercury	26-Apr-18	English
4	Isolezwe	26 Apr-18	Zulu

The Draft Basic Assessment Report has also been placed on the NAKO ILISO website (www.iliso.com).

APPRECIATION TO INTERESTED AND AFFECTED PARTIES FOR THEIR PARTICIPATION

The Environmental Impact Assessment Team would like to express its sincere thanks and appreciation to all stakeholders that have registered as I&APs, attended meetings and provided input and comments by other means.

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ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT:

132 kV DISTRIBUTION POWERLINES

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT BASIC ASSESSMENT REPORT

EXECUTIVE SUMMARY

Background

ESKOM Holdings SOC Ltd (Eskom) has commissioned a project to strengthen the supply of electricity in Northern KwaZulu-Natal (KZN). NAKO ILISO has been appointed to undertake an Environmental Impact Assessment (EIA) to support applications for Environmental Authorisation.

The project has been divided into the following four components, each of which has an application:

- Iphiva Substation;
- Normandie-Iphiva 400 kV Transmission Powerline;
- Iphiva-Duma 400 kV Transmission Powerline; and
- 132 kV Distribution Powerlines.

This report documents the process and findings of the assessment of the Distribution Powerlines. This report will be subject to a public comment period after which it will be finalised and submitted to the competent authority for review.

Need for the project

The Northern KZN network is currently fed at 132 kV by the Normandie and Impala Main Transmission Substations. The major load centres are Pongola and the Makhatini Flats. The Normandie Substation is situated approximately 80 km north-west of Pongola and the Impala Substation is situated approximately 180 km south of Makhatini Flats. High voltage drops are experienced in the 132 kV network and the voltages are approaching unacceptable low voltage levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network.

Project Description

In order to strengthen and alleviate current and future network constraints in Northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area. The Iphiva Substation will be integrated with the existing electricity network by 400 kV Transmission Powerlines to the Normandie and Duma Substations, and approximately 165 km of 132 kV Distribution Powerlines.

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The following 132 kV powerlines are included in this application:

- Iphiva – Pongola (1) 132 kV powerline to tie in with the existing powerline, which may be double circuit with Iphiva/ Hluhluwe;
- Iphiva – Pongola (2) 132 kV powerline;
- Iphiva/ Makhathini 132 kV powerline which may be double circuit with Iphiva/ Mbazwane; and
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala/ Normandie Line.

Listed Activities

The proposed project triggers several activities listed in the National Environmental Management Act (No 107 of 1998) (NEMA), as amended, as requiring environmental authorisation before they can commence. The purpose of this study is to undertake an EIA process, with associated Public Participation Process (PPP) and specialist studies, to enable the competent authority to decide whether the project should go ahead or not, and if so, then on what conditions.

Receiving Environment

The project is located in the KZN province. The area has warm to hot summers, high evaporation, dry warm winters and a mean annual rainfall between 495 and 1 560 mm. Average rainfall is higher in the west and decreases gradually to the east. The dominant landscape features are valley slopes to undulating hills and flat plains with a network of rivers and smaller streams. The northern and central parts of the study area are more mountainous and have extreme topographical features.

The region is well known for its large wetlands, river systems, grassland hills, bushveld and diverse micro-habitats. The study area falls within the Maputaland-Pondoland-Albany hotspot, which is rich in floral diversity and is part of the Maputaland Centre of Plant Endemism. 58 of Southern Africa's endemic and near endemic avifaunal species are found within the project area.

Mkuze and Pongola are the large towns in the area. The rest of the area consist of settlements in areas under traditional leadership, commercial farms and game reserves. The land under traditional management belongs to the Ingonyama Trust. Settlement patterns are scattered. Dwellings consist mostly of brick structures or traditional structures. Most people have isiZulu as their home language.

In terms of commercial farming, sugar cane and forestry are concerns when it comes to the presence of powerlines. Sugar cane needs to be burnt, and as such cannot always be planted below powerlines. Although there are other methods to harvest sugar cane under powerlines, these are more expensive and labour intensive. Fire is a risk for forestry, and a spark or a snapped powerline could cause extensive damage.

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Alternatives

The **no-project** alternative, i.e. without these 132 kV powerlines, Eskom Distribution will have to implement localised rotational load shedding in order to avert a 132 kV system voltage collapse from as early as 2019. This will impact 40 000 customers.

One of the 132 kV distribution powerlines considered in this assessment, namely, the Iphiva-Makhathini / Iphiva-Mbazwane Distribution Powerline has an **alternative route**.

A design alternative that has been assessed is **burying cables** for sections of the 132 kV powerlines in areas where the visual impact is of concern, which is along the P 234 road (the Bangonomo Road) between the Manyoni Private Game Reserve and proposed Zimanga Private Game Reserve.

Public Participation in the Draft Basic Assessment Phase

Public participation is an important aspect of any EIA, with the objective to assist stakeholders to table issues of concern, suggestions for enhanced benefits and to comment on the findings of the EIA. The PPP is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner.

An I&AP database has been established to record the details of stakeholders that wish to register for the project. Key stakeholders have been identified and notified of the project and their opportunities to participate. A Background Information Document was compiled and distributed to all registered I&APs and at meetings. Newspaper advertisements were placed in four newspapers in English and isiZulu. Onsite notices were erected at 23 locations in the study area. Meetings were held with Key Stakeholder and Authorities at four venues in the study area, in order to present the proposed project to them, and give them an opportunity to raise any concerns that they might have. Similar meetings, in isiZulu, took place with each of the 31 Traditional Councils in the study area. Focus group meetings with Ezemvelo KZN Wildlife, organisations concerned about impacts on birds, Farmers Organisations and the landowners of the substation site alternatives also took place. All comments made have been captured in a Comments and Responses Report.

This draft report is now available for a 30-day public comment period. All comments received will be considered and the report will be finalised for submission to the competent authority.

Key Issues

The following key issues have been identified:

- Impacts on areas protected by national and provincial legislation resulting in loss of plants and animals of conservation value and a loss in the income from and value of the facilities, primarily due to visual impacts;
- Impacts on the rich and diverse fauna and flora (specifically large birds);
- Impacts on land use, particularly for sugar cane farmers and forestry;
- Impacts on Heritage Resources;
- Social impacts;

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- Economic,
- Impacts on the biophysical environment resulting from access roads;
- Construction Impacts; and
- Cumulative impacts.

Specialist Studies

This Basic Assessment Report uses input from specialists to assess the key impacts, determine their significance, and recommend appropriate measures to mitigate negative impacts and enhance benefits. The specialist studies that have been undertaken are summarised below. Mitigation measures recommended have been included in the Draft Environmental Management Programme (EMPr).

*An assessment of the local **flora and fauna** communities associated with the proposed powerlines was undertaken. This study predicted that:*

- *The direct loss of floral species/vegetation types and biodiversity will have a moderate significance after mitigations;*
- *The loss of species of special concern (protected species) would have a minor impact after mitigation; and*
- *The impact of alien vegetation establishment will be negligible after mitigation.*

The west routing alternative for the Iphiva-Makhathini / Iphiva-Mbazwane powerline was recommended.

*Impacts on **birds** that could be associated with a project of this nature include collision of birds with the overhead conductors; electrocution; destruction of habitat; and disturbance of birds. Collisions are the biggest potential risk to avifauna, while habitat destruction is also expected to be an important impact of this project. The consideration of alternative corridors from an **avifaunal** perspective, was primarily determined by the ecological sensitivity present based on:*

- *Presence or absence of Red Data or protected bird species;*
- *Presence or absence of exceptional Avifaunal species diversity;*
- *Extent of intact habitat in good ecological condition in the absence of disturbance; and*
- *Presence or absence of important ecosystems protected areas, such as Important Bird Areas, Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.*

The results of the comparison of alternatives is that the west routing alternative for the Iphiva-Makhathini / Iphiva-Mbazwane Distribution line and that all below ground design options along the P234 corridor are recommended to avoid impacts on birds.

*A desktop assessment of **wetlands** associated with the powerlines was undertaken. The following baseline and background information was researched and used to understand the study area:*

- *The Ramsar Convention;*
- *National Freshwater Ecosystem Priority Areas (NFEPA) (Nel et al., 2011);*

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- *Water Management Areas (WMA) and Quaternary Catchments; and*
- *The KZN 2012 Critical Biodiversity Areas Map.*

Desktop delineations based on the available contour and topographic data, as well as detailed aerial imagery were applied to the proposed powerline corridors to provide an indication of the potential extent of the wetland areas likely to be present. Limited in-field verification of these systems took place.

Eskom avoids placing towers in wetlands for technical reasons. Most of the wetlands are narrow enough for the conductors to be strung over them. Direct loss of wetlands, increased sedimentation, compaction of wetland soils, altered wetland hydrology, onset of erosion, and the establishment of alien invasive plant species is expected to result from the clearing of vegetation for the construction of access roads and towers foundations, as well as the increased vehicular activity associated with the stringing of the powerlines.

During the operational phase, no direct impacts to wetlands are expected to occur, however, potential risks include hydrocarbon spills and indirect risk of poaching and fires.

The significance of the impacts of site access and disturbance and clearing after mitigation was assessed to be negligible for both the construction and operational phases.

Burying powerlines in wetlands will have the most significant impact, and above-ground powerlines are recommended.

*The investigation of **agricultural potential** involved the collation of climate, geology, topography information and determining the broad soil groups of the area as background for further interpretation. Properties of the soil groups, soil depth, clay content, soil restrictions as well as land capability classes were considered. The soil investigation was based on a field investigation and additional available information from the Land Type Survey of the Institute of Soil Climate and Water, as well as other relevant information.*

The soils in the project area were then classed in four land capability/potential classes, namely:

- *Soils of intermediate suitability for arable agriculture;*
- *Soils not suitable for arable agriculture, but suitable for forestry or grazing;*
- *Soils of poor suitability for arable agriculture; and*
- *No dominant class.*

Properties like clay content and susceptibility to erosion is highly dependent on the parent material. The mudstone underlying this area can give rise to soils severely susceptible to erosion when exposed. Exposed surfaces should therefore be limited or prevented. It should be covered with any vegetation even for short periods.

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Arable crop production is not restricted by the climate of the area but may become risky in the areas with lower and irregular rainfall patterns.

The corridors of the Iphiva-Pongola (1) / Iphiva-Hluhluwe double circuit powerline, the loop to Candover switching station, the Iphiva-Mbazwane / Iphiva-Makhathini double circuit and the alternative route for Iphiva-Mbazwane and Iphiva-Makhathini double circuit powerline have a land capability with soils of intermediate suitability for arable agriculture. The majority of soils in the Iphiva-Pongola (2) 132 kV corridor are either not suitable for arable agriculture, but suitable for forestry or grazing (largest part), of intermediate suitability for arable agriculture (in the north and eastern parts of the corridor), or of poor suitability for arable agriculture (in the north western parts of the corridor).

The specialist has no objections to the project from the agricultural and soil potential standpoint.

The western corridor of the Iphiva/Makhathini – Iphiva/Mbazwane 132 kV powerline has less impact on agriculture. Above-ground powerlines are preferred to buried.

*The **Heritage Impact Assessment** complies in part with the KZN Heritage Act, 2008 (Act No. 4 of 2008) (KZNHA) and National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The greater cultural landscape is expected to contain heritage resources spanning from palaeontological through to contemporary living heritage resources. Various resource types are anticipated to occur. These include but are not limited to archaeological resources from various time periods; and burial grounds and graves.*

Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures, construction and/or upgrading of access roads and stringing of conductors have the greatest likelihood of direct impacts on heritage resources.

Iphiva 6 is presently the location of a rural settlement where anthropogenic disturbance through establishing of structures and agricultural fields may have disturbed or removed previous in situ subsurface heritage resources. Iphiva 3, in contrast, remains largely free from anthropogenic disturbance, reducing the suitability of the site. Iphiva 6 is known to contain burial grounds and graves. While these will have permitting requirements in the event that they are to be impacted upon, because they are known the potential impacts can be easily avoided therefore making it more suitable than Iphiva 3. The heritage specialist concludes that Iphiva 6 is the more suitable alternative from a heritage perspective based on the available information.

Direct impacts to archaeological resources with a high or medium Cultural Significance and direct impacts to burials, monuments and memorials with a high Cultural Significance have a negligible positive significance after mitigation.

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The **visual specialist study** is based on the Oberholzer (2005) guideline that draws on best practice in EIA and provides guidance applicable to visual specialist assessments. Projects-specific receptor (viewer) sensitivity is based on accepted international practice, previous experience of the visual specialists, social specialist and the economic specialist.

Guest houses, game lodges and nature-based tourism in protected areas dependent upon a pristine visual resource for tourism value are considered to have a High viewer sensitivity. rural (commercial farming) homesteads a Moderate viewer sensitivity, and National / provincial road users where other infrastructure is present and transformation has already taken place, Formal settlements (such as Pongola / Mkuze / Ulundi) and informal settlements / villages (likely considers transmission lines as a sign of progress) a Low viewer sensitivity.

The greatest factor that influenced visual impact for this project was the presence of conservation areas, due to their dependence upon the landscape as visual resource as income generator for tourism-related activities. The avoidance and minimisation of the visual impact was mostly focused around reducing impact on these areas.

Impacts were identified for each of the viewer groups against each of the infrastructure components. Visibility and visual exposure were combined in the GIS viewsheds generated. These aspects and visual intrusion were combined to calculate the intensity / magnitude of each impact. The visual intensity was then combined with pre-defined impact assessment aspects such as the nature, duration, extent to determine the significance of each impact before and after mitigation.

The visual specialist recommended that the following components of 132 kV powerlines be authorised:

- Iphiva-Pongola (2) (no alternative corridor);
- Iphiva/Hluhluwe – Iphiva Pongola (1) double circuit powerline (no alternative);
- Candover HV to existing 132 kV powerline (no alternative); and
- The Western alternative of the Iphiva/Makhathini – Iphiva-Mbazwane which relates to the existing land use (mostly farming) and existing other infrastructure (rail and road), thereby consolidating visual impact along one corridor.

The potential visual impacts associated with Distribution powerlines and associated infrastructure are related to alignment close to sensitive areas such as elevated ridges, koppies and wetlands that could be conserved as visual assets for tourist related activities. This was considered in the route selection process, where visual sensitivity was considered as a constraint to route alignment, thereby meeting the first step in the mitigation hierarchy, namely that of avoidance of the impact. Visual impacts are best mitigated in the planning and design phase, and to a lesser extent the construction phase

With regards the possibility of burying powerlines along the P-234, although will reduce the visual impact, at the Integration meeting with the other specialists it was agreed that the overall impacts

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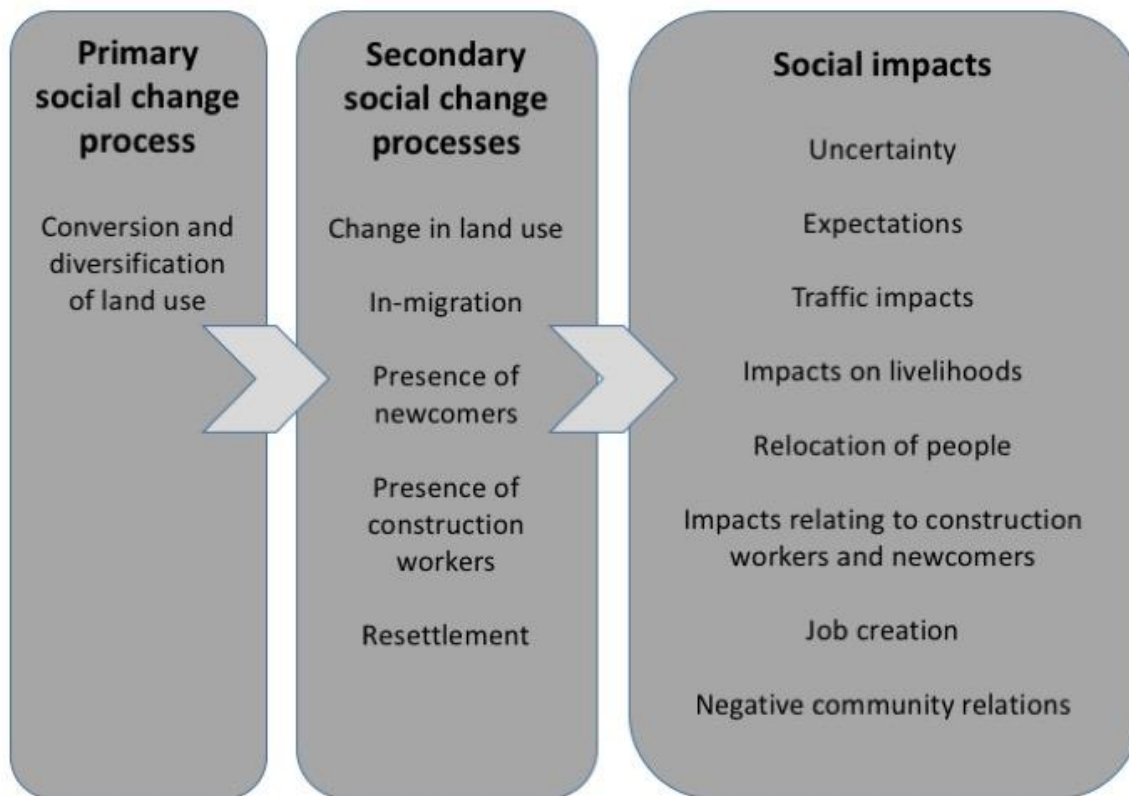
of burying the powerline are greater than the overall impacts of above-ground powerline. The impact ratings have therefore been done for above-ground powerlines.

Demographic, economic, geographic, institutional, legal, emancipatory, empowerment, and socio-cultural processes were investigated in the **Social Impact Assessment**: The social specialist identified the following key stakeholder groups potentially impacted by the project:

- Communities under traditional authority;
- Commercial farming;
- Tourism establishments; and
- Surrounding urban areas.

The proposed project activities set into motion certain social change processes, and these change processes can lead to the experience of social impacts. Social impacts are context specific and may be experienced differently by different groups in the area. The social environment is very dynamic and is constantly changing.

The following change processes and impacts have been identified for the proposed project:



The social specialist concluded that the project will make an important contribution to the supply of electricity in Northern KZN and will be of service to many previously disadvantaged communities. She therefore recommends that the project as a whole should proceed, but in the process attempt to minimise negative social impacts to the immediate environment, keeping in mind the current economic climate and broader societal picture in terms of expenditure. The western route for the

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lphiva-Makhathini/lphiva-Mbazwane double circuit powerline is recommended as well as all above ground powerline along the P234.

*One of the key issues that landowners affected by the proposed project have raised is the impact on the eco-tourism activities and knock-on effects including decline in property values, loss of jobs, reduced budgets for conservation of animals. The socio-economic specialist study only allowed for this to be assessed on a qualitative level. Interaction with the landowners has highlighted that the project could be opposed should this aspect not be adequately addressed. The inclusion of a more detailed **economic assessment** was therefore commissioned.*

Tourism is not an economic sector in its own right but is a complex and composite sector comprising mainly of accommodation, transportation, food and beverages, cultural and recreational activities. The activities undertaken by the tourist relate with the travel, destination, and entertainment activities and expenditure that tourists make. The tourism sector contributes approximately 6 % to the value of economic activity for all goods and services produced within the area. This is slightly higher than the national average. The total number of people employed in tourism amounts to approximately 4.6 % of all employment within the regional economy. The tourism value of the region is estimated at R 1.9 billion for the geographical area for 2016, and employment amounts to approximately 9 831 for the corresponding year.

The development of the Distribution powerlines will be a significant investment for and have a positive impact on the economy. This is related to the construction and maintenance of the infrastructure as well as positive spin-off impact due to increased electricity supply. Investment costs were estimated to be in the order of R 2 million per km for single circuit lines and R 4 million for double circuit lines above ground. The cost of burying the lines is understood to be higher but no value was provided.

The economic specialist found that the agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand. The intensity of the economic impact for tourism activity will be different for each property/activity and depends on inter alia the:

- Land use type – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far possible, be eliminated from the preferred alignment.*
- Powerline route – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.*
- Size of the property – A powerline that transcend properties diagonally or through the middle, for property smaller than 200 ha – tips an argument for expropriation*
- Existing infrastructure – Do not place powerlines over or in close proximity to tourism infrastructure.*
- Visibility of the new structure - Place the powerlines / pylons and the substation in areas where it is not visible from tourism areas/hides/etc.*

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- *Market related compensation for the affected property should be provided where the powerline is developed.*
- *Landowners should be consulted about their preferred configuration if their property is affected.*

Once a servitude for the powerlines is finalised it will be possible to quantify the impact on individual property values. A registered property valuer should assess each individual affected property to determine the value impact, if any.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales. The alternatives where the negative economic impact is lowest is preferred.

Impacts (Table below) are measured in terms of:

- *Production: refers to the value of output generated in the economy as a result of the existing tourism activity.*
- *Employment: reflects the number of jobs created by the tourism activity.*
- *Household Income: refers to the income by households as a result of their involvement in the activity and downstream beneficiation production.*

Summary of economy wide economic impact

Project Component	Total hectare within reserve/ lodge/ game farm	Economy-Wide Economic Value	Employment	Household Income
<i>P234 Corridor</i>	<i>948 ha</i>	<i>R 11.2 million</i>	<i>44 jobs</i>	<i>R 5.3 million</i>
<i>lphiva-Pongola (2) 132 kV powerline</i>	<i>2 510 ha</i>	<i>R 29.7 million</i>	<i>116 jobs</i>	<i>R 14 million</i>
<i>132 kV Loop in to Candover</i>	<i>0 ha</i>			

The economic specialist found that the construction and operation of the lphiva-Pongola (2) 132 kV powerline will have a medium-low significant impact after mitigation on:

- *Property value for the affected and adjacent properties;*
- *Loss in tourism employment; and*
- *Reduction in the economic value of the regional economy as a result of a reduction in tourism activities and future expansion/investment in tourism activity may also be impacted due to the loss in productive land.*

The alternatives along the P234 were assessed and the loss in property value, tourism employment ad reduction in economic value were found to have impacts with significances varying from low to very high, depending on the specific circumstances.

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The loop-in to the Candover Switching station has a Low significance impact for all of the economic impacts assessed as listed above.

The economic specialist found that burying the powerlines along the most sensitive stretch of the P 234 corridor will mitigate most of the negative economic impacts. The economic specialist recommended that the project be authorised on condition that a property valuer is appointed to quantify the value impact for directly affected properties with appropriate compensation, and that a cost comparison analysis between burying the powerline and overhead powerlines is undertaken. If the costs are similar, then the powerlines should be buried in high value tourism areas.

Conclusion and Recommendation

The EAP recommends that the corridors within which servitudes for the construction and operation of the Iphiva/Pongola (1) - Iphiva/Hluhluwe double circuit 132 kV powerlines to tie in with the existing powerline, the Iphiva – Pongola (2) 132 kV powerline, the western corridor of the Iphiva / Makhathini - Iphiva / Mbazwane double circuit 132 kV powerline; and the 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie powerline be authorised. All powerlines should be constructed above-ground.

The 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line is considered a temporary powerline and must be decommissioned as soon as the Iphiva Substation and associated 400 kV powerlines have been commissioned.

Should both the Normandie-Iphiva (2) 400 kV and Iphiva-Pongola (2) 132 kV be authorised and implemented, then Eskom Distribution and Eskom Transmission must co-ordinate implementation to ensure the best practical environmental option of both powerlines in the same corridor. This could include the option of multi-circuit towers.

The powerlines should be constructed on farm boundaries as far as possible, specifically in areas where land is used for forestry. Towers should be placed outside of wetland/riparian areas and their associated 32 m zones of regulation as far as is possible. Where powerlines are constructed in parallel, towers should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action. Lattice towers with visually intrusive footing designs should be avoided to reduce visual impacts, except for situations where strain towers are required or stability/geotechnical aspects play a role. Servitudes should avoid ridge, follow existing infrastructure corridors and avoid visually sensitive areas and receptors where practical.

Water Use Licences/Registrations must be obtained for any construction in an area regulated by the National Water Act (below 1:100 year floodline or 100 m from a watercourse and 500 m from a wetland).

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A walk-down of the servitude once the tower positions have been determined, prior to any construction activities, must be undertaken by suitably qualified heritage, ecology and bird specialists. The specialist should recommend feasible design changes (i.e. moving tower positions within the approved corridor, preferably within the servitude if already negotiated) to further reduce impacts and identify any heritage resources that may be impacted upon, plants or animals that require rescue and sections of the powerlines that require bird diverters and towers that require bird guards. Areas with a high ecological sensitivity, wetlands and watercourses should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel. These findings must be documented on powerline profiles and incorporated into the EMPr.

The footprint area of towers must be limited to what is essential in order to minimise impacts as a result of vegetation clearing and compaction of soils. Removal of plants should be restricted to only those trees that pose a risk to the powerline. Protected trees within the servitude will necessitate that appropriate permits are applied for before these trees are damaged or removed. Physical damage to natural vegetation on the periphery of the servitude, in all riparian areas and areas with steep slopes must be avoided. No hunting is permitted by Eskom employees or contractors. No incision and canalisation of the wetland features should take place. No material may be dumped or stockpiled in any “No-Go areas. All vehicles must remain on demarcated roads and within the project area footprint. All land disturbed by Eskom should be vegetated and left in the condition it was before the construction of the powerlines and no disturbed areas should be left uncovered during construction to prevent erosion.

Exemption from further palaeontological assessment is recommended. A Fossil Chance Find Procedure must be included in the EMPr.

The social mitigation and management measures include appointing a Community Liaison Officer, compiling and implementing policies for employment, conduct of employees and contractors, road use, access control specifically for protected and game reserve areas, a relocation and compensation in accordance with international best practice, strategies for community relations, communication, Corporate Social Investment, safety and security, HIV and life skills, and a grievance mechanism. A relocation specialist should be appointed should relocation be required. Construction camps should be established in accordance with international best practice, and Eskom must join local fire protection agencies and have and implement a fire fighting strategy.

A property valuer must be appointed to quantify the value impact of the powerlines along the P234 corridor for the proposed Zimanga and Manyoni Private Game Reserves.

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**ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT:
132 kV DISTRIBUTION POWERLINES
ENVIRONMENTAL IMPACT ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT
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APPENDICES**APPENDIX A: Curricula Vitae and Declaration of EAP****APPENDIX B: Surveyor General Codes for potentially impacted properties****APPENDIX C: Public Participation Process****APPENDIX D: Social Specialist Study****APPENDIX E: Agricultural Potential Specialist Study****APPENDIX F: Heritage Specialist Study****APPENDIX G: Fauna and Flora Specialist Study****APPENDIX H: Avi-fauna Specialist Study****APPENDIX I: Wetland Specialist Study****APPENDIX J: Visual Specialist Study****APPENDIX K: Economics Specialist Study****APPENDIX L: Co-ordinates of Corridors**

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LIST OF ACCRONYMS

Amafa	<i>Amafa aKwaZulu Natali</i> , KZN Provincial Heritage Resources Authority
APM	Archaeology, Palaeontology and Meteorites
BID	Background Information Document
BPA	Biodiversity Priority Areas
COGTA	Cooperative Governance and Traditional Affairs
C-Plan	Conservation Plan
CRR	Comments and Responses Report
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DPLG	Department of Provincial and Local Government
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EO	Environmental Officer
Eskom	ESKOM Holdings SOC Ltd
GIS	Geographic Information System
HIA	Heritage Impact Assessment
HRA	Heritage Resources Authority
I&AP	Interested and Affected Party
IAIA	International Association of Impact Assessment
IAIAsa	South African Affiliate of the International Association of Impact Assessment
IBAs	Important Bird Areas
IDP	Integrated Development Plan
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
KZN	KwaZulu-Natal
KZNHA	KwaZulu-Natal Heritage Act (Act No. 4 of 2008)
MDG	Millennium Development Goal
MinMec	Ministers and Members of the Executive Council
MPHRA	Mpumalanga Provincial Heritage Resources Authority
N2	National Route 2
NDP	National Development Plan

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NEMA	National Environmental Management Act (Act 107 of 1998)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act
NPAES	National Protected Areas Expansion Strategy
NPC	National Planning Commission
PGDS	Provincial Growth and Development Strategies
PICC	Presidential Infrastructure Coordinating Committee
PPP	Public Participation Process
SABAP2	South African Bird Atlas Project data
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SDF	Strategic Development Frameworks
SEA	Strategic Environmental Assessment
SHEQ	Safety, Health, Environment and Quality
SIA	Social Impact Assessment
SIPs	Strategic Integrated Projects
UN	United Nations
UNEP	United Nations Environmental Programme

LIST OF UNITS

km	Kilometre
m	Meter
kV	kilo Volts

GLOSSARY OF TERMS

- No-go area:** An area in which the Powerlines cannot be routed due to resulting significant environmental, technical and social impacts.
- Corridor:** A corridor, approximately 500 m wide for 132 kV powerlines, that is feasible for the routing of the proposed powerline which will be authorised by DEA. Within this approved corridor a final servitude will be negotiated by Eskom with individual landowners.
- Sense of place:** Defining oneself in terms of a given piece of land. It is the manner in which humans relate or feel about the environments in which they live.
- Social change process:** A discreet, observable and describable process that changes the characteristics of a society, taking place regardless of the societal context (that is, independent of specific groups, religions etc.) These processes may, in certain circumstances and depending on the context, lead to the experience of social impacts.

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Social impact: Something that is experienced or felt by humans. It can be positive or negative. Social impacts can be experienced in a physical or perceptual sense.

Study area: The area that has been covered by the EIA process within which possible substation and corridors for 132 kV and 400 kV powerlines have been investigated.

Substation: A collection of equipment for the purpose of raising, lowering and regulating the voltage of electricity.

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**ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT:
132 kV DISTRIBUTION POWERLINES
ENVIRONMENTAL IMPACT ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT**

1. INTRODUCTION

1.1 BACKGROUND

ESKOM Holdings SOC Ltd (Eskom) has commissioned a project to strengthen the supply of electricity in Northern KwaZulu-Natal (KZN). The Northern KZN network is currently fed at 132 kV by the Normandie and Impala Substations. The major load centres are Pongola and the Makhathini Flats. The Normandie Substation is situated approximately 80 km north-west of Pongola and the Impala Substation is situated approximately 180 km south of Makhathini Flats. High voltage drops are experienced in the 132 kV network and the voltages are approaching unacceptable levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network.

In order to alleviate current and future network constraints in Northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area.

1.2 PURPOSE OF THIS STUDY

The proposed project triggers several activities listed in the National Environmental Management Act (Act 107 of 1998) (NEMA) as requiring environmental authorisation before they can commence. The purpose of this study is to undertake an Environmental Impact Assessment (EIA) process, with associated Public Participation Process (PPP) and specialist studies, to enable the competent authority to decide whether the project should go ahead or not, and if so, then on what conditions.

A Basic Assessment process is required for the application for the authorisation of the 132 kV Distribution powerlines.

1.3 OBJECTIVES OF THIS REPORT

This report documents the process and findings of the Basic Environmental Assessment. This report will be subject to a public comment period after which it will be finalised and submitted to the competent authority for review.

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1.4 DETAILS OF THE APPLICANT

The applicant is **Eskom Holdings SOC Ltd** represented by the Programme Management Land Development, Mr Archibold Mogoknyana (ID 701104 5082 088).

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1.5 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

The Environmental Assessment Practitioner (EAP) undertaking this EIA is **Terry Calmeyer** from MDT Environmental (Pty) Ltd who is sub-contracted to NAKO ILISO.

Terry is certified with the Interim Certification Board as an EAP (No. 0067/05), has a MA (Environment and Society) from the University of Pretoria and over 20 years of EIA experience. She is a Past President of the South African Affiliation of the International Association of Impact Assessment (IAIAsa), serves on the Training and Professional Committee of IAIA (international) and is a member of the Environmental Law Association. She has been involved in a variety of different types of EIAs including for powerlines, substations, water supply projects, dams, roads, railway lines, waste water treatment works and airports, in South Africa, Uganda, Lesotho, Botswana, Namibia and Mozambique. She has led public participation programmes on a number of projects, and has provided strategic environmental input on transportation planning projects. Terry has also been responsible for compiling and updating Environmental Management Programmes (EMPrs), the management of Environmental Control Officers (ECOs) and Environmental Officers (EOs) and providing environmental project implementation advice. Terry has co-ordinated, lectured for and moderated examinations for several tertiary education courses and presented at external workshops and conferences.

1.6 STRUCTURE OF THIS REPORT

The location of the project is presented in **Chapter 2** and project description in **Chapter 3**. Assumptions and Limitations are presented in **Chapter 4**, legislation that is applicable is discussed in **Chapter 5** and the Need and Desirability in **Chapter 6**. Alternatives assessed are presented in **Chapter 7**. The PPP undertaken is covered in **Chapter 8**. Key issues raised in the PPP and how they were addressed in the EIA are described in **Chapter 9**. Attributes associated with the footprint are discussed in **Chapter 10**. **Chapter 11** covers the impact and risk assessment of the proposed project. Summary of findings and recommendations of specialists studies are described in **Chapter 12**. The Environmental Impact Statement is outlined in **Chapter 13**. **Chapter 14** presents aspects to be included as conditions of authorisation. A Conclusion and Recommendations is in **Chapter 15**, and references are listed in **Chapter 16**.

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1.7 COMPLIANCE WITH THE EIA REGULATIONS

Section 3 of Appendix 1 of GN R982, as amended by GN R326 gazetted on 7 April 2017, specifies the content requirements for a Basic Assessment Report. **Table 1.1** indicates how this document complies with these requirements.

Table 1.1: Regulatory content requirements for a Basic Assessment Report

Section of Appendix 1 GN R.982	Section in Basic Assessment Report	
3 (a) details of-	Section 1.5	
(i) the EAP who prepared the report;		
(ii) the expertise of the EAP, including a curriculum vitae;	Section 1.5 and Appendix A	
(b) the location of the activity, including-	Chapter 2	
(i) the 21-digit Surveyor General code of each cadastral land parcel;	Appendix B	
(ii) where available, the physical address and farm name;		
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;		
(c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Chapter 2	
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or		
(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;		
(d) a description of the scope of the proposed activity, including-	Chapter 3	
(i) all listed and specified activities triggered;		
(ii) a description of the activities to be undertaken, including associated structures and infrastructure;		
(e) a description of the policy and legislative context within which the development is proposed including	Chapter 5	
(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and	Chapter 5 and Chapter 6.2	
(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Chapter 5 and 6	
(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Chapter 6	
(g) a motivation for the preferred site, activity and technology alternative;	Chapter 7	
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including -	Chapter 7	
(i) details of all the alternatives considered;		
(ii) details of the PPP undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 8	
(iii) a summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Chapter 9	
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 10	
(v) the impacts and risks which have informed the identification of	Chapter 11	
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Section of Appendix 1 GN R.982	Section in Basic Assessment Report	
<p>each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts-</p> <p>(aa) can be reversed;</p> <p>(bb) may cause irreplaceable loss of resources; and</p> <p>(cc) can be avoided, managed or mitigated;</p>		
(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 11	
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 11	
(viii) the possible mitigation measures that could be applied and level of residual risk	Chapter 11	
(ix) the outcome of the site selection matrix;	Chapter 7	
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Not Applicable	
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Chapter 7	
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including -	Chapter 11	
(i) a description of all environmental issues and risks that were identified during the EIA process; and	Chapter 11	
(ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Chapter 11	
(i) a description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists;	Chapter 11	
<p>(j) an assessment of each identified potentially significant impact and risk, including—</p> <p>(i) cumulative impacts;</p> <p>(ii) the nature, significance and consequences of the impact and risk;</p> <p>(iii) the extent and duration of the impact and risk;</p> <p>(iv) the probability of the impact and risk occurring;</p> <p>(v) the degree to which the impact and risk can be reversed;</p> <p>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and</p> <p>(vii) the degree to which the impact and risk can be avoided, managed or mitigated;</p>	Chapter 11	
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Chapter 12	
<p>(l) an environmental impact statement which contains—</p> <p>(i) a summary of the key findings of the EIA;</p> <p>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any</p>	Chapter 13	
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Section of Appendix 1 GN R.982	Section in Basic Assessment Report
(iii) areas that should be avoided, including buffers; and a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives and the impact management outcomes for the development for inclusion in the EMPr;	
(n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Chapter 14
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 4
(p) a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Chapter 13
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	Not applicable
(r) an undertaking under oath or affirmation by the EAP in relation to— (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by I&APs and	Appendix A
(s) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable
(t) any specific information that may be required by the competent authority; and	Not applicable
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	Not applicable

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2. LOCATION OF THE PROJECT

GN 982 Appendix 1:

- (b) the location of the activity, including-
 - (i) the 21-digit Surveyor General code of each cadastral land parcel;
 - (ii) where available, the physical address and farm name;
 - (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;
- (c) a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-
 - (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or
 - (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;

The proposed powerlines are located in KZN. The uPhongola and Nongoma Local Municipalities (LM) in the Zululand District Municipality (DM) and the Jozini LM in the Umkhanyakude DM are potentially affected by the powerlines, with Pongola and Mkuze being the main towns in the study area.

The proposed project consists of the following 132 kV powerlines that will all link into the new Iphiva Sub-station (**Figure 2.1**):

1. Iphiva- Pongola (2) 132 kV Powerline
2. and 3. Iphiva/Makhathini 132 kV which may be double circuit with Iphiva/Mbazwane
4. and 5. Iphiva/Pongola (1) 132 kV Powerline to tie into existing line, which may be double circuit with Iphiva/Hluhluwe
6. 1,2 km 132 kV powerline loop-In line to Candover Switching station from existing Impala/Pongola Line. This line is temporary and will be removed once the Iphiva Sub station and new Iphiva/Normandie Line are commissioned.

The surveyor general codes are presented in **Appendix B**.

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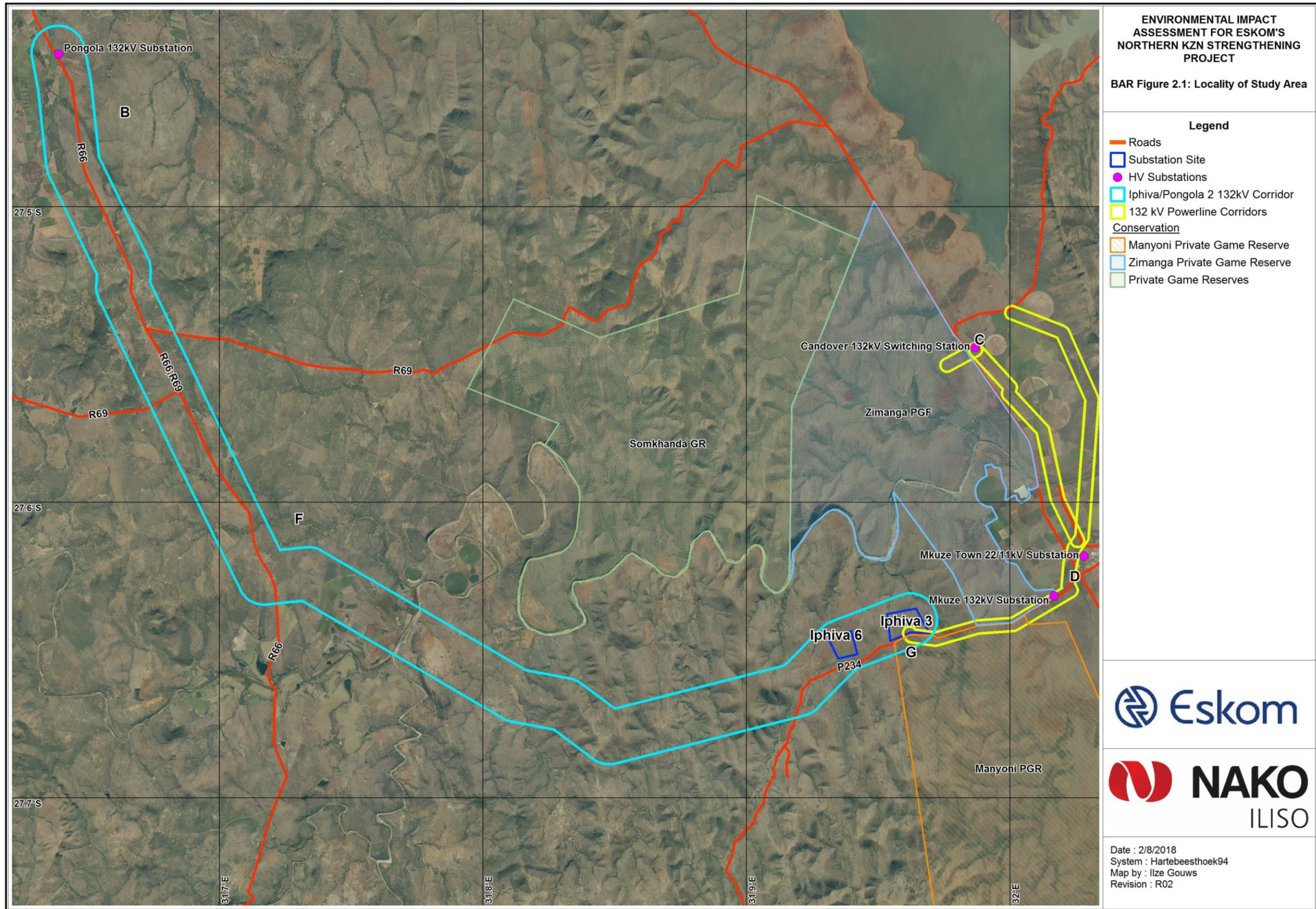


Figure 2.1: Locality of Study Area

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3. PROJECT DESCRIPTION

GN 982 Appendix 1:

- (d) a description of the scope of the proposed activity, including-
 - (i) all listed and specified activities triggered and being applied for; and
 - (ii) a description of the activities to be undertaken, including associated structures and infrastructure;

This section describes the proposed project and activities listed in the EIA Regulations 2014, as amended, that will be triggered by the project. Photographs in this section are courtesy of Bruce Burger (Eskom).

3.1 OVERVIEW OF THE ELECTRICAL NETWORK

The South African electrical power system can be broadly divided into the generators that supply the power, the Transmission system that carries the power from the generating centres to the load centres, and the distribution system that feeds the power to consumers. (Figure 3.1).

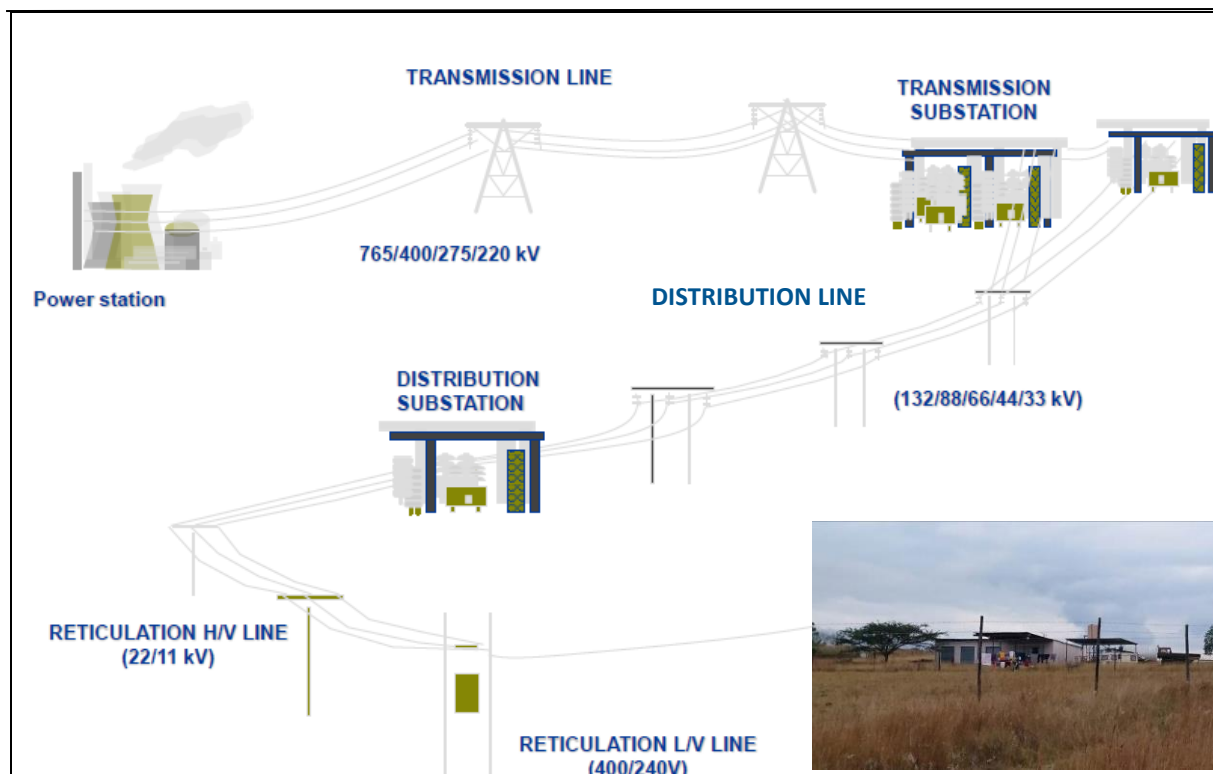


Figure 3.1: Electrical Networks

To reduce the cost of transporting bulk electricity over long distances, the electricity is transmitted at higher voltages typically 765 kV, 400 kV and 275 kV. In South Africa most of

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the load centres are situated far from the generators, therefore the voltage is stepped-up (increased) at the generation point and stepped-down (decreased) near the load. Substation transformers are used to step-up or step-down voltages to adjust the voltage along the network (long distance transmission lines to sub-transmission and distribution lines). For safety reasons power is generally distributed to consumers at lower voltages.

The electrical power system must be expanded and strengthened over time to meet the increasing demand for electricity as the new customers get connected. The current electricity requirements in Northern KZN are presently met by 132 kV sub transmission lines. The demand will exceed the transfer capability of the existing 132 kV system going forward. This will lead to thermal overloading of the infrastructure (switchgear and lines) and low network voltages in the affected area.

Thermal overloading is caused by operating the equipment beyond its rated capability. As the power run along the power system increase, the hotter the switchgear and powerlines get. This can lead to equipment failure and drooping of powerlines. The powerline can slump way below the allowable ground-to-line clearance, which could create a short circuit with nearby structures. Low voltage is a result of an inability of the network to supply the required reactive power to meet the demand. Low voltages can cause damage to motors and electrical appliances. Electricity utilities normally cut off the affected part of the network when the network experiences thermal overloading and/or low voltages to avoid cascading network failures.

The proposed new Iphiva Substation will provide the additional capacity to cater for the projected growth in demand and to ensure the system operates within the acceptable limits as stipulated in the South African Grid Code. The bulk electricity to Iphiva substation will be transmitted from Normandie substation near Piet Retief and Duma substation between Empangeni and Ulundi. The electricity will be stepped-down to 132 kV for distribution to the respective load centres via 132 kV sub transmission powerlines.

3.2 LISTED ACTIVITIES TRIGGERED BY THE PROPOSED DISTRIBUTION POWERLINES

Activities Triggered by the proposed Iphiva Substation are presented in **Table 3.1**.

Table 3.1: Listed Activities triggered by the proposed Distribution Powerlines

Listed activity as described in GN R 983 and 984	Description of project activity that triggers listed activity	
GN R. 983 (11) as amended by GN R. 327 (11): The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or	The proposed project will consists of six 132kV Distribution powerlines of varying lengths which will exit the proposed Iphiva 400/132kV Substation.	
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Listed activity as described in GN R 983 and 984	Description of project activity that triggers listed activity
<p>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</p> <p>(a) temporarily required to allow for maintenance of existing infrastructure;</p> <p>(b) 2 kilometres or shorter in length;</p> <p>(c) within an existing transmission line servitude; and</p> <p>(d) will be removed within 18 months of the commencement of development.</p>	
<p>GN R. 983 (19) as amended by GN R. 327 (19): The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from – (i) a watercourse.</p>	<p>The upgrading or construction of access roads may require the infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic meters from a watercourse.</p>
<p>GN R. 983 (28) as amended by GN R. 327 (28) Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 ha.</p>	<p>The construction of the powerlines may require the use of some land that is currently being used for agriculture and/or afforestation.</p>
<p>GN R. 985 (12) as amended by GN R. 324 (4): Clearance of an area of 300 m² or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (b) KZN: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.</p>	<p>The tower positions as well as an 8m strip along the entire servitude will be cleared of vegetation for stringing.</p> <p>Some of these areas are in KZN and in community conservation areas; within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; A protected area identified in terms of NEMPAA, excluding conservancies; Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; or Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority.</p>

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3.3 DESCRIPTION OF THE PROPOSED DISTRIBUTION POWERLINES

Six 132 kV powerlines of varying lengths will exit the proposed Iphiva 400/132 kV Substation, to, ultimately link up with the following existing and proposed 132 kV infrastructure, namely:

1. Iphiva- Pongola 2 - 132 kV powerline
2. Iphiva/Makhathini 132 kV powerline (may be double circuit with Iphiva/Mbazwane)
3. Iphiva/Mbazwane 132 kV powerline (may be double circuit with Iphiva/Makhathini)
4. Iphiva/Pongola 132 kV 1 powerline to tie into existing line (may be double circuit with Iphiva/Hluhluwe)
5. Iphiva/Hluhluwe 132 kV powerline to tie into exiting line (may be double circuit with Iphiva/Pongola 1)
6. 132 kV powerline loop-In line to Candover Substation from existing Impala/Pongola Line. This line is temporary and will be removed once the Iphiva Substation and new powerlines are commissioned.

In future 132 kV powerlines will also be required from Iphiva to Ehlanzeni and from the existing line to the Makhathini Substation to Mabazwane. These lines are not included in this application,

The EIA will assess 500 m wide corridors for each 132 kV powerlines, and a 2 km wide corridor for Iphiva-Pongola 2 (because this corridor is shared with the Normandie-Iphiva 400 kV project) within which 36 m wide servitudes will be negotiated by Eskom during the implementation of the project. A consideration is that, due to spatial constraints, two powerlines may be combined on a single set of structures where necessary and technically feasible. An eighth spare 132 kV feeder bay will be allowed for in the Iphiva Substation to make allowance for a potentially eighth 132 kV line should it be required, to exit the substation.

For the 132 kV Distribution powerlines, the height of the tower will be approximately 25-40 m and tower spacing is approximately 200 - 250 m. A combination of self-supporting and strain towers will be used.

Clearance distances apply as follows:

- Minimum vertical clearance distance between the ground and powerline conductors is 6.5 m;
- The minimum vertical clearance to any fixed structure that does not form part of the powerline is 3.8 m from the edge of the servitude;
- The minimum distance from a powerline running parallel to a proclaimed public road is 90 m from the centre line of the road servitude;
- The minimum safe distance required the edge of a domestic house is 40 m from the centre of the powerline (i.e. 18 m plus 12.5 m);
- The maximum crop height within the servitude is 4.3 m; and
- The maximum operation height under the conductors is 2.0 m.

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Examples of typical double circuit towers are shown in **Plates 1 to 3**.



Plate 1: 245A double circuit suspension tower



Plate 2: 245D Angle Strain Tower



Plate 3: 245E Terminal Tower

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3.4 CONSTRUCTION PROCESS

No staff will be accommodated on site during the construction or operation of the substation or powerlines, but will transported to site each day.

The co-ordinates of the centre line of the route and position of the towers will be determined by surveyors after a final route corridor has been approved by the environmental authorities.

The construction process consists of the following phases:

- Contractor site establishment;
- Survey and pegging of tower positions;
- Access road negotiation and construction;
- Gate installation and vegetation clearing (**Plate 4**);
- Foundation excavation and installation;
- Tower assembly and erection;
- Conductor stringing and tensioning, and
- Servitude clean-up and rehabilitation.

The exact position of the construction camps will be negotiated with the relevant landowners. Strict conditions, including the approval of the location of the construction camp by the ECO and for the use and management of resources will be set out in the EMPr and will have to be adhered to.



Plate 4: Bush cleared for vehicle access to tower sites

An 8 m wide strip directly under the position of the powerline will be cleared of all vegetation for construction purposes. Any plants that could interfere with the construction, maintenance or operation of the powerline, will be removed or trimmed in accordance with relevant legislation and the EMPr. The EMPr specifies standards to be adhered to for vegetation clearing and protected species management. This will result in a loss of flora. Once the centre line has been cleared, the tower positions will be pegged.

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A maximum of 8 m is required for Civil Engineers to access each tower position in order to conduct Geotechnical Investigations (**Figure 3.2**). This 8 m also caters for centre phase clearance. An additional 7.2 m is required to ensure that Eskom conforms to all required clearances for the outer phases. Construction vehicles drive within this 7.2 m during stringing of pilot cable for earthwire and outer conductors.

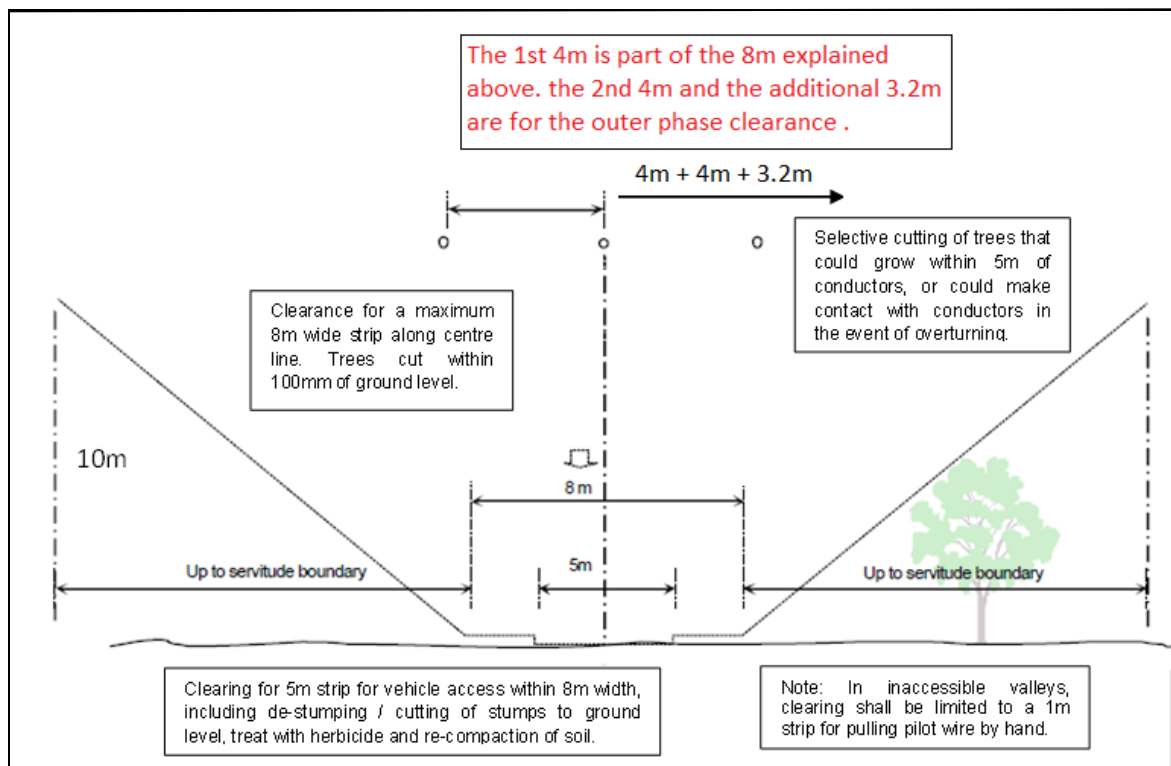


Figure 3.2: Bush Clearing required in servitudes

Vehicle access is usually required along the entire route for construction, maintenance and operation purposes. Existing roads will be used as far as possible and the construction of roads and bridges will be kept to the minimum (**Plate 5**). Access roads will all be less than 6 m wide. Any additional authorisation required (for example water use licences from Department of Water and Sanitation (DWS)) is a condition of the EMPr and will be obtained during the implementation phase of the project and prior to construction of the relevant component of the project. Any existing infrastructure will be maintained in its existing condition. Access points and roads will be negotiated with the relevant landowners.

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Plate 5: Construction/ upgrading access road

The type of foundation required for each tower is dependent on the geo-technical conditions. If the area is bushveld, then it will be cleared, but if it is grassland, then it will just be trampled by activities.

Foundations may be drilled, mechanically excavated, or dug by hand. No blasting will take place. Concrete is then placed (**Plate 6**). Helicopters may be used to transport equipment and materials if tower positions are inaccessible. Due to the costs involved, this is not the standard method of accessing the towers and line and access roads will still be used for the majority of the route.

Any incomplete excavations will be protected to prevent animals and people from injury. All foundations are back-filled, and stabilised through compaction and capped with concrete at ground level. Towers are assembled on the ground and then lifted into position by cranes or helicopters.

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Plate 6: Construction of foundations for towers

The conductor is then strung between towers by first passing a guide wire through the desired position (**Plate 7**). Cable drums (containing 2.5 km of cable, can be steel or wooden approximately 2.5 to 3 m in size) are placed at 5 km intervals in the cleared section of the servitude, and passed 2.5 km in each direction (**Plate 8**).



Plate 7: Guide wire being passed through towers

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Plate 8: Stringing

3.5 OPERATION AND MAINTENANCE

Ongoing maintenance of the powerlines will be required throughout its lifespan.

3.5.1 Line Inspections

Line inspections are usually undertaken once or twice per annum. The maintenance process encompasses the identification and correction of defects which could have detrimental effect on future line operation. This include a means of inspection, evaluation and repair of the identified defects in a reasonable period so as to prevent imminent failure, mal-operation or reduced reliability. This may be done via the access routes, or by helicopter.

3.5.2 Servitude Management

The following documents highlight the most pertinent issues in the servitude management of Distribution's overhead lines:

- Pro-active Bird Mortality Mitigation in Distribution: ENV16-R223;
- Soil Erosion Guideline: Unique Identifier 41-337;
- Vulture Electrocution Risk Areas: Distribution Technical Bulletin: 03TB-026;
- Vegetation management and Maintenance within Eskom Land, Servitudes and Rights of Way: Unique Identifier 240-70172585;
- Environmental Management of Trees and Plants in KZN OU: Document identifier KZN13THTI141;

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- Approved Bird Flight Diverters to be used on Eskom’s Lines (Mitigation Devices): Technical Bulletin 09 TB-01;
- Utilization of Bird Flight Diverters on Eskom Overhead Lines: Unique Identifier 240-03563150; and
- Covering of jumpers on MV auxiliary structures: Distribution Technical Bulletin 02TB 023.

The environmental impact due to the modification of the habitat of birds and plant species must be closely monitored to ensure that no negative influences result. In the case of birds, it could relate to increased collisions and electrocutions. The stimulation of alien or invasive species of plants should be avoided where possible.

A readily accessible servitude road facilitates quicker line patrols and maintenance. It also expedites the execution of emergency repairs. It is thus imperative for these to be properly maintained and managed. More importantly is the exposure of concrete foundations, which introduces the risk of tower collapse during high wind loading conditions. The environmental deterioration is another concern which constitutes contravention of environmental legislation. The encroachment on the right of way by settlements poses a safety risk to the public.

3.5.3 Insulators

Glass insulators in highly polluted areas should regularly be evaluated. Appropriate cleaning should be done and insulators found to be under specified in creepage for the prevailing pollution level should be replaced with units of the appropriate creepage level.

The methods of washing, whether by hand or spray washing, shall be determined by the urgency and the resources at hand. Alternatively, where regular cleaning/ washing is required at a great expense, the glass insulators should be replaced with polymeric, silicone insulators.

Insulators should be scanned with a corona camera to ascertain the extent of corona. On detection of corona activity, a program should be put in place to monitor and replace the insulators.

3.5.4 Hardware

Earthing, and line hardware should be inspected and any defects identified should be monitored and prioritised for replacement or repair. Action plans should be initiated, as a matter of priority, to ensure that imminent failures are averted.

3.5.5 Anti-climbs

Anti-climbs are essential for preventing the public (especially children) from climbing to within critical distance from live conductors. Damaged or removed anti-climbs should be replaced as soon as reasonably possible, as it constitutes a regulatory requirement on the

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part of the business. They should be affixed between 2,5 m to 3 m above ground and maintained in operable condition.

3.5.6 Foundations

Exposed foundations due to flooding or erosion, constitutes a safety hazard and should be addressed, through the rehabilitation of the surrounding soil and damaged foundations. Currently no standard or guideline exist for rehabilitation of damaged tower foundations.

3.5.7 Tower Earthing

Loose and corroded earth straps should be fixed to ensure the electrical integrity of the connection to the tower.

3.5.8 Tower corrosion protection

The painting or coating of structures must be preceded by a thorough surface preparation which encompasses, removal of loose paint, scale and rust by means of scraping or sanding, followed by washing using clean sponges and clean potable water. The specification details the procedure to be followed under various corrosive environments. It also addresses the type of coating system suited for specific applications, with recommended and approved products for use.

It is imperative that the operational lines staff are guided in the optimum application of coating systems by the relevant corrosion specialists.

3.5.9 Live Line Maintenance

Two techniques of live working have been developed on transmission voltages.

The “stick” or “distance” method utilised insulated pole and special tools and equipment to perform work on live apparatus while at ground potential. This technique is mainly used on 132 and 220 kV as the safe approach distance, and as a result the stick length, becomes impractical on the higher voltages.

For higher voltages the “bare hand” technique is used. In this method the live line worker is energised to the voltage of the live part to be worked on and physically performs the work with his hands, rather than using a stick as described earlier. Special precautions are taken to ensure an equi-potential zone around the body. Insulated aerial devices, insulated ladders as well as helicopters are used to transfer the live line worker from ground to system potential. It goes without saying that maintaining the safe approach distance at all time is critical.

Because of the risks involved, the live work environment is highly proceduralized and controlled. Strict requirements are contained in standards and procedures in the Transmission quality manual.

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A major benefit of performing live line maintenance is the increased availability obtained on a specific line due to the fact that it does not have to be switched out to perform maintenance. This reduces supply risk to customers and strengthens the system from an operational point of view. The fact that maintenance can be performed on a line when required, and not subject to outages, results in increased reliability, which results in superior performance of the line. The ability to perform live maintenance reduces and/or delays the need for capital expenditure to build new lines for redundancy in order to perform maintenance under de-energised conditions.

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4. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

GN 982 Appendix 1:

- (o) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

The objective of this assessment was to obtain authorisation for a corridor within which Eskom can negotiate a servitude within which they can design and construction 132 kV distribution powerlines. The corridors for most of the 132 kV powerlines is 500 m wide. This gives Eskom the freedom to accommodate some property specific requests from landowners to avoid local impacts. The corridor for the Iphiva-Pongola (2) 132 kV powerline is, however 2 km wide. This is because it is shared with the Normandie-Iphiva 2 corridor for a proposed new 400 kV powerline, which is the subject of a separate EIA Report. Should both the Normandie-Iphiva (2) 400 kV and Iphiva-Pongola (2) 132 kV be authorised and implemented, then Eskom Distribution and Eskom Transmission must co-ordinate implementation to ensure the best practical environmental option of both powerlines in the same corridor. This could include the option of multi-circuit towers.

This approach to the impact assessment and its role and stage in the project implementation process results in the exact servitude or tower positions not being known at this stage. This causes some difficulties with a strict interpretation of the EIA Regulations.

Each specialist lists their assumptions, uncertainties and gaps in knowledge in their specialist study reports (**Appendix D to K**).

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5. POLICY AND LEGISLATIVE CONTEXT

GN 982 Appendix 1:

(e) a description of the policy and legislative context within which the development is proposed including -

- (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and
- (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;

5.1 LEGISLATION APPLICABLE TO THIS EIA

Table 5.1: Legislation of relevance to the EIA

Legislation	Applicable Legislative Requirements	Implications for the Applicant
Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996)	Section 24 – Environmental Rights	<p>Everyone has the right to –</p> <p>An environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that –</p> <ul style="list-style-type: none"> • Prevent pollution and ecological degradation, • Promote conservation, • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. <p>The Constitution sets in place all laws of the country and the Applicant should note the protection of the environment in the Bill of Rights, especially in relation to justifiable economic and social development.</p>
Constitution of the Republic of South Africa Amendment Act, 1997 (Act 35 of 1997)	Section 33 – Access to Information	<p>Everyone has the right to administrative action that is lawful, reasonable and procedurally fair.</p> <p>Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons.</p> <p>The provisions of NEMA and its Regulations dictate the manner in which environmental authorisation processes are undertaken, decisions made, and the appeal process; all of which are applicable to the current application.</p>
	Section 32 – Administrative Justice	<p>Everyone has the right of access to:</p> <ul style="list-style-type: none"> • Any information held by the state (unless it is information that is explicitly excluded by the Promotion of Access to Information Act, 2000 (Act 2 of 2000), • Any information held by another person and that is required for the exercise or protection of any rights. <p>The Applicant will need to make information available to the public if requested.</p>

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
	Section 38 Enforcement of Rights and Administrative Review	Section 38 of the Constitution guarantees the right to approach a court of law and to seek legal relief in the case where any of the rights that are entrenched in the Bill of Rights are infringed or threatened.
NEMA	<p>Section 2</p> <p>Chapter 1</p> <p>Chapter 5</p> <p>Chapter 6</p>	<p>NEMA states that the State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the needs of previously disadvantaged communities. It states further that sustainable development requires the integration of social, economic and environmental factors in the planning, evaluation and implementation of decisions to ensure that development serves present and future generations.</p> <p>Chapter 1 of NEMA contains a list of principles and states clearly that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests (NEMA, 1998). It states further that negative impacts on the environment and on peoples' environmental rights must be anticipated and prevented, and if they cannot be prevented, they should be minimised and remedied. It elaborates further on the equity of impacts, and the fact that vulnerable communities should be protected from negative environmental impacts. It refers to the principle that everyone should have equal access to environmental resources, benefits and services to meet their basic human needs (NEMA, 1998). Therefore, there is a clear mandate for environmental and restorative justice in the act.</p> <p>Chapter 5 of the NEMA aims to promote the use of appropriate environmental management tools, such as an EIA, in order to ensure the integrated environmental management of activities.</p> <p>The general objective of integrated environmental management, as described in NEMA, is to identify, predict and evaluate the impacts of an activity on the social, economic, bio-physical and cultural components of the environment. This assessment includes the risks associated with activities, consequences of the activities as well as considering alternatives and mitigation measures to avoid, minimise or compensate for negative impacts, maximise benefits, and promote compliance with the principles of environmental management as set out in section 2 of NEMA. This is implemented by requiring environmental authorisation for activities that are "listed" in the EIA Regulations, 2014.</p> <p>The purpose of this EIA is to assess the components of this proposed project that are NEMA listed activities for which Eskom has the mandate and intention to implement. The EIA process will provide the information that the environmental authorities require to decide whether the project should be authorised or not, and if so then with what conditions.</p> <p>In terms of public participation NEMA states that people should be empowered to participate in the environmental governance processes, and that their capacity to do so should be developed if it does not exist. All decisions regarding the environment should take the needs, interest and values of the public into account, including traditional and ordinary knowledge. Chapter 6 of NEMA elaborates on the public participation requirements and is supplemented by the EIA regulations. GN 982 provides requirements for the public participation, the minimum legal requirements for PPP, the generic steps of a PPP, requirements for planning a PPP and a description of the roles and responsibilities of the various role players.</p> <p>The principles NEMA also state that community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, sharing of environmental knowledge and experience and any other appropriate means. It states that the social, environmental and economic impacts of activities, including disadvantages and</p>

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
		<p>benefits, must be considered, assessed and evaluated, and decisions taken must be appropriate given the assessment and evaluation. NEMA recognises that the environment is held in public trust for the people, and therefore the beneficial use of environmental resources must serve the peoples' interest and protect the environment as the peoples' common heritage.</p> <p>NEMA takes a holistic view of the environment, and promotes the consideration of social, economic and biophysical factors to obtain sustainable development and achieve effective management of the biophysical environment.</p>
National Environmental Management: Air Quality Act (Act 39 of 2004)	Sections 21 and 37	<p>National Ambient Air Quality Standards GNR 1210 dated 24 December 2009.</p> <p>GNR 893 in Government Gazette 37054 dated 22 November 2013, listing activities and associated minimum emission standards identified in terms of section 21 of the Air Quality Act.</p> <p>Declaration of temporary Asphalt Plants as controlled emitters and establishment of emission standards, in GNR 201 in Government Gazette No 37461 dated 28 March 2014.</p> <p>National Dust Control Regulations, in GNR 827 in Government Gazette 36974 dated 1 November 2013.</p> <p>Activities include Macadam preparation (the mixing of aggregate and tar or bitumen to produce road surfacing in permanent facilities and mobile plants). These activities require an Atmospheric Emission Licence in terms of Section 37 of the Act.</p>
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA)	Chapter 4	<p>NEMBA expresses the commitments that South Africa made in approving the Convention on Biological Diversity. The Act aims at resolving the fragmented nature of biodiversity-related legislation that occurred at national and provincial levels by combining different laws and giving effect to the principle of co-operative governance, and at the same time responding to commitments made under the Convention on Biological Diversity (DEA (LGS)).</p> <p>In line with the objectives of the Convention on Biological Diversity, NEMBA provides for:</p> <ul style="list-style-type: none"> • Management and conservation of South Africa's biodiversity within NEMA's framework; • Usage of indigenous biological resources in a sustainable manner; • Fair and equitable sharing among stakeholders of the benefits arising from bio-prospecting involving indigenous biodiversity; • Protection of species and ecosystems that warrant national protection; and • Establishment and functions of the South African National Biodiversity Institute (SANBI). <p>NEMBA restricts activities involving listed threatened or protected species.</p> <p>In addition, the Alien and Invasive Species Regulations (GNR 506 of 2013), promulgated in terms of Section 97(1) of NEMBA apply, as well as the Alien Invasive Regulations (2014) and Alien and Invasive Species Lists (2016).</p> <p>The purpose of this Chapter is to-</p> <p>(a) provide for the protection of ecosystems that are threatened or in need of protection to ensure the maintenance of their ecological integrity; and</p>

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
National Environmental Management Protected Areas Act, 2003 (Act No. 57 of 2003) (NEMPAA)		<i>(b)</i> provide for the protection of species that are threatened or in need of protection to ensure their survival in the wild.
	Section 17	<p>The purposes of the declaration of areas as protected areas are-</p> <ul style="list-style-type: none"> (a) to protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected areas; (b) to preserve the ecological integrity of those areas; (c) to conserve biodiversity in those areas; (d) to protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa; (e) to protect South Africa's threatened or rare species; (f) to protect an area which is vulnerable or ecologically sensitive; (g) to assist in ensuring the sustained supply of environmental goods and services; (h) to provide for the sustainable use of natural and biological resources; (i) to create or augment destinations for nature-based tourism; (j) to manage the interrelationship between natural environmental biodiversity, human settlement and economic development; (k) generally, to contribute to human, social, cultural, spiritual and economic development; or (l) to rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species
	Section 23	<p>(1) The Minister or the MEC may by notice in the <i>Gazette</i>-</p> <ul style="list-style-type: none"> (a) declare an area specified in the notice- <ul style="list-style-type: none"> (i) as a nature reserve; or (ii) as part of an existing nature reserve; and (b) assign a name to the nature reserve. <p>(2) A declaration under subsection (1)(a) may only be issued-</p> <ul style="list-style-type: none"> (b) to protect the area if the area- <ul style="list-style-type: none"> (i) has significant natural features or biodiversity; (ii) is of scientific, cultural, historical or archaeological interest; (iii) is in need of long-term protection for the maintenance of its biodiversity (c) to provide for a sustainable flow of natural products and services to meet the needs of a local community (d) to enable the continuation of such traditional consumptive uses as are sustainable; or (e) to provide for nature-based recreation and tourism opportunities.
Section 41	<p>(1) The object of a management plan is to ensure the protection, conservation and management of the protected area concerned in a manner which is consistent with the objectives of this Act and for the purpose it was declared.</p> <p>(2) A management plan must contain at least-</p>	

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
	<p>Section 50 (1) & (2)</p> <p>Section 50 (5)</p> <p>Section 86 1(d)</p>	<p>(a) the terms and conditions of any applicable biodiversity management plan;</p> <p>(b) a co-ordinated policy framework;</p> <p>(c) such planning measures, controls and performance criteria as may be prescribed</p> <p>(d) a programme for the implementation of the plan and its costing;</p> <p>(e) procedures for public participation, including participation by the owner (if applicable), any local community or other interested party;</p> <p>(f) where appropriate, the implementation of community-based natural resource management; and</p> <p>(g) a zoning of the area indicating what activities may take place in different sections of the area, and the conservation objectives of those sections.</p> <p>(3) A management plan may contain</p> <p>(a) development of economic opportunities within and adjacent to the protected area in terms of the integrated development plan framework;</p> <p>(b) development of local management capacity and knowledge exchange;</p> <p>(c) financial and other support to ensure effective administration and implementation of the co-management agreement; and</p> <p>(d) any other relevant matter.</p> <p>(1) The management authority of a nature reserve and world heritage site may, despite any regulation or by-law referred to in section 49, but subject to the management plan of the reserve or site-</p> <p>(a) carry out or allow-</p> <p>(i) a commercial activity in the reserve or site; or 25</p> <p>(ii) an activity in the reserve or site aimed at raising revenue;</p> <p>(b) enter into a written agreement with a local community inside or adjacent to the reserve or site to allow members of the community to use in a sustainable manner biological resources in the reserve or site.</p> <p>(2) An activity allowed in terms of subsection (1) (a) or (b) may not negatively affect the survival of any species in or significantly disrupt the integrity of the ecological systems of the nature reserve or world heritage site.</p> <p>No development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority.</p> <p>The Minister may make regulations that are not in conflict with this Act-</p> <p>(d) prohibiting or restricting-</p>

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	Section 88 (2)	<p>(i) activities that have an adverse effect in protected areas;</p> <p>(ii) the use of biological resources in protected areas and</p> <p>(iii) land uses in protected areas that are harmful to the environment.</p> <p>Regulations made under section 86 or 87 may provide that any person who contravenes or fails to comply with a provision thereof is guilty of an offence and liable on conviction to a fine or to imprisonment for a period not exceeding five years or to both a fine and such imprisonment.</p>
National Water Act No 36 of 1998 (NWA)	Section 21 GN R. 509 of 2016	<p>The construction of the proposed substation and powerlines and associated activities involves a number of water uses listed in terms of the NWA, and therefore requires a Water Use Licence.</p> <p>The General Authorisation gazette in GN R. 509 in August 2016 says that 6 (2) “<i>All State Owned Companies (SOC’s), and other institutions specified in Appendix D2 having lawful access to that property or land may on that property use water in terms of section 21 (c) or (i) of the Act as specified under each of the relevant SOC’s and other institution (Appendix D2)</i>”.</p> <p>Appendix D2 says that ESKOM may undertake the construction of new transmission and distribution powerlines, and minor maintenance of roads, river crossings, towers and substations where the footprint will remain the same.</p> <p>If the construction of the substation triggers a water use, then it is not covered by the GA.</p> <p>The following water uses could apply: s21 (a): taking water from a water resource; s21 (b): storing of water; s21 (c): impeding or diverting the flow of water in a water course; s21 (e): engaging in a controlled activity (i.e. the generation of hydropower); s21 (i): altering the bed, banks, course or characteristics of a water course, s21 (f): discharge of waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit; and s21 (g): disposing of waste in a manner which may detrimentally impact on a water resource.</p> <p>Registration of water use and the application for any water use licences are not included in the EIA.</p>
National Heritage Resources Act 25 of 1999 (NHRA)	Section 5. General principles for Heritage Resources Management Section 6. Principles for management of heritage resources Section 7. Heritage assessment criteria and grading Section 38. Heritage	<p>The Act requires that Heritage Resources Authorities (HRAs), in this case the South African Heritage Resources Agency (SAHRA), KZN Provincial Heritage Resources Authority, <i>Amafa aKwaZulu Natali</i> (Amafa), and Mpumalanga Provincial Heritage Resources Authority (MPHRA) be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act.</p> <p>The activities that apply to the proposed project include: 38(1)(a) - The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; 38(1)(c) - Any development or other activity which will change the character of a site exceeding 5 000 m2 in extent; or</p>

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	resources management	<p>Involving three or more existing erven or sub-divisions thereof; or involving three or more erven or sub-divisions thereof which have been consolidated within the past five years; and 38(1)(d) - The rezoning of a site exceeding 10 000 m² in extent.</p> <p>A Needs and Desirability Application (NDA) and Notification of Intent to Develop (NID) will be submitted, as part of this HRM process, to Amafa and SAHRA and MPHRA respectively. A Heritage Impact Assessment (HIA) will be compiled to comply with subsection 3(3)(a) and (b) of the NHRA.</p>
KZN Heritage Act, 2008 (Act no. 4 of 2008) (KZNHA)		<p>The KZNHA provides for the protection and management of heritage resources within KZN. These heritage resources take account of those under general protection and special protection, including:</p> <ul style="list-style-type: none"> • General protection: <ul style="list-style-type: none"> • Structures under Section 33; • Graves of victims of conflict under Section 34; • Traditional burial places under Section 35; and • Battlefields, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites under Section 36. • Special Protection: <ul style="list-style-type: none"> • Heritage Landmark under Section 38; • Provincial Landmark under Section 39; • Graves of members of the Royal Family under Section 40; • Battlefield sites, public monuments and memorials under Section 41; and • Heritage Objects under Section 43. <p>In terms of the KZNHA, a permit is required to carry out certain listed activities. To accomplish this, a NDA form must be completed for any proposed development. This form is submitted to Amafa for processing after which Amafa will issue comments for further heritage studies, if necessary.</p> <p>A NDA will be submitted, as part of the HRM process, to Amafa and SAHRA. An HIA will be compiled to comply with subsection 3(3)(a) and (b) of the NHRA. The NDA was compiled to comply with the KZNHA and subsection 38(1) of the NHRA.</p>
National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)	GN 921	<p>GN 921 lists Waste Management Activities in respect of which a Waste Management Licence (WML) is required. These include various activities associated with the storage of waste, reuse, recycling and recovery of waste, treatment of waste (which includes the remediation of contaminated land) and disposal of waste. The Schedule to the Notice distinguishes between two categories of waste management activities which require licensing and for which a basic assessment process (for Category A Waste Management Activities) or an EIA process (for Category B Waste Management Activities) must be conducted. A third category (Category C) refers to activities for which norms and standards have been set.</p> <p>Construction activities usually result in general as well as hazardous waste.</p> <p>WMLs are required for, amongst others:</p>

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
		<ul style="list-style-type: none"> • The storage of general or hazardous waste in lagoons; • The disposal of inert waste to land in excess of 25 tons; • The disposal of any hazardous waste to land; • The disposal of general waste to land covering an area of more than 50 m² and • The disposal of domestic waste generated on premises in areas not serviced by the municipal service where the waste disposed exceeds 500 kg per month. <p>Schedule 3 of the NEMWA, as amended, defines "general waste" as waste that does not pose an immediate hazard or threat to health or to the environment, and includes:</p> <p>(a) domestic waste;</p> <p>(b) building and demolition waste;</p> <p>(c) business waste; and</p> <p>(d) inert waste; or</p> <p>(e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within business, domestic, inert, building and demolition wastes as outlined in Schedule 3 of the Act.</p> <p>Where</p> <p>"building and demolition waste" means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition; and includes discarded concrete, bricks, tiles and ceramics, discarded wood, glass and plastic, discarded metals, discarded soil, stones and dredging spoil and "other" discarded building or demolition wastes.</p> <p>"inert waste" means waste that—</p> <p>(a) does not undergo any significant physical, chemical or biological transformation after disposal;</p> <p>(b) does not burn, react physically or chemically biodegrade or otherwise adversely affect any other matter or environment with which it may come into contact; and</p> <p>(c) does not impact negatively on the environment, because of its pollutant content and because the toxicity of its leachate is insignificant and which include discarded concrete, bricks, tiles and ceramics, discarded glass and discarded soil, stones and dredging spoil, as listed in Schedule 3 of the Act.</p> <p>A WML may be required for the settling ponds that will be used to capture runoff from the batching and crusher plants (Activity (1) of Category A: Storage of general waste in lagoons).</p> <p>No WML Applications are included in this EIA process and if applications are required, they will have to be applied for separately.</p>
National Forest Act, 1998 (Act 84 of 1998)		Trees may have to be disturbed, damaged or destroyed/removed to make way for the new infrastructure. If those trees are protected a licence must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF).
KZN Nature		Certain indigenous plant and animal species in KZN are provided with special protection under the KZN Nature Conservation

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
Conservation Ordinance , 1974 (Act No. 15 of 1974)		<p>Ordinance and permits are required from Ezemvelo KZN Wildlife (Ezemvelo) for their removal, destruction or translocation.</p> <p>The proposed project may affect some indigenous species which are protected. This will only be confirmed on the sub-station site once the layout is finalised and during the walk-down of the transmission and distribution line routes by the specialists.</p>
The Infrastructure Development Act (Act no. 23 of 2014)		<p>The Infrastructure Development Act provides for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic; to ensure that infrastructure development in the Republic is given priority in planning, approval and implementation; to ensure that the development goals of the State are promoted through infrastructure development; to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation and operations. The Act commenced on 10 July 2014.</p> <p>The Presidential Infrastructure Coordinating Commission (PICC) and structures of the Commission are established in terms of this Act. Strategic integrated projects (SIPs), which are projects of significant economic or social importance to the country or a region in the country, or which facilitate regional economic integration on the African continent, are identified and implemented in terms of this Act.</p> <p>Section 15 states that when the Steering Committee of a SIP has identified the approvals, authorisations, licences, permissions and exemptions required to enable the implementation of the SIP, it shall inform, without any delay, the applicant to submit all applications simultaneously to allow for concurrent consideration by the persons authorised by the relevant laws to take the applicable decisions. A member of the Steering Committee must monitor the processing of the application and report to the Steering Committee any undue delays and regulatory concerns emerging for exploration or consideration of solutions thereto.</p> <p>Section 18 concerns environmental assessments specifically and states that whenever an environmental assessment is required in respect of a SIP, such assessment must be done in terms of the NEMA, with specific reference to Chapter 5.</p> <p>Time frames are stipulated in Schedule 2 and may not be exceeded without written approval. Schedule 2 refers to “project plans”, “applications” and “mitigation plans” that are not defined in the Act. It is not clear how these apply to the EIA process.</p>
KZN Planning and Development Act, 2008 (Act 6 of 2008) (SPLUMA)		<p>The SPLUMA came into force on 1 July 2015 and replaces the KZN Planning and Development Act, 2008. However, the two will run in parallel until each Local Municipality has set up the structures required by SPLUMA.</p> <p>In terms of the current KZN Planning and Development Act, 2008, Eskom will need to submit a Planning and Development Application (PDA) to the Local Municipalities. This application will need to meet all the requirements of legislation. Important</p>

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Legislation	Applicable Legislative Requirements	Implications for the Applicant
		<p>aspects will include planning considerations, and compliance with the municipality's Integrated Development Plan and Spatial Development Framework.</p> <p>The exact requirements will depend on the timing of Eskom's application to the Municipalities and the status of the legislation and by-laws currently applicable at the time in the local municipality.</p>
Promotion of Administrative Justice Act 3 of 2000		<p>The Bill of Rights in the Constitution of the Republic of South Africa 1996 states that everyone has the right to administrative action that is legally recognised, reasonable and procedurally just. The Promotion of Administrative Justice Act (PAJA) 3 of 2000 gives effect to this right. The PAJA applies to all decisions of all State organisations exercising public power or performing a public function in terms of any legislation that negatively affects the rights of any person. The Act prescribes what procedures an organ of State must follow when it takes decisions. If an organ of State implements a decision that impacts on an individual or community without giving them an opportunity to comment, the final decision will be illegal and may be set aside. PAJA also forces State organisations to explain and give reasons for the manner in which they have arrived at their decisions and, if social issues were involved, how these issues were considered in the decision-making process.</p> <p>PAJA therefore protects the rights of communities and individuals to participate in decision-making processes, especially if these processes affect their daily lives.</p>
Bylaws		<p>All bylaws of the local and district municipalities traversed will apply to the project. The uPhongola and Nongoma Local Municipalities in the Zululand District Municipality and the Jozini Local Municipality in the Umkhanyakude District Municipality are potentially affected by the powerlines</p>

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5.2 GUIDELINES CONSIDERED

- DEAT Integrated Environmental Management Information Series 1-5 and 12-15
- NEMA draft Implementation Guideline
- Western Cape DEA and Development Planning NEMA EIA Regulations Guideline and Information Document Series – Guideline on Public Participation (2007)
- IAIA guidelines
- DEA (2017), Guideline on Need and Desirability, (DEA), Pretoria, South Africa (ISBN: 978-0-9802694-4-4)
- Public Participation Guideline published in 2012 (GN 807 of 10 October 2012) in terms of section J of NEMA (NEMA, 1998).
- According to the guidelines, public participation can be seen as one of the most important aspects of the environmental authorisation process. Public participation is the only requirement of the EIA process for which exemption cannot be given, unless no rights are affected by an application. This stems from the requirement in NEMA that people have a right to be informed about potential decisions that may affect them and that they must be given an opportunity to influence those decisions.
- SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007). The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA Report. Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment. The HRM process will be completed to adhere to the minimum standards as defined by Chapter II of the SAHRA APM Guidelines (2007).
- Guidelines for Biodiversity Impact Assessments in KZN, 2003 (February 2013, Ezemvelo).
- International Union for the Conservation of Nature (IUCN) Red List (IUCNRedList.org 2016-2).
- Department KZN Biodiversity Conservation Plan (C-Plan) (Updated 2011).

5.3 NATIONAL AND INTERNATIONAL STANDARDS

National and international industry standards aimed at sustainable development and social justice specifically have become abundant in the last decade. Many industries use these standards as indicators for good practice. The discussion below highlights only a few of these standards.

5.3.1 ISO 26000:2010/SANS 26000:2010

Performance standards have long been a voluntary tool used by industry to achieve certain outcomes. The first standard on social responsibility, ISO 26000 was published on 1 November 2010 (ISO, 2010). It was developed using a multi-stakeholder approach involving experts from more than 90 countries and 40 international or broadly based regional organisations involved in different aspects of social responsibility (ISO, 2010).

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The South African Bureau of Standards (SABS), a statutory body that is mandated to develop, promote and maintain South African National Standards (SABS, [sa]) adopted the ISO 26000 Standard as a South African National Standard (SANS) 26000:2010.

ISO 26000 is discussed in the Social Scoping Report (**Appendix D**).

5.3.2 International Social Performance Standards/Initiatives

There is a profusion of global initiatives aiming at assisting companies to make their operations more sustainable. The most frequently used in the EIA industry is the International Finance Corporation’s (IFC) principles (IFC, 2012). The IFC is a member of the World Bank group, and as a part of their sustainability framework they created performance standards on environmental and social sustainability (IFC, 2012). The standards relevant to the social environment are the following:

1. Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
2. Performance Standard 2: Labour and Working Conditions
3. Performance Standard 4: Community Health, Safety, and Security
4. Performance Standard 5: Land Acquisition and Involuntary Resettlement
5. Performance Standard 7: Indigenous Peoples
6. Performance Standard 8: Cultural Heritage (IFC, 2012).

Issues such as gender, climate change, water and human rights are addressed across the standards. A guidance note accompanies each standard (IFC, 2012:4). Environmental and social risks and impacts must be managed by using an Environmental and Social Management System. The standard applies to all the activities funded by the IFC for the duration of the loan period. A number of private banks adopted most of the IFC standards in an initiative known as the Equator Principles (Esteves, Franks & Vanclay, 2012).

5.4 ESKOM POLICY DOCUMENTS

5.4.1 Control Plans for Alien Invasive Species (AIS)

Government Notice Regulation (GNR) 598 of 2014, Alien and Invasive Species Regulations requires that Eskom as a landowner is legally obliged to clear its properties of alien invasive species. As such, Eskom is required by law to firstly determine if Alien Invasive Species (AIS) are present on its property and if so, as per the listed category, control them so as to prevent them invading outside that property. AIS are one of the initiatives set out on the Eskom’s Biodiversity Implementation Plan (Eskom Biodiversity Implementation Plan, 2017).

Alien invasive plant species on land under linear infrastructure is addressed by the National Vegetation Management Commodity Strategy. The updated AIS list as per the most recent legislation is incorporated into the vegetation maintenance schedule going forward.

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As a priority, Eskom Real Estate, Generation Peaking and Nuclear have in place AIS Control Plans for all conservation sites. Some Power Stations do possess site specific Vegetation Assessments which need to be aligned to the Control Plan requirements (Eskom Biodiversity Implementation Plan, 2017).

Eskom 5-year Alien Invasive Control Plan is compiled for submission to DEA as an overarching framework to implement AIS regulations in accordance with Eskom’s operational risk and supporting finances, capacity and resources. The plan includes:

- Implementation of AIS Control Plan as per priority land specified;
- Training – Engaging with DEA’s preferred suppliers and providing Eskom environmental practitioners with the relevant training of identification, effective control methodologies per species etc.;
- On the ground implementation – Setting up a national Memorandum of Understanding with Working for Water to initiate provincial collaborations;
- Spatial Support – ensuring Eskom practitioners have access to the most updated spatial data layers to inform their planning of AIS control on their sites; and
- Collaboration with DEA /other parastatals on large scale projects (Eskom Biodiversity Implementation Plan, 2017).

5.4.2 Waste Management

The need for a Waste Management Plan is to manage waste holistically in the Distribution’s KZN Operating Unit to avoid or minimize legal, financial, environmental and reputational risks to the Operating Unit. In line with Eskom, the KZN Operating Unit supports government’s commitment to waste reporting and tracking as one of the means of upholding the environmental rights of South Africans and as required by legislation and international agreements. In support of Eskom’s Safety, Health, Environment and Quality (SHEQ) Policy and legislative requirements, it is essential that waste is reported and tracked regularly in line with Eskom’s Waste-reporting Requirements, contained in Eskom Waste Management Procedure (Waste Management in the KZN Operating Unit, 2017).

A generic plan applying to the KZN Operational Unit is used; sites use the plan to create site specific plans compliant to the relevant municipalities in which they operate. Environmental Advisors in consultation with the sites determine the Local Municipality requirements and submit Waste Management Plans where required (Waste Management in the KZN Operating Unit, 2017).

5.4.3 Vegetation Management within Eskom Land, Servitudes and Rights of Way

The Vegetation Management within Eskom Land, Servitude and Rights of Way (Unique Identifier 240-70172585) approved in November 2013 is a standard that specifically deal with vegetation management, specifying general requirements and servitude widths. It sets out the manner in which initial servitude route clearing, and any subsequent vegetation maintenance is to be performed. It sets minimum standards for vegetation clearing and maintenance.

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This standard excludes servitudes in commercial forestry areas where Eskom is guided by the draft Timber Growers Agreement.

Eskom's policy is to leave the vegetation in servitudes alone unless it impacts on safe clearance, prevents access to the servitude, poses a fire risk or there is a legal imperative to manage it. For 132 kV powerlines an 8 m clearance on either side of the centre line will be cleared.

5.4.4 Environmental Management of Trees and Plants in KZN

Eskom's Technical Instruction on the Environmental Management of Trees and Plants in KZN (Document Identifier KZN13TGI141) was compiled to manage legal, financial and reputational risks associated with tree cutting incidents by contractors.

Indigenous trees in a natural forest are often habitats (or islands of biodiversity) for an array of species, such as birds, insects, reptiles, small mammals, etc. Trees also fulfil an aesthetic, cultural and a sentimental function for individuals and local communities, e.g. a tree used by indigenous peoples as a meeting point, or trees planted to beautify a property. Trees are often removed (cut, trimmed/pruned) during the construction of electrical infrastructure such as powerlines and substations. Trees encroaching into servitudes, causing dangerous safety hazards and quality of supply problems, also need to be trimmed (pruned) or cut regularly.

In compliance with this technical instruction, the flora specialist will identify the need for any indigenous trees in a natural forest, protected trees, threatened or protected species and specially protected indigenous plants to be trimmed or cut, during the walk-down of the servitude, once negotiated. The necessary tree permits must be obtained prior to commencement of any work in the specific area or section of powerline that has such trees/plants.

Eskom will identify the need for bush clearing or tree cutting or pruning/trimming from line patrols during the Operational Phase. The necessary licences must be obtained from DAFF and/or permits from Ezemvelo. The Vegetation Management Contractor has the right to refuse to undertake work that will cause serious environmental damage e.g. removal or damage of indigenous trees in a natural forest, protected trees, threatened or protected species and specially protected indigenous plants, if no licence or permit is available. Eskom must also familiarise her/himself with the conditions of the DAFF license and Ezemvelo permit (where applicable). Eskom must also ensure compliance to conditions of the license and/or permit by the Contractor, before invoices are signed off for payment to Vegetation Management Contractors.

Eskom staff must avoid informing customers/landowners that the delay in supply or maintenance of the line is due to trees or the awaiting of the tree licence and/or permits from authorities, in such a manner that the customer/landowner is motivated to remove the trees her/himself. Eskom must advise customers that should any customer/landowner cut

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protected and indigenous trees without the necessary tree licence and/or permit, DAFF will stop the project for a full investigation and the customer/landowner will be liable for criminal charges; this is likely to delay the supply or the maintenance of the line even more.

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6. NEED AND DESIRABILITY

GN 982 Appendix 1:

- (f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;
- (g) a motivation for the preferred site, activity and technology alternative;

6.1 GENERAL PURPOSE AND REQUIREMENT FOR THE PROJECT

Various substations being fed from Normandie 400 kV Transmission Substation are experiencing low voltages on the 132kV busbars which are well below acceptable limits (0.95 p.u). These Distribution Substations include Candover, Makhathini, Nondabuya, Ndumo and Mkuze. With the current electrification load growth in the areas around the listed substations and Gezisa Substation establishment, the busbar voltages will further drop below minimal acceptable limits until the system collapses. The Normandie Substation is not completely backfeedable. A loss of either the Normandie-Vergenoeg 132 kV line or the Normandie-Pongola 132 kV line will result in load being shed.

Currently the Impala-Nseleni 132 kV line is loaded to beyond 90 % of its capacity with Mtubatuba and Hluhluwe experiencing low HV Busbar voltages in the year 2019 and beyond due to an increase in both electrification and industrial load. The Impala Substation is not backfeedable. A loss of the Impala-Nseleni line will result in load being shed (approximately 44 000 customers).

With the establishment of Iphiva 400-132 kV Substation together with the seven 132 kV lines evacuating power from the substation. The following benefits will be experienced:

- Increases in all SS HV Busbar Voltage Levels to above 1 p.u;
- Transformer Taps Reduce throughout the system (fewer lockouts);
- Accommodates Load Growth for both electrification and industrial loads; and
- 100% Back-feeding possible during the loss of Normandie-Pongola, Normandie-Vergenoeg and Impala-Nseleni 132 kV lines.

6.2 STRATEGIC AND STATUTORY CONTEXT FOR THE CONSIDERATION OF NEED AND DESIRABILITY

DEA (2017), Guideline on Need and Desirability, Guideline on Need and Desirability, says that when evaluating project specific applications, the strategic context of such applications and the broader societal needs and the public interest should be considered. The contents of Municipal Integrated Development Plans (IDP), Strategic Development Frameworks (SDF), Environmental Management Frameworks (EMF) and other relevant plans frameworks and strategies must be taken into account. Whether a proposed activity will be in line with or deviate from the plan, framework or strategy per se is not the issue, but rather the ecological, social and economic impacts that will result because of the alignment or

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deviation”. Where an application deviates from a plan, framework or strategy the EIA must show why the deviation might be justifiable.

The DEA 2017 Guideline on Need and Desirability says that the need for and desirability of a proposed activity should specifically and explicitly be addressed throughout the EIA process when dealing with individual impacts and specifically in the overall impact summary by taking into account the answers to *inter alia* the questions in **Table 6.1**.

Table 6.1: Questions from DEA 2017 Need and Desirability Guideline Document

	Question in guideline document	Response
1.	How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?	See Sections 11.4.1 to 11.4.3 (refer to summaries of the Fauna and Flora, Avifauna and Wetlands Specialist Studies.
2.1	What is the socio-economic context of the area, based on, amongst other considerations, the following considerations: 2.1.1. The IDP (and its sector plans’ vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area, 2.1.2. Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.), 2.1.3. Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and 2.1.4. Municipal Economic Development Strategy (“LED Strategy”).	IDPs are discussed in Section 6.2.5 .
2.2	Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area? 2.2.1. Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?	See 11.4.6 and 11.4.8.
2.3	How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?	See section 12.6.
2.4	Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?	Yes.
2.5	In terms of location, describe how the placement of the proposed development will: 2.5.1. result in the creation of residential and employment opportunities in close proximity to or integrated with each other,	No new residential areas will be created as a result of the proposed new powerlines. Limited job opportunities will

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	Question in guideline document	Response
	<p>2.5.2. reduce the need for transport of people and goods,</p> <p>2.5.3. result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</p> <p>2.5.4. compliment other uses in the area,</p> <p>2.5.5. be in line with the planning for the area,</p> <p>2.5.6. for urban related development, make use of underutilised land available with the urban edge,</p> <p>2.5.7. optimise the use of existing resources and infrastructure,</p> <p>2.5.8. opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</p> <p>2.5.9. discourage "urban sprawl" and contribute to compaction/densification,</p> <p>2.5.10. contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</p> <p>2.5.11. encourage environmentally sustainable land development practices and processes,</p> <p>2.5.12. take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</p> <p>2.5.13. the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</p> <p>2.5.14. impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</p> <p>2.5.15. in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</p>	<p>be created during the construction phase and very limited during the operational phase. This is addressed in the Social and Economic Specialist studies (Appendices C and K).</p> <p>There will be no impact on public transport in the vicinity of the proposed new powerlines.</p> <p>The project will benefit the recipients of electricity in the entire region.</p>
2.6	<p>How were a risk-averse and cautious approach applied in terms of socio-economic impacts?</p>	<p>The information used in the socio-economic reports are based on the official data received from the municipalities. Given that municipalities are subject to public consultation processes; the assumption is made that the data is correct. A conservative approach was taken to the identification of impacts in the scoping phase. In the impact assessment phase of the project the impacts presented in the scoping reports will be triangulated</p>

	Question in guideline document	Response
		through a participation process to ensure that the assumptions were correct, and to close any gaps in the data. The project area includes vulnerable communities, and the socio-economic studies used appropriate methods to ensure that these communities were included in the impact assessment process. This process commenced in the announcement phase where the PP team ensured that communities were not excluded from the study, and consulted in a language that they are comfortable with. Given the nature of the project, no critical social resources should be affected, and once commissioned, there is a relatively low risk for social disruption. Communities will be consulted about the social mitigation measures during the impact assessment phase to ensure that the measures suggested are acceptable to the communities affected by the project.
2.7	How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following: 2.7.1. Negative impacts: e.g. health (e.g. HIV-AIDS), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 2.7.2. Positive impacts. What measures were taken to enhance positive impacts ?	This has been addressed in the Social Specialist Study (Appendix D).
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?	Will is addressed in the Social Specialist Study (Appendix D).
2.9	What measures were taken to pursue the selection of the " best practicable environmental option " in terms of socio-economic considerations?	Will be addressed in the Social Specialist Study (Appendix D).
2.10	What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)? Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?	The beneficiaries of the project are the general population of the region, as described in Chapter 10 .

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	Question in guideline document	Response
2.11	What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?	This project aims to provide services in the form of reliable electricity supply to the population of the region.
2.12	What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?	Environmental health and safety standards are built into all of Eskom's specifications and standards. An example of this is the requirement for servitudes with restrictions within which powerlines are constructed.
2.13	What measures were taken to: 2.13.1. ensure the participation of all I&APs, 2.13.2. provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, 2.13.3. ensure participation by vulnerable and disadvantaged persons, 2.13.4. promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means, 2.13.5. ensure openness and transparency, and access to information in terms of the process, 2.13.6. ensure that the interests, needs and values of all I&APs were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and 2.13.7. ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?	Please see Section 8 of this report.
2.14	Considering the interests, needs and values of all the I&APs, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?	This project aims to provide services in the form of reliable electricity supply to the population of the region.
2.15	What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the right of workers to refuse such work will be respected and protected?	Standard Eskom procedures address these issues.
2.16	Describe how the development will impact on job creation.	Is addressed in the Social Specialist Study (Appendix D)

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	Question in guideline document	Response
2.17	What measures were taken to ensure: 2.17.1. that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and 2.17.2. that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?	No specific intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment took place as a result of this specific project. No conflicts of interests have arisen as a result of this project.
2.18	What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?	No special measures have been taken.
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Proposed mitigation measures are realistic. Minimal long term environmental legacy and management burdens will be left by the project.
2.10	What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?	The applicant is responsible for implementing the EMP.
2.11	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	This is discussed throughout this report.
2.12	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	This is addressed in the Social and Economic Specialists Studies (Appendices C and K as summarised in Chapter 12).

6.2.1 National Development Plan

On 11 November 2011 the National Planning Commission (NPC) released the National Development Plan (NDP): Vision for 2030 (NPC, 2012) for South Africa and it was adopted as government policy in August 2012. The NDP was undertaken to vision what South Africa should look like in 2030 and what action steps should be taken to achieve this (RSA, 2013). The aim of the NDP is to eliminate poverty and reduce inequality by 2030. The report is discussed in the Social Specialist Report (**Appendix C**).

6.2.2 Sustainable Development Goals

All 189 Members States of the United Nations (UN), including South Africa, adopted the UN Millennium Declaration in September 2000 (UN, 2000). The commitments made by the Millennium Declaration are known as the Millennium Development Goals (MDGs), and 2015

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was targeted as the year to achieve these goals. The UN Open Working Group of the General Assembly identified seventeen sustainable development goals, built on the foundation of the MDGs as the next global development target (UN, 2014). The sustainable development goals include aspects such as ending poverty, addressing food security, promoting health, wellbeing and education, gender equality, water and sanitation, economic growth and employment creation, sustainable infrastructure, reducing inequality, creating sustainable cities and human settlements, and addressing challenges in the physical environment such as climate change and environmental resources (UN, 2014). These aspects are included in the NPD, and it can therefore be assumed that South Africa’s development path is aligned with the international development agenda.

“The consideration of “need and desirability” during an application process, ... must consist of a preliminary description of the relevant consideration ... in relation to the feasible and reasonable alternatives” (DEA 2010 pg. 13).

6.2.3 Strategic Environmental Assessment for Electricity Grid Infrastructure

In order to facilitate the efficient roll out of SIPs lead by the PICC and detailed in the National Infrastructure Plan, the DEA, mandated by Ministers and Members of the Executive Council (MinMec), commissioned the Council for Scientific and Industrial Research (CSIR) in January 2014 to undertake a Strategic Environmental Assessment (SEA) linked to SIP 10: Electricity Transmission and Distribution for all. The CSIR has partnered with Eskom and the SANBI to deliver on project outputs (<https://egi.csir.co.za/> accessed on 6 January 2017). The corridors being assessed in this EIA do not fall in any of the identified suitable routing corridors that will enable the efficient and effective expansion of key strategic transmission infrastructure designed to satisfy national transmission requirements up to the 2040 planning horizon, in this SEA (**Figure 6.1**). This is, however, not a problem as the SEA did not prioritise the load centre served by this project on the national level. The need for the project, on a regional level, is still justified.

6.2.4 Provincial Growth and Development Strategies

Provinces play an important role in contextualising acts and other tools of governance and grounding them within the realities of each province. The provincial governments must guide the local government in the implementation and development of IDPs and other programmes for sustainable development. Provincial Growth and Development Strategies (PGDS) are a critical tool to guide and coordinate the allocation of national, provincial and local resources and private sector investment to achieve sustainable development outcomes. They are not a provincial government plan, but a development framework for the province as a whole (Department Provincial and Local Government [DPLG], 2005).

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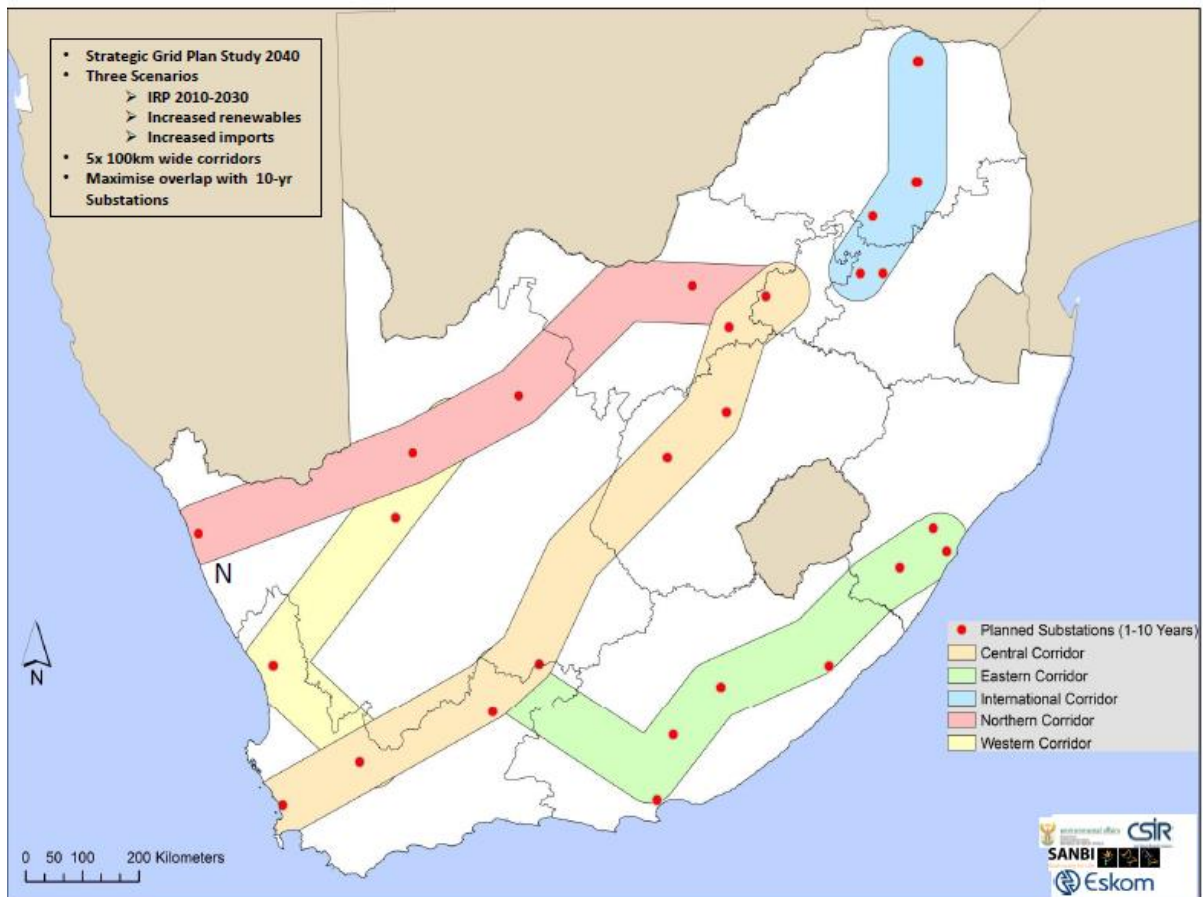


Figure 6.1: SEA suitable electricity routing corridors

Source: (<https://egi.csir.co.za/> accessed on 6 January 2017)

PGDS are not a legislative requirement, but play an important role in ensuring effectiveness and coordinating delivery of the overall objectives of South Africa as a developmental state. PGDS are based on a long-term view of the provinces' development route. Their primary purpose is to provide a collaborative framework to drive implementation within a province (DPLG, 2005).

The KZN PGDS strategy consists of seven long-term goals and 30 objectives (KZN PGDS, 2011):

1. Job creation
 - 1.1. Unleash agricultural potential
 - 1.2. Enhance industrial development through Trade, Investment & Exports
 - 1.3. Expand Government-led job creation programmes
 - 1.4. Promote SMME, entrepreneurial and youth development
 - 1.5. Enhance the knowledge economy
2. Human resource development
 - 2.1. Improve early childhood development, primary and secondary education
 - 2.2. Support skills alignment to economic growth

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- 2.3. Promote and enhance youth skills development & life-long learning
- 3. Human and community development
 - 3.1. Alleviate poverty and improve social welfare
 - 3.2. Enhance health of communities and citizens
 - 3.3. Safeguard sustainable livelihoods & food security
 - 3.4. Sustain human settlements
 - 3.5. Enhance safety & security
 - 3.6. Advance social cohesion
 - 3.7. Promote youth, gender and disability advocacy & the advancement of women
- 4. Strategic infrastructure
 - 4.1. Develop ports and harbours
 - 4.2. Develop road & rail networks
 - 4.3. Develop Information and Communications Technology infrastructure
 - 4.4. Improve water resource management
 - 4.5. Develop energy production capacity
- 5. Responses to climate change
 - 5.1. Increase productive use of land
 - 5.2. Advance alternative energy generation
 - 5.3. Manage pressures on biodiversity
 - 5.4. Manage disaster
- 6. Governance and policy
 - 6.1. Strengthen policy, strategy coordination and Inter Government Relations
 - 6.2. Build Government capacity
 - 6.3. Promote participative, facilitative & accountable governance
- 7. Spatial equity
 - 7.1. Promote spatial concentration
 - 7.2. Facilitate integrated land management & spatial planning

The KwaZulu Natal Provincial Spatial Development Strategy has been developed in order to achieve the goals and objectives of the PGDS in a targeted and spatial coordinated manner (KZN PGDS, 2011).

This project Human and community development (Objective 3) and Strategic Infrastructure (Objective 4).

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6.2.5 Integrated Development Plans

The South African government operates on three spheres, namely local (municipal), provincial and national. IDPs are compulsory through the Municipal Systems Act 32 of 2000 on municipal level. Integrated Development Planning is a process by which municipalities prepare 5-year strategic development plans. The IDP is the written plan that results from the integrated development planning process. It is the principle strategic planning instrument that guides and informs all planning, management, investment, development and implementation decisions and actions in the local area and supersedes all other plans that guide local development (Coetzee, 2002).

The White Paper on Local Government (RSA, 1998) has contextualised the IDP as a tool for developmental local government with the intention of enabling municipalities to:

- Help align scarce resources behind agreed policy objectives and programmes;
- Make sure that actions are prioritised around urgent needs;
- Ensure the necessary integration with other spheres of government, serving as a tool for communication and interaction with them, and
- Serve as a basis for engagement between local government and communities/residents.

Although the following municipalities have IDP documents that have been obtained, they are not specifically relevant to this application because the powerlines only traverse them in order to bring electricity to other regions:

- Zululand District Municipality
 - Uphongolo Local Municipality
 - Nongoma Local Municipality
- Umkhanyakude District Municipality
 - Jozini Local Municipality.

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7. ALTERNATIVES ASSESSED

GN 982 Appendix 1:

- (h) a full description of the process followed to reach the proposed preferred alternative within the site, including—
- (i) details of all the alternatives considered;

7.1 NO PROJECT ALTERNATIVE

The main trigger for the Iphiva Substation is the thermal, voltage and quality of supply issues currently experienced by the Distribution 132 kV system.

Northern KZN is amongst the regions in the country that has high levels of backlog to basic services such as electricity and water. Currently the load in Northern KZN is 130 MVA and it is projected to reach 180 MVA by 2022. The existing 132 kV network is experiencing high voltage drops which are below acceptable limits.

This has become evident with the increased number of power interruptions from Makhathini, Nondabuya and Ndumo substations. During the 2017 winter months these substations were locking out on Tap 17 during peak hours due to low voltages on the 132 kV line resulting in loss of supply to more than 35 000 customers.

There are no contingencies on the 132 kV lines. A loss of either the Normandie Vergenoeg 132 kV line or the Normandie Pongola 132 kV line will result in load being shed. Load cannot be shifted onto the interconnected Impala Main Transmission Substation due to thermal overloading constraints on the Impala Nseleni 132 kV Wolf line. With the loss of either 132 kV line, back feeding is not possible and as a result most substations are without supply for the duration of an outage.

With the current electrification and commercial load growth in the areas around the listed substations and Gezisa Substation establishment, the busbar voltages will further drop below minimal acceptable limits on both HV and MV networks. If the proposed 2nd Pongola Candover 132kV line and associated capacitor banks are not commissioned in 2019, the probability of experiencing 132 kV system voltage collapse is extremely high. The same scenario applies to Iphiva. Without these powerlines, Eskom Distribution will have to implement localised rotational load shedding in order to avert a 132 kV system voltage collapse.

7.2 ROUTE ALTERNATIVES

Only 1 of the 132 kV powerlines has an alternative corridor, i.e. the Iphiva-Makhathini/Iphiva-Mbazwane double circuit powerline. The alternative route is indicated on **Figure 2.1**.

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Table 7.1: Comparative Assessment of Iphiva-Makhathini/Iphiva-Mbazwane double circuit powerline routes

	Specialist	Recommended Alternative
1	Fauna and Flora	West
2	Wetlands	West
3	Agriculture	West
4	Avi-fauna	West
5	Social	West
6	Heritage	West
7	Visual	West
8	Economic	West

7.3 BURYING CABLES

During the Key Stakeholder and Authority and focus group meetings, I&APs requested that Eskom consider burying the powerlines, specifically for the section between G and D. Burying of lines – along the P234, it may be possible to bury some of the powerlines. Possibilities are:

- burying 4 x 132 kV powerline and construct 1 x 400 kV powerline next to them;
- bury all of the lines;
- bury the 400 kV lines and construct 132 kV above ground on double circuit towers; and
- one tower with 1 x 400 kV and 2 x 132 kV powerlines and the rest buried.

Spacing between buried conductors (cables) for a single underground line is typically 2 m (for all three trenches per powerline). The depth of buried cables is at least 1.2 m. Land use above buried cables will be limited. No trees or structures will be allowed, only grass. Mini substation structures will be required at each point where the powerline changes from buried to above-ground.

The two possible scenarios for the P234 lines (with and without the Iphiva-Duma 400 kV Powerline) are presented in **Figures 7.1** and **7.2**. Please note that the lines on the figures below are for illustrative purposes only and do not indicate a preferred centre line for the servitude. The powerlines could be constructed north or south of the road.

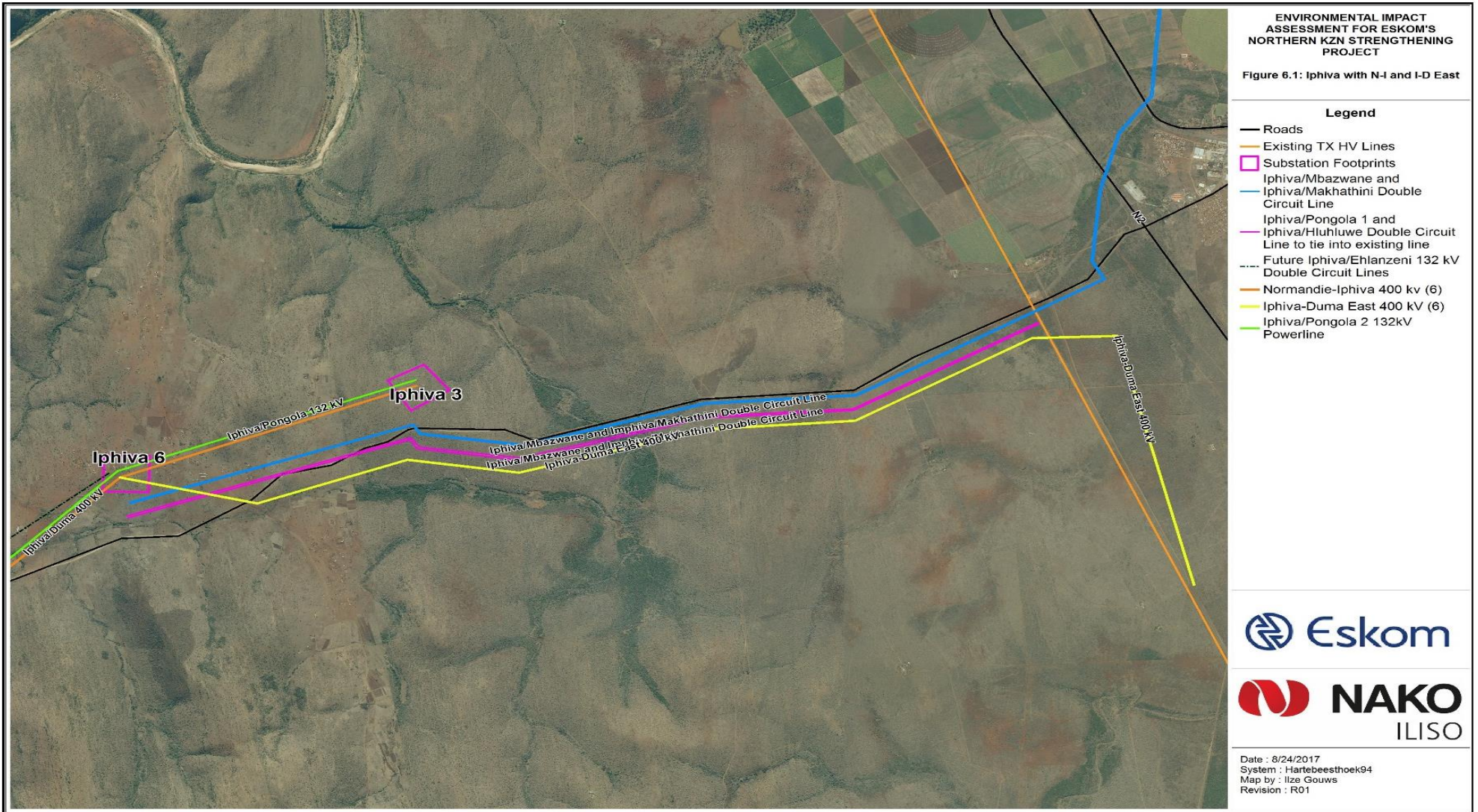


Figure 7.1: Iphiva with N-I and I-D East

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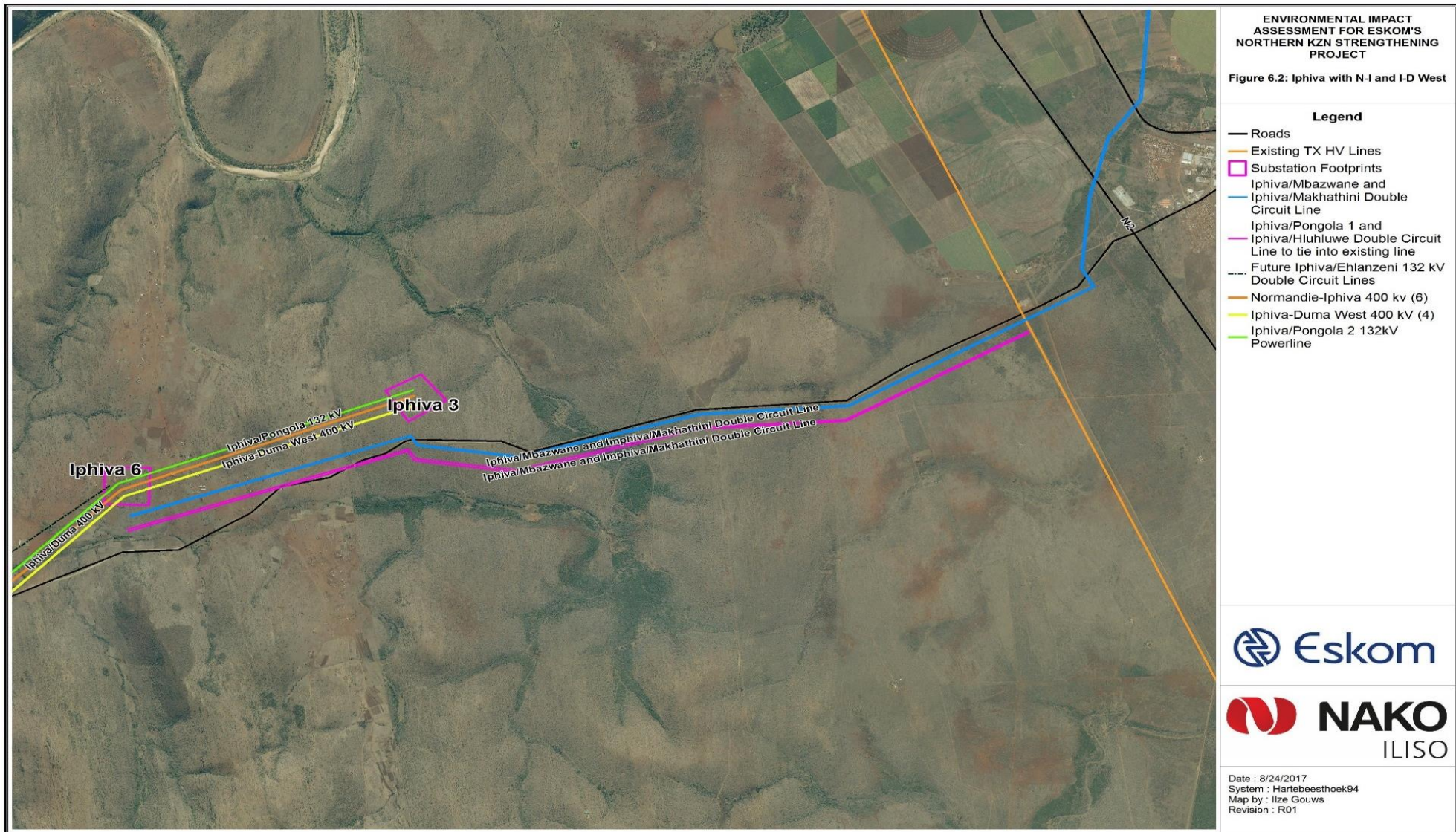


Figure 7.2: Iphiva with N-I and I-D West

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7.4 MULTI-CIRCUIT TOWERS

In addition to burying powerlines, visual and land use impacts can also be reduced by using double or multi-circuit towers. The various combinations of burying and multi-circuit towers is presented in **Table 7.2**. These have been assessed in the specialist studies and the findings are presented in the sections that follow.

Table 7.2: Combinations of burying and multi-circuit towers in the P234 Corridor

	Iphiva-Duma West	Iphiva-Duma East
All above ground (132k V powerlines on double circuit towers)	1	2
Burying 4 x 132 kV powerline and construct 1 x 400 kV powerline next to them	3	4
Bury all of the lines	(same as 3)	5
Bury the 400 kV powerline and construct 132 kV above ground on double circuit towers next to it	(same as 1)	6
One tower with 1x400 kV and 2x 132kV powerlines and 1 x 132kV powerline buried	N/A	7

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8. PUBLIC PARTICIPATION

GN 982 Appendix 1:

- (ii) details of the PPP undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

Due to the cumulative and interrelated nature of the four components of the Northern KZN Strengthening Project (the substation, two 400 kV powerlines and 165 km of 132 kV powerlines) a combined PPP is being undertaken. The PPP therefore covers the greater study area that include the powerline corridors.

8.1 LEGAL REQUIREMENTS

Public participation is a legal requirement for an application for environmental authorisation and is defined in NEMA (as amended) as the “*process by which potential I&APs are given opportunity to comment on, or raise issues relevant to the application*”.

Section 24(4)(a)(v) of NEMA requires that such public information and participation procedures “*provide all I&APs, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures*”.

The PPPs required are prescribed in Chapter 6 of GN No. R982 of December 2014 (the “2014 EIA Regulations”) and are also guided by relevant principles contained in Chapter 2 of NEMA. The PPP for the EIA of the proposed Eskom’s KZN Strengthening Project is designed to satisfy the requirements laid down in the above legislation. The IAIA Fast Tips have been taken into account as a guideline.

The following are minimum legal requirements required by GN R982:

- Regulation 39 (1) Obtaining written consent of the landowner or person in control of the land to undertake the activity on that land, except for linear activities (the powerline is a linear activity);
- Give notice to all I&APs by:
 - Fixing a notice board to the boundary of the proposed and all alternative sites and/or along the corridors
 - Giving written notice in accordance with Section 47D of NEMA (as below) to the owners, occupiers or persons in control of the proposed site and alternatives, adjacent land, municipal ward councillors, any organisation of ratepayers, the municipality, any organ of state having jurisdiction in respect of any aspect of the activity, and any other party as required by the competent authority
 - Placing an advertisement in one local newspaper or Gazette
 - Placing an advertisement in at least one provincial or national newspaper,

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- Maintain a register of I&APs, and
- Comments and responses must be recorded in reports and plans submitted to the authorities.

- 1) Section 47D of NEMA says that “A notice or other document in terms of NEMA or a specific environmental management Act may be issued to a person—
- (a) by delivering it by hand;
 - (b) by sending it by registered mail—
 - (i) to that person’s business or residential address; or
 - (ii) in the case of a juristic person, to its registered address or principal place of business;
 - bA) by faxing a copy of the notice or other document to the person, if the person has a fax number;
 - bB) by e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or
 - bC) by posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;
 - (c) where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating the area of that person’s last known residential or business address.

[Subsection 1 amended by section 23(a) of Act No. 30 of 2013]

- (2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved.

[Subsection 2 amended by section 23(b) of Act No. 30 of 2013].”

The PPP will give all registered I&APs a period of at least 30 days to submit comment on each of the documents that form part of the EIA as they are completed, i.e. the Basic Assessment Report (scoping report and EIA Report for the other three applications) and EMPr, and all information that reasonably has or may have the potential to influence the decision with regard to the application.

8.2 SERVITUDE NEGOTIATION AND THE EIA PROCESS

8.2.1 Servitude Negotiation and the EIA Process

Distribution powerlines are constructed and operated within a servitude (36 m wide for 132 kV lines) that is established along its entire length. The servitude allows Eskom Distribution certain rights and controls that support the safe and effective operation of the line.

The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or just the negotiation process.

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The negotiation process is undertaken directly by Eskom Distribution. Important points relating to the EIA process are as follows:

- Servitude negotiation is a private matter between Eskom Distribution and the landowner concerned.
- The negotiation process involves a number of stages, and culminates in the ‘signing’ of a servitude. Here Eskom Distribution enters into a legal agreement with the landowner.
- The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities.
- Compensation measures are agreed in each case.
- It may take place at any time in the planning of a new powerline.
- It must be completed (i.e. the agreement must be signed) before construction starts on that property.
- It is independent of the EIA process.

The EIA process has become important in the initial planning and route selection of a new Transmission powerline. For this reason, it would normally be preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation.

However, it may be required that the negotiation process needs to start earlier, and may begin before or run in parallel to the EIA process. This may be due to tight timeframes, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

8.2.2 The Negotiation Process

The negotiation process can be extensive, often running into years on the longer lines. It is therefore critical that it is correctly programmed into the planning of a new powerline. The negotiation process involves:

- Initial meeting with the landowner.
- The signing of an ‘option’ to secure a servitude (this indicates that the owner will accept that the line will cross his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
- Once the route is confirmed (i.e. options signed with the upstream and downstream landowners) the servitude agreement will be finalised with the individual landowners. This agreement will set out the conditions for the establishment and operation of the servitude, and will be site specific (different landowners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office.

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- Once the construction is complete and the land rehabilitated to the landowner's satisfaction, the landowner signs a 'Final Release' certificate. Until such time Eskom Distribution remains liable for the condition of the land.
- Once the clearance certificate is signed, the responsibility for the powerline and servitude is handed over to the regional Eskom Distribution office. Prior to this the Eskom national office is responsible for the process.

8.3 PUBLIC PARTICIPATION TASK LEADER

The PPP Task Leader, **Bongi Shinga**, has 15 years of experience in communications management, stakeholder engagement and PPPs, in support of environmental management and development processes. She has extensive experience in running complex yet successful communication programmes, particularly in the bulk water and energy sectors. She has been involved in various water resources development assignments for the DWS and infrastructural development projects for Eskom. She also has actively managed PPPs for the review of policies and management plans in the conservation sector. Her ability to communicate and interact with all levels of stakeholders (local, provincial and national), in both rural and urban settings has contributed to effective approaches for monitoring and maintaining stakeholder relationships. She is well-versed in the requirements of public participation as applied in environmental assessments in South Africa. Her role includes facilitation of the public, focus group and key stakeholder meetings.

8.4 THE EIA PROCESS AND LINKS TO THE PUBLIC PARTICIPATION PROCESS

An EIA is a planning and decision-making tool. It identifies the potential negative and positive consequences of a proposed project or development at an early stage, and recommends ways to enhance positive impacts and to avoid, reduce or minimize negative impacts. The EIA findings will also inform further technical and financial investigations and decisions. The EIA is undertaken in terms of section 24C of NEMA.

Public participation is an important aspect of any EIA, with the objective to assist stakeholders to table issues of concern, suggestions for enhanced benefits and to comment on the findings of the EIA. The PPP is designed to provide sufficient and accessible information to I&APs in an objective manner.

Public Participation can be divided into the following phase:

1. **Announcement Phase** – I&APs are identified and notified of the proposed project. They are given an opportunity to raise any concerns that they have and suggest any alternatives not considered.
2. **Scoping Phase** – During the Scoping Phase I&APs will have an opportunity to provide written comment on the DSR for the other three applications. During this phase they should check that the issues they have raised have been accurately captured and will be addressed by the specialist studies.

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3. **Impact Assessment Phase** – The findings and recommendations of the specialist studies and impact assessment will be presented to the I&APs in this phase, primarily by an opportunity to comment on the Draft EIA Report. The Draft Basic Assessment Report for this Distribution Powerlines is also available for review during this period.
4. **Decision making phase** – I&APs will be notified of DEA’s decision regarding the project and of their opportunity to appeal.

One of the approaches of the PPP in this EIA is to limit the amount of printing as much as possible, without compromising the effectiveness of the process. Digital methods of making information available (e-mail, webpages and CDs) are therefore used wherever possible.

8.5 PUBLIC PARTICIPATION ACTIVITIES IN THE ANNOUNCEMENT AND SCOPING PHASES

8.5.1 Stakeholder Identification

Taking into account the legal requirements set out in the regulations 39 – 44, the following steps were undertaken to identify, notify and register I&APs:

Through newspaper advertisements, networking, referral to existing databases of projects undertaken in the study area, stakeholder and/or public meetings.

An effort was made to ensure that individuals and/or organisations were identified from an institutional and geographic point of view. The KZN Department of Cooperative Governance and Traditional Affairs (COGTA) assisted the Public Participation Team in identifying stakeholders within the Zululand District. A copy of the application form was submitted to the Mpumalanga Department of Economic Development, Environment and Tourism together with a hard copy of the Draft Scoping Report (DSR) and Summary Report on 31 August 2017. No comments have been received from them.

I&APs identified and notified included the following:

- National and Provincial government departments:
 - DWS,
 - DAFF,
 - Department of Local Government and Traditional Affairs,
 - AMAFA/Heritage KZN,
 - Ezemvelo,
 - Department of Agriculture and Rural Development,
 - KZN Department of Economic Development, Tourism and Environmental Affairs,
 - KZN Department of COGTA,
 - Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET)
- Organs of state which have jurisdiction in respect of the activity to which the application relates:

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- Eskom Holdings SOC Limited
- District Municipalities:
 - Gert Sibande District Municipality – Piet Retief
 - Zululand District Municipality
- The Local Municipalities:
 - Mkhondo Local Municipality – Piet Retief
 - uPhongolo Local Municipality
 - Jozini Local Municipality
 - Abaqulusi Local Municipality
 - eDumbe Local Municipality
- Landowners/Land Occupiers.
 - Private Landowners
 - Game Reserves and Tourism Establishment Operators
 - Community Trusts
- Traditional Councils within Zululand District
 - Ndlangamandla Traditional Council
 - Sibiya Traditional Council
 - Msibi Traditional Council
 - Simelane Traditional Council
 - Gumbi Traditional Council
 - Emgazini Traditional Council
 - Ntshangase Traditional Council
 - Mavuso Traditional Council
 - Klwana Traditional Council
 - Msiyane Traditional Council
 - Empangisweni Traditional Council
 - Khambi Traditional Council
 - Emathongeni Traditional Council
 - Hlahlindlela Traditional Council
 - Othaka Traditional Council
 - Mandlakazi Traditional Council
 - Usuthu Traditional Council
 - Dlamini Traditional Council
 - Ndlela Traditional Council
 - Mthethwa Traditional Council

A GIS map of the study area (**Appendix C**) has been developed with property boundaries shown and where landowners/ traditional authorities have been notified or registered on the database shaded in. This gives a visual representation of the extent of landowner consultation.

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8.5.2 I&AP Database

An Excel database has been used which allows for stakeholders to be registered, categorised into sectors and for a full record of their participation in the project, including comments submitted, to be recorded (**Appendix C**).

8.5.3 Newspaper Adverts

Advertisements announcing the project were drafted, translated into isiZulu and placed in the newspapers listed in **Table 8.1**. Copies are included in **Appendix C**.

Table 8.1: Newspapers where advertisements have been published

Newspaper	Language	Geographic area covered	Date of publication
Mercury Regional newspaper	English	Mkuze, Pongola, Paulpietersburg, Duma and Vryheid	11 August 2016
Excelsior News	English	Piet Retief	11 August 2016
Isolezwe	Zulu	Mkuze, Pongola, Paulpietersburg, Duma and Vryheid	11 August 2016

A second round of newspaper advertisements will be placed in the same newspapers to announce the availability of the DSR for comment, and to invite I&APs to the second round of Key Stakeholder and Authorities Meetings, scheduled to take place in August 2017.

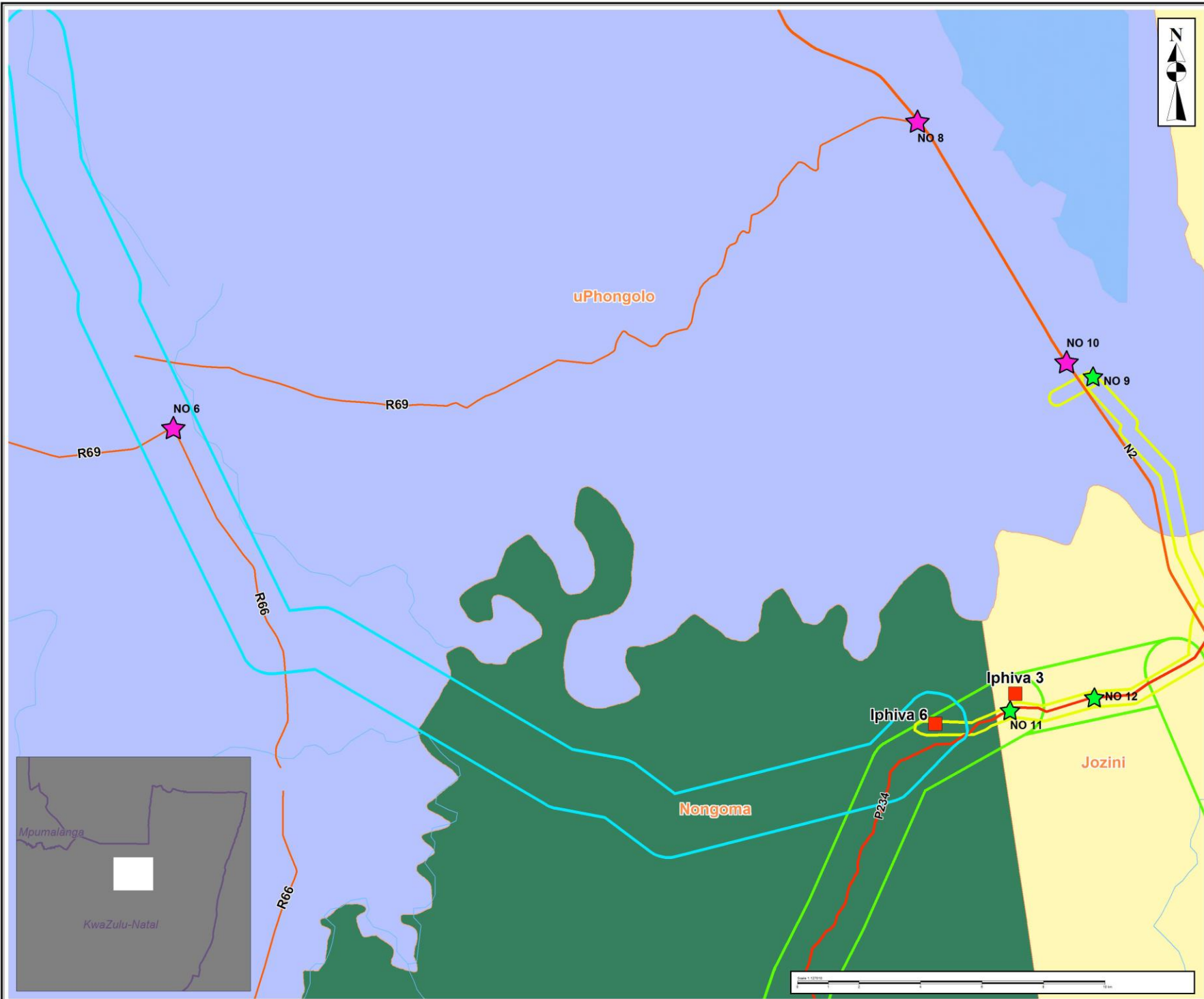
8.5.4 Onsite Notices

Twenty-three on-site notices were erected for the entire larger study area. The locations of those relevant to the Basic Assessment are indicated on **Figure 8.1**. Notices have complied with GN 982 Regulation 41 (2), (3) and (4).

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ENVIRONMENTAL IMPACT
ASSESSMENT FOR ESKOM'S
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PROJECT

BAR Figure 8.1 : Location of Onsite
Notices



- Legend**
- Local Municipalities
 - Towns
 - Dams and Rivers**
 - Dams and Lakes
 - Rivers
 - Substations
 - Proposed Duma Iphiva Corridors
 - Iphiva/Pongola 2 132kV Corridor
 - 132 kV Powerline Corridors
 - Notices**
 - notices english
 - notices zulu
 - notices new



Date : 4/19/2018
System : Hartebeesthoek94
Map by : Ilze Gouws
Revision : R11



Plate 16: Examples of onsite notice

8.5.5 Written Notice

Notification letters (**Appendix C**) have been given to the municipal councilors of the wards affected by the project, the district and local municipalities and organs of state indicated in **Section 8.5.1**. Notices were e-mailed with a copy of the Background Information Document (BID) (**Appendix C**) and I&AP registration form.

8.5.6 Background Information Document

A 6-page x A4 BID was compiled in English, translated into isiZulu and distributed with the notification letters. Additional copies were made available at the first round of key stakeholder and authorities' meetings, FGMs and traditional council meetings (**Appendix C**).

8.5.7 Draft Report Comment Periods

The 2014 EIA Regulations require a 30-day comment period for all draft reports prior to submission to the competent authority. The first comment period was for the DSRs for the other three applications.

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A notification letter was emailed to all registered I&APs on 31 August 2017 (**Appendix C**). Hard copies of the letter, translated into isiZulu was delivered to the Traditional Councils with a copy of the isiZulu translation of a Summary of each of the Scoping Reports.

Table 8.2: Newspapers where availability of the Draft Scoping Report was advertised

Newspaper	Geographics	Language	Areas covered	Insertion Date
The Mercury	Regional	English	Mkuze, Pongola, Paulpietersburg, Duma and Vryheid	04 September 2017
Excelsior News	Local	English	Piet Retief	01 September 2017
Isolezwe	Regional	Zulu	Northern KZN	04 September 2017
Ilanga	Regional	Zulu	Northern KZN	05 September 2017

Hard copies of the draft documents were made available at four (4) public places in the study area, as indicated in **Table 8.3**. Pdf versions of the documents were uploaded to the ILISO website (www.iliso.com). CDs were also available at key stakeholder and authorities and focus group meetings, and posted to I&APs on request.

Table 8.3: Placing of draft documents at public venues

Area	Venue	Address	Contact Details
Piet Retief	Piet Retief Public Library	Piet Retief, 2380	Tel: 017 826 8153
Pongola	Pongola Public Library	61 Martin St, Pongola, 3170	Tel: 034 413 1540
Mkuze	Ghost Mountain Inn	Fish Eagle Street, Mkuze	Tel: 035 573 1025
Hluhluwe	Hluhluwe Public Library	163 Zebra Street, Hluhluwe	Tel: 035 562 0040

All comments received have been recorded in the Comments and Responses Report (CRR) for the DSR review period (**Appendix C**).

8.5.8 Key Stakeholder and Authorities Meetings

The first round of Key Stakeholder and Authorities' Meetings took place in September 2016 (**Table 8.4**).

Table 8.4: Venues for Key Stakeholder Meetings

AREA	DATE	VENUES	TIME	ATTENDEES
Piet Retief	Monday, 05 Sept 2016	Piet Retief Country Club West End Street, Piet Retief	10H00 – 12H30	9
Pongola	Tuesday, 06 Sept 2016	Pongola Country Lodge 14 Jan Mielie Street Pongola	10H00 – 12H30	13

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Mkuze	Wednesday, 07 Sept 2016	Ghost Mountain Inn Fish Eagle Road, Mkuze	10H00 – 12H30	14
Hluhluwe	Thursday, 08 Sept 2016	Protea Hotel 104 Main Road, Hluhluwe	10H00 – 12H30	9

Invitations (**Appendix C**) were sent to all registered I&APs. Minutes were prepared and distributed to all attendees with the opportunity to provide corrections within 14 days. Final minutes are included in **Appendix C**.

A second round of Key Stakeholder and Authorities meetings took place in September 2017. Due to the poor turnout at the first round of meetings, the second round of meetings were only arranged for Pongola and Mkuze.

The public and focus group meeting that took place during September 2017 to present the DSRs and project description for the Distribution powerlines are listed in **Table 8.5**.

Table 8.5: Public and Focus Group Meetings during the Draft Scoping Report Comment Period

AREA	DATE	VENUES	TIME	ATTENDEES
Paulpietersburg Farmers	Monday, 18 Sept 2017	Mr. Eckard Hiestermann's farm	14:00 – 15:00	8
Pongola	Tuesday, 19 Sept 2017	Pongola Country Lodge	10H00 – 12H30	15
Mkuze	Wednesday, 20 Sept 2017	Ghost Mountain Inn	10H00 – 12H30	22

8.5.9 Focus Group Meetings

Two (2) focus group meetings were held during the announcement phase and one during the DSR Comment Period as follows:

No	Date	Group/Target Audience	Venue	Time
1	09 September 2016	Ezemvelo	Queen Elizabeth Park, 1 Peter Brown Drive; Pietermaritzburg	10h00 – 11h30
2	25 October 2016	Landowners potentially affected by Iphiva Substation Sites	Ghost Mountain Inn	09h00 – 11h30
2	18 September 2017	Farmers in the Paulpietersburg area	Mr Hiestermann's Farm	14h00 – 15h00

Minutes of focus group meetings were compiled and distributed to attendees. (**Appendix C**).

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8.5.10 Meetings with Traditional Councils

32 Traditional Councils within the study area that could be affected by the project have been identified. Meetings have taken place with each of these councils as shown in **Table 8.6**. Minutes are presented in **Appendix C**.

Table 8.6: Focus Group Meetings with Traditional Councils that have taken place

NO	MEETING WITH	VENUE	DATE
1	Makhasa Traditional Council	Makhasa Tribal Court (Hluhluwe)	12 Sept 2016
2	Nibela Traditional Council	Nibela Tribal Court (Hluhluwe)	13 Sept 2016
3	AbakwaHlabisa Traditional Council	AbakwaHlabisa Tribal Court (Hlabisa)	14 Sept 2016
4	Mdletshe Traditional Council	Mdletshe Tribal Court (Hlabisa)	14 Sept 2016
5	Mpembeni Traditional Council	Mpembeni Tribal Court (Hlabisa)	15 Sept 2016
6	Myeni/Ntsinde Traditional Council	Myeni Tribal Court (Obonjeni)	20 Sept 2016
7	Ngwenya/Ntsinde Traditional Council	Ngwenya Tribal Court (Mkuze)	20 Sept 2016
8	Ndlangamandla Traditional Council	Ndlangamandla Tribal Court (Pongola)	21 Sept 2016
9	Sibiya Traditional Council	Sibiya Tribal Court (Pongola)	22 Sept 2016
10	Msibi Traditional Council	Msibi Tribal Court (Emgulatshani)	23 Sept 2016
11	Simelane Traditional Council	Simelane Tribal Court (Pongola)	26 Sept 2016
12	Gumbi Traditional Council	Gumbi Tribal Court (Pongola)	27 Sept 2016
13	Emgazini Traditional Council	Emgazini Tribal Court (Pongola)	28 Sept 2016
14	Ntshangase Traditional Council	Ntshangase Tribal Court (Pongola)	29 Sept 2016
15	Mavuso Traditional Council	Mavuso Tribal Court (Pongola)	03 Oct 2016
16	Klwana Traditional Council	Klwana Tribal Court (Piet Retief)	03 Oct 2016
17	Msiyane Traditional Council	Msiyane Tribal Court (Louwsberg)	04 Oct 2016
18	Empangisweni Traditional Council	Empangisweni Tribal Court (Langkraans)	05 Oct 2016
19	Khambi Traditional Council	Khambi Tribal Court (Gluckstadt)	06 Oct 2016
20	Emathongeni Traditional Council	Emathongeni Tribal Court (Vryheid)	07 Oct 2016
21	Hlahlindlela Traditional Council	Hlahlindlela Tribal Court (Swart Umfolozi)	12 Oct 2016
22	Othaka Traditional Council	Othaka Tribal Court (Nqutu)	12 Oct 2016
23	Mandlakazi Traditional Council	Mandlakazi Tribal Court (Emondlo)	13 Oct 2016
24	Usuthu Traditional Council	Usuthu Tribal Court (Nongoma)	13 Oct 2016
25	Dlamini Traditional Council	Dlamini Tribal Court (Nongoma)	18 Oct 2016
26	Ndlela Traditional Council	Ndlela Tribal Court (Paulpietersburg)	18 Oct 2016
27	Bhovungane Traditional Council	Bhovungane Tribal Court (Paulpietersburg)	19 Oct 2016
28	Mthethwa Traditional Council	Mthethwa Tribal Court (Paulpietersburg)	20 Oct 2016
29	Mpukunyoni Traditional Council	Mpukunyoni Tribal Court (Paulpietersburg)	21 Oct 2016
30	Usuthu Traditional Council	Usuthu Tribal Court (Mtubatuba)	25 Oct 2016
31	Gumbi Traditional Council	Gumbi Tribal Court (Nongoma)	26 Oct 2016
32	Mandlakazi Traditional Council	Mandlakazi Tribal Court (Pongola)	28 Oct 2016

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All Traditional Council meetings were conducted in Zulu. Zulu BIDs were also distributed at all meetings. Additional copies were also provided to the Councilors, Izinduna and AmaKhosi. All comments received at these meetings have been incorporated into the CRR.

8.5.11 Comments and Responses Report

The issues raised in meetings, telephone calls or emails during the announcement phase have been recorded in a CRR (**Appendix C**) that will be updated as the project progresses. A copy of the CRR with comments received up until that point, was available to stakeholders for review as part of the DSR public comment period for the draft reports in order for them to confirm that their issues have been accurately captured and understood.

All comments received during the DSR Comment Period have been captured in the CRR for the Draft Basic Assessment Report (**Appendix C**).

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9. ISSUES RAISED

GN 982 Appendix 1:

(iii) a summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

An issue is a point of concern around which debate can be held. These have been identified during the Scoping Phase of the project. An impact is how the natural, social or economic environment will be affected by a specific activity. These have been assessed in this phase (Impact Assessment Phase) of the project. The following key issues were identified by the EAP in consultation with I&APs, the applicant and specialists:

- Protected areas;
- Fauna and Flora (including birds);
- Land use;
- Heritage;
- Social;
- Access;
- Construction Impacts; and
- Cumulative impacts.

9.1 PROTECTED AREAS

How will the Northern KZN Strengthening Project impact on protected areas and associated biodiversity, tourism and investment value?

The study area is characterised by large number of protected and conservation areas (varying from provincially proclaimed reserves to private game reserves) (**Figure 9.8**), including (from the South African Protected Areas Database (2016)):

- Bendor Private Nature Reserve;
- Ithala Nature Reserve;
- Ntendeka Wilderness Area;
- Somkhanda Game Reserve;
- Umkoonyan No1 Private Nature Reserve;
- Welkom Private Nature Reserve; and
- Witbad Nature Reserve.

Private game reserves, such as the Manyoni Private Game Reserve (previously called the Zululand Rhino Reserve), which is owned by a consortium of owners, and Zimanga Private Game Park (owned by Mr Charl Senekal) develop facilities in the reserve for their own and

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tourist use. These reserves rely on income from tourists that make use of the facilities to fund their operations. The owners are concerned that **visual** impacts from the Iphiva Substation and/or any above-ground powerlines will reduce the number of visitors to lodges in the private game reserve, or the price that visitors are prepared to pay for the experience. This could impact on the **economic viability** of the existing lodges and potential **future developments and investors**.

If this happens, then it will reduce the **job opportunities** provided by the Reserves, as well as additional **income to the region** from tourists visiting the facilities, negatively impacting the **livelihoods of local communities**. Less income to the Reserves will also result in less funds available for looking after (e.g. supplementary feeding) and protecting important **Red Data species** such as rhinos and wild dogs.

If there is any construction inside a protected area, the Reserve management will have to provide additional **security** to protect the construction workers from the wild animals during construction, which will have a **cost**.

Construction will require the **clearing of vegetation** impacting on the biodiversity of the area. Removing some of the vegetation below the powerlines may have an impact on the **carrying capacity** of the Reserves that could financially impact the Reserve and its shareholders.

Construction workers in the park increase the risk of **poaching**.

Response

The EAP recommends that any new powerlines in existing protected areas should be completely avoided, and believes that this will be possible. It will, however, not be possible to completely avoid having sight of the powerlines from all protected areas, although this will be minimised as far as is possible.

The concern from the landowners is based on **sense of place**, and the value the owners and tourists place on the sense of place (which is subjective and will differ from person to person). It can be difficult to prove that any losses are specifically due to powerlines, as there are numerous factors that could impact on tourism, such as economic conditions, tourism trends, environmental aspects such as droughts etc.

The construction phase is a specifically vulnerable phase, as it is the phase with most activities. Landowners have expressed concern that access to the properties required for construction will increase the risk of poaching.

These impacts have been assessed by a number of specialists including using existing studies for comparative purposes. A viewshed analysis has been undertaken for the lodges

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that are particularly close to potential impacts to test the impact (Visual Specialist Study in **Appendix J**). The assessment has been undertaken qualitatively as visual impact is a perception, and by nature, differs from person to person. An economic specialist has also been commissioned to assess the potential economic impacts on these parties (**Appendix K**).

9.2 FAUNA AND FLORA

What impacts will the construction and operation of the Northern KZN Strengthening Project have on the natural environment (flora and fauna) of the region?

The construction of surface infrastructure will entail the removal/ clearing of vegetation, which will affect the current vegetation present in the study areas. Habitat utilised by mammals, amphibians, reptiles and bird species will also be lost. Open areas will facilitate the establishment of alien invasive plant species. Protected plant and animal species will also be affected by construction activities.

The potential impacts on Red Data Species and Birds were raised by I&APs. Birds are impacted by electrocutions, collisions, habitat destruction and disturbance.

Electrocutions

The electrocution of birds on overhead lines is a significant cause of unnatural mortality of a number of bird species in Southern African. The larger terrestrial dwelling species and birds of prey are the most susceptible. The electrocution can occur when 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 (Van Rooyen 2004). Electrocution is possible on 400 and 132 kV powerlines, especially where large raptors and vultures feature prevalently. It is very likely that vultures will occur in the study area as well as numerous large eagles, ibises and buzzards, so the risk of electrocution is high.

Collisions

Collisions are the biggest single threat posed by over-head powerlines to birds in Southern Africa (Van Rooyen 2004). In general, large powerlines with earth wires that are not always visible to birds can have the largest impact in terms of these 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 powerlines (Van Rooyen 2004). Unfortunately, many of the collision sensitive species are considered threatened in Southern Africa. The Red Data, rare and endemic (species of special concern) species vulnerable to powerline collisions are generally long living, slow reproducing species. There are a few exceptions to this with the likes of some of the smaller lark and pipit

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species which generally are unaffected. Some of the larger terrestrial dwelling species like bustards and cranes require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the long or even medium term. The project area has a number of these species that are susceptible to powerline collisions.

Many of the anthropogenic threats to these species including habitat destruction, disturbance and powerlines all contribute to adult mortality of these larger species of special concern and it is not known what the cumulative effect of these impacts could be over the long term. Collisions of certain large flying bird species such as Great White Pelican (*Pelecanus onocrotalus*), Pink-backed Pelican (*Pelecanus rufescens*), Saddle-billed Stork (*Ephippiorhynchus senegalensis*), Yellow-billed Stork (*Mycteria ibis*), Woolly-necked Stork (*Ciconia episcopus*), Lesser Flamingo (*Phoenicopterus minor*), Black-bellied Bustard (*Lissotis melanogaster*), Secretarybird (*Sagittarius serpentarius*) and the three crane species, are all a possibility within the project area.

A number of new species of special concern are now regarded as being of high collision threat. These include African Pygmy Goose (*Nettapus auritus*), Southern Ground Hornbill (*Bucorvus leadbeateri*), Hooded Vulture (*Necrosyrtes monachus*), Bateleur (*Terathopius ecaudatus*), African Marsh Harrier (*Circus ranivorus*) and Black Harrier (*Circus maurus*).

Habitat destruction

Habitat clearing and alteration inevitably takes place during the construction of powerlines. This happens with the construction of access roads, and the clearing of servitudes. Servitudes also have to be cleared of excess vegetation at regular intervals during the operational phase. These activities impact on breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat (Van Rooyen, 2004).

Disturbance

Similarly, the above mentioned construction and maintenance activities impact on birds through disturbance, particularly during ground breeding activities within species. Uncontrolled vehicle access results in unnecessary loss of indigenous and riparian vegetation and preferred habitat for breeding bird species such as lark, pipit, lapwing, courser and bustard species.

Response

These impacts have been assessed in the fauna and flora and avifauna specialists' studies. Impacts, as a result of powerlines, are linked to the risk that they present for bird collisions and mortality and to a lesser extent the limitations on flora in the servitude. As such, the

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impacts are potentially more significant for the access roads during **construction**, whereas for powerlines during **operations**.

Alien Invasive plant species can be controlled with the implementation and regular monitoring of Eskom's Invasive Species management plan.

Impacts on Protected Plant and Animal species must be addressed through a species of special concern management plan (EMPr). Impacts could be addressed through avoidance, mitigation, rehabilitation, compensation and offsets.

9.3 COMMERCIAL FARMING

What impacts will the construction and operation of the Northern KZN Strengthening Project have on commercial farming in the region?

In terms of commercial farming, sugar cane and forestry are concerns when it comes to the presence of powerlines (**Figure 9.1**).

Sugar cane needs to be burnt. If it is burnt below powerlines the smoke provides a conductor and creates arcs to the ground resulting in the risk of lines tripping. Although there are methods other than burning to harvest sugar cane, these are more expensive and labour intensive.

Fire is a great risk in terms of forestry, and a spark or a snapped powerline could cause extensive damage. Fire is sometimes used as a retribution measure in some areas, and this might also cause damage to powerlines.

Farmers in the north west of the study area have voiced their concerns in a series of focus group meetings (**Appendix C**)

Their concerns included:

- Late identification and involvement in the EIA process;
- Impacts on homesteads;
- Loss of forestry, grazing and cultivated lands;
- Noise pollution and health hazards;
- Visual impacts;
- Long terms financial losses;
- Using a local wood fuelled power station as an alternative to Transmission Powerlines from the coal fires power stations;

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- Impacts on cell phone communication;
- Safety for small planes and helicopters used for firefighting and crop spraying;
- Risk of fire;
- Maintenance of fire breaks; and
- Impacts on farm workers.

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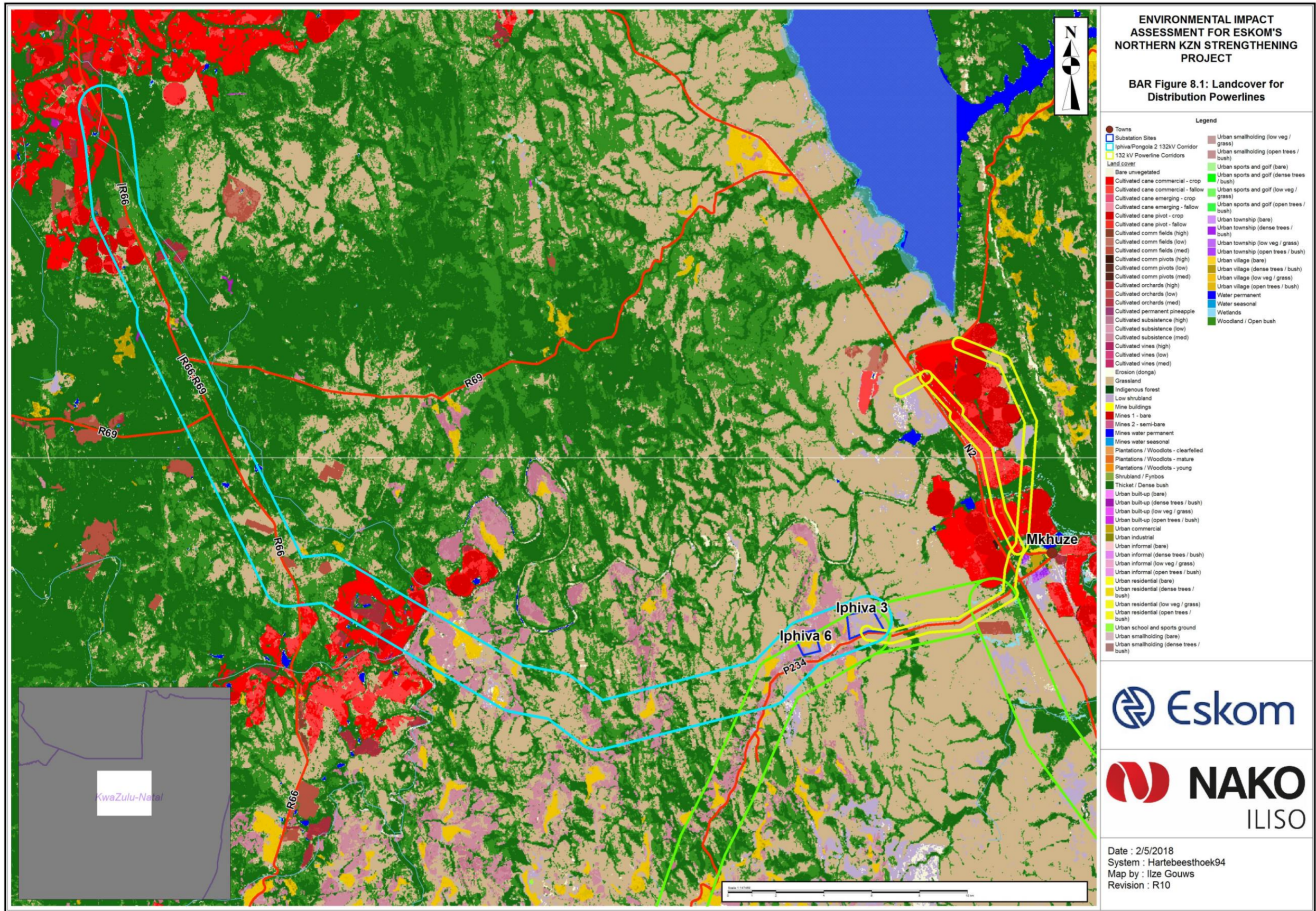


Figure 9.1: Land cover

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9.4 HERITAGE

What effects will the construction of the powerline have on cultural heritage resources?

Different heritage impacts may manifest in different geographical areas and diverse communities. An impact to a heritage resource from a project related activity may manifest in several ways. These impacts are not always comparable in scale. In addition, project activities can influence the significance of heritage resources without any actual physical impact on the resources taking place. Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example, destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking; and
- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.

9.5 SOCIAL

What are the potential social impacts associated with the construction and operation of the proposed powerline?

A social impact is something that is experienced or felt by humans. It can be positive or negative. Social impacts can be experienced in a physical or perceptual sense. Therefore, two types of social impacts can be distinguished:

- Objective social impacts – i.e. impacts that can be quantified and verified by independent observers in the local context, such as changes in employment patterns, in standard of living or in health and safety.
- Subjective social impacts – i.e. impacts that occur “in the heads” or emotions of people, such as negative public attitudes, psychological stress or reduced quality of life.

It is important to include subjective social impacts, as these can have far-reaching consequences in the form of opposition to, and social mobilisation against the project (Du Preez & Perold, 2005).

It is very likely that a number of social change processes will be set in motion by the project. Whether or not these processes cause social impacts will depend on the successful implementation of mitigation measures. The social environment is, however, dynamic and constantly changing, making it difficult to predict exact impacts. External processes not

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related to the project, like political changes or global economic changes can alter the social environment in a short period of time, and therefore alter the predicted impacts.

Sources of social impacts are often not as clear-cut as those in the biophysical environment. Social impacts are not site-specific, but occur in the communities surrounding the proposed site – where the people are.

Response

A Social Specialist study has been undertaken (**Appendix D**).

9.6 ACCESS

In order to implement the proposed powerline, Eskom and its contractors will require access to tower positions and servitudes. Access requirements to the tower positions and servitude are less arduous than an access road to a substation, which needs to be able to accommodate the extraordinary loads when large heavy equipment is delivered.

Existing roads will be used, and upgraded if necessary, wherever possible. In some cases, new temporary or permanent access roads may need to be constructed within the corridors assessed. Access roads are therefore included in the application, project description, assessment and EMPr.

Initial field work has revealed that some areas of the study area already have significant erosion resulting from other activities.

Response

The comparative assessment of the initial alternatives undertaken in the Scoping phase considered access roads. The soils and agricultural potential specialist study has also considered erosion (**Appendix E**). Mitigation measures and monitoring requirements have been included in the EMPr.

9.7 CONSTRUCTION IMPACTS

What impacts will the common construction activities of powerlines have?

Construction activities cause a well-known suite of impacts and risks. These include dust, noise, visual intrusion, increased traffic, erosion, pollution, waste generation and social impacts as a result of an influx of construction workers.

A real potential exists for surface and groundwater pollution as well as impacting on the volume and flow patterns of surface and groundwater.

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Response

These impacts have been addressed in the EMP, which includes mitigation measures recommended by specialists in their studies.

Although no specialist studies on the impacts on surface and groundwater was commissioned associated mitigation plans have still been prescribed.

9.8 CUMULATIVE IMPACTS

What cumulative effects will the proposed powerline contribute to?

GN 982 defines a cumulative impact in relation to an activity as “*the past, current or reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities*”.

In terms of cumulative impacts, this project is directly affected by the proposed Iphiva Substation because the powerline will have to loop into that new substation. If the new powerline is constructed next to an existing powerline then this would also be considered a cumulative impact. No other reasonably foreseeable future activities that will result in cumulative impacts have been identified.

Response

The Normandie-Iphiva 400 kV powerline is not being assessed in isolation, but in conjunction with the proposed new Iphiva Substation, as well as the other 400 kV powerline and 132 kV powerlines that will link into Iphiva. Therefore, the foreseeable future has been taken into account, in both the Scoping comparative assessment and this phase. This is also the main reason that the four applications are being assessed together as part of an overall scheme.

Impacts from past and current activities have also been taken into account in the description of the receiving environment (**Chapter 10**)

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10. ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE FOOTPRINT

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(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

As components of the Northern KZN Strengthening Project (the substation, two 400 kV powerlines and 165 km of 132 kV powerlines) impact on each other and are being assessed concurrently, the environmental attributes discussed below generally cover the greater study area that include all of these components.

10.1 CLIMATE

The area has warm to hot summers, high evaporation, dry warm winters and a mean annual rainfall between 495 and 1 560 mm. Average rainfall is higher in the western parts next to the hills and decreases gradually to the eastern parts further from the hills.

10.2 GEOLOGY

This region of KZN is underlain by lithostratigraphic units associated with the Karoo Supergroup (Main Karoo Basin), ranging in age from Late Carboniferous to Middle Jurassic. The Karoo Supergroup is famously known for its terrestrial vertebrate fossils, distinctive plant assemblages, thick glacial deposits and extensive dolerite dykes and sills.

10.3 LANDSCAPE AND TOPOGRAPHY

The dominant landscape features are valley slopes to undulating hills and flat plains with a network of trailing rivers and smaller streams. Mean elevation ranges from 0 m above mean sea level (mamsl) to 2,000 mamsl. The typical height increases as one moves further away from the coast. Eastern areas ranges from 0 – 910 mamsl, while areas in the west ranges from 655 – 1,559 mamsl.

10.4 SOILS

The Fb soil group occupies a large percentage (42.6%) of land in the Normandie-Iphiva corridors. These Fb group of soils are shallow and of low agricultural potential and have rock or weathered rock as underlying material. Relatively very small numbers of hectares have deep soils (>750 mm) in the corridors and soil depth is more likely to be between 450 to 750 mm. Clay contents is generally between 15 and 35% in both corridors. Almost 10.2% of the soils in the Normandie-Iphiva corridors have clay contents more than 35% and may therefore be susceptible to water

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erosion. Soils should always be kept covered with plants or crops to prevent erosion. The soils of the corridors have high percentages with a restricted soil depth associated with rockiness (31.6%).

10.5 AGRICULTURAL POTENTIAL

Arable crop production is not restricted by the climate of the area, but may become risky in the areas with lower and irregular rainfall patterns. The profile (plant) available water content also indicates soils of low potential in the entire project area. Almost 35% of the soils have favourable soil physical properties.

The area can be classed in five land capability classes, namely:

- Soils of intermediate suitability for arable agriculture;
- Soils not suitable for arable agriculture, but suitable for forestry or grazing;
- Soils of poor suitability for arable agriculture;
- No dominant class; and
- Water bodies.

The percentage of soils not suitable for arable agriculture, but suitable for forestry or grazing covers the highest percentage of the proposed corridors, namely 52.2%. Only small patches in the study area have a high potential agricultural value,

10.6 WATER RESOURCES

10.6.1 Drainage and Quaternary Catchments

The proposed powerline routes will directly traverse a total of 13 quaternary catchments, as listed in **Table 10.1**.

Table 10.1: Quaternary catchments

Quaternary Catchment	Major watercourse
W21K	White Mfolozi River; Nhlungwane ¹ ; and Mbilane tributary ¹ .
W21L	White Mfolozi River; Muniwana tributary ¹ ; and Mayayeni tributary ¹ .
W22J	Black Mfolozi River.
W22K	Wela tributary ² ; and Mvalo tributary ² .
W23A	Mfolozi River; Mvamanzi tributary ³ ; Nkatha tributary ³ ; and Mbukwini tributary ³ .
W31F	Nkuzana tributary ⁴ ; and Mpuphisi tributary ⁴ .
W31G	Mkuze River; and Mtiki tributary ⁴ .
W31H	Mkuze River; and Kwasekane tributary ⁴ .
W31K	Msunduzi tributary ⁴ ; Ntweni tributary ⁴ ; Msebe tributary ⁴ ; and Mduna tributary ⁴ .

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Quaternary Catchment	Major watercourse
W32C	Mzinene tributary ⁵ ; Mhlosinga tributary ⁵ ; Ngweni tributary ⁵ ; and Munywana tributary ⁵ .
W32E	Hluhluwe River ⁵ .
W32F	Nzimane tributary ⁶ ; Manyisa tributary ⁶ ; and Manzabomvu tributary ⁶ .
W32G	Nyalazi River ⁵ ; Hlazane tributary ⁵ ; Sikhathula tributary ⁵ ; Mnyaba tributary ⁵ ; and Nsane tributary ⁵ .

Key: ¹ denotes tributaries of the White Mfolozi River; ² denotes tributaries of the Black Mfolozi River; ³ denotes tributaries of the Mfolozi River; ⁴ denotes tributaries of the Mkuze River; ⁵ denotes tributaries of the St Lucia estuary; ⁶ denotes tributaries of the Hluhluwe River.

The major rivers associated with wetland and riparian habitat along the powerline routes include: The Pongola River and its tributaries traversed by the Normandie-Iphiva corridors, as well as the Mkuze and Hluhluwe Rivers.

10.6.2 National Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) (Nel *et. al.*; 2011) are strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources were considered to evaluate the importance of the wetland areas located within the project area (Nel *et. al.*; 2011). **Figure 10.1** shows the distribution of NFEPA wetlands associated with the study area.

Section A-B of the Normandie-Iphiva route traverses a large valley flat wetland of rank 2 (important for the maintenance of biodiversity), as well as numerous rank 4 (wetlands in good ecological condition) and 5 (wetlands identified for future rehabilitation efforts) wetlands.

A rank 1 wetland has been identified by NFEPA, which is attributable to the presence of a Ramsar wetland associated with the study site (found 2 km from the study area). The St Lucia Ramsar site consists of a complex arrangement of coastal dune forest, marine, estuarine and fresh water wetlands and hygrophilous grassland to the east of the study area. As a consequence, any wetlands linked to the adjacent Ramsar site should be conserved.

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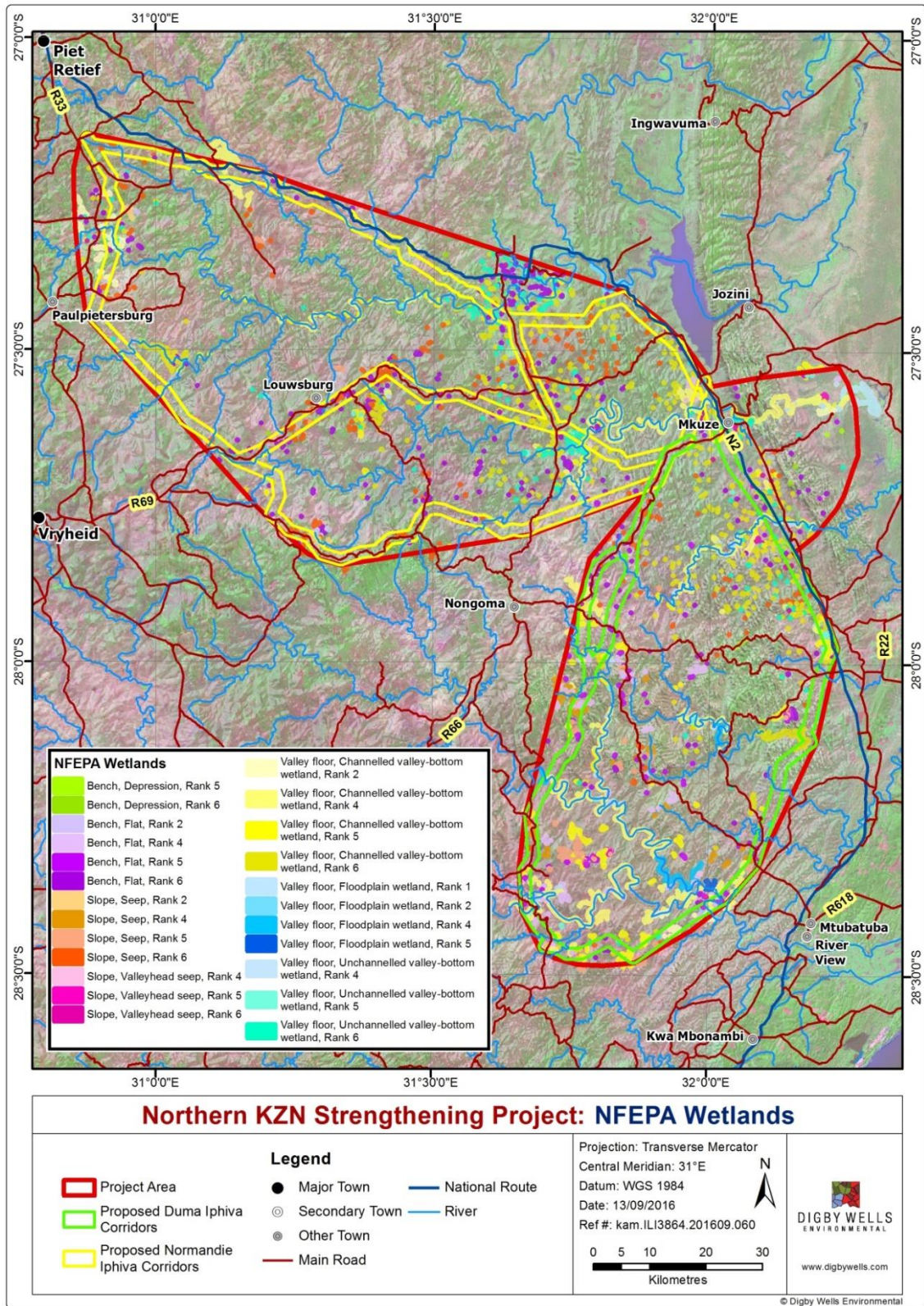


Figure 10.1: National Freshwater Ecosystems Priority Areas

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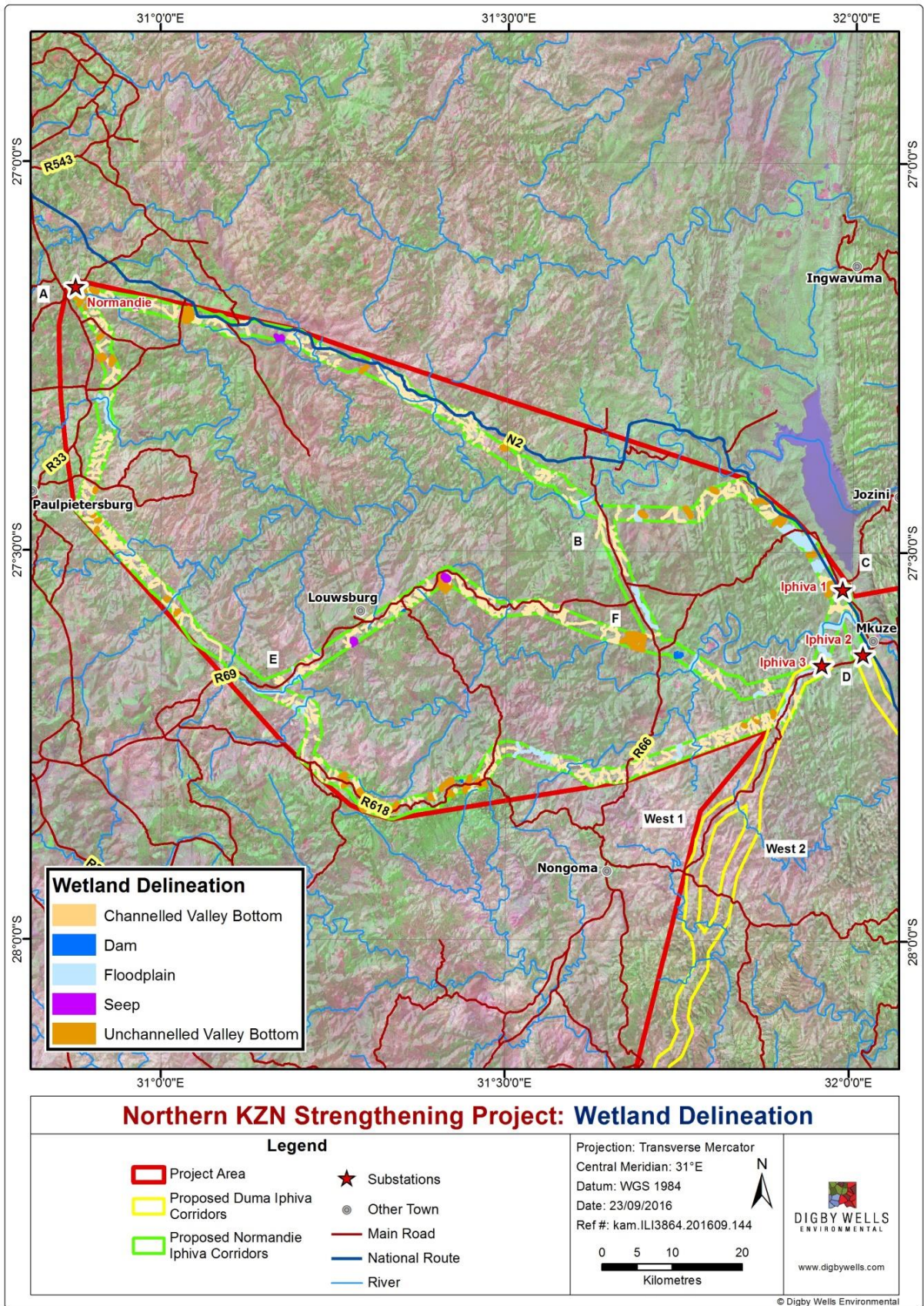


Figure 10.2: Preliminary Wetland Delineation

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10.7 FAUNA AND FLORA

10.7.1 Regional Vegetation

The KZN Vegetation Type map has undergone several changes since the publication of the Mucina and Rutherford (2006) national Vegetation Types. Ezemvelo has, in collaboration with various government departments, NGOs, Working Groups and Forums e.g. KZN Wetland Forum, IAIA, municipalities and parastatals, refined the KZN Vegetation Types to develop an accurate representation of the pre-transformation extent of the vegetation types present. As a result of the finer scale mapping and classification, KZN vegetation types map has in some cases identified new vegetation types and or subtypes within the vegetation types identified at national level. The sub types in some instances have different red data statuses from the main vegetation type, and are indicated as such (**Appendix G**). The fauna and flora specialist focussed on high conservation status vegetation in his field.

10.7.2 Flora

Species of Special Concern

The Red Data listed species that have been recorded previously in the relevant 26 Quarter Degree Square Grid (QDS grids) are listed in the Fauna and Flora Specialist study (**Appendix G**). This list is supplemented with data received from Ezemvelo in January 2017.

Within this list three species are designated as Critically Endangered, 15 species as Declining, ten species as Endangered, 13 species as Near Threatened, five species as Rare, one species as Threatened and 21 species as Vulnerable. No champion trees occur within the route alignments. (DAFF 2012).

10.7.3 Fauna

Mammals

A database search for mammal species that have been recorded in the 26 QDS grids, on the virtual museum of the Animal Demography Unit (<http://www.adu.org.za>) was performed (**Appendix G**). This database forms part of the Department of Biological Science at the University of Cape Town. Mammal species that have been recorded in the Kwa-Zulu Natal province, and could possibly occur in the area of interest are discussed below.

Mammal species expected to occur in the area of interest include eight Vulnerable species, two Near Threatened, one Critically Endangered species and two Endangered as per ADU database searches. The variety of vegetation types occurring in the area of interest ensures an ecologically diverse assemblage of plant species which in turn could support a variety of mammal species, therefore the current expected species list could be more extensive than it is currently.

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21 bat species of conservation concern can possibly be present in the area of interest.

10.7.4 Reptiles

Reptiles are ectothermic (cold-blooded) meaning they are organisms that control body temperature through external means. As a result, reptiles are dependent on environmental heat sources. Due to this many reptiles regulate their body temperature by basking in the sun, or in warmer areas. Substrate is an important factor determining which habitats are suitable for which species of reptile.

According to the Animal demography unit's virtual museum a total of 60 species have been recorded in the relevant QDS grids in the past (<http://sarca.adu.org.za/>). Only three protected species are expected to occur within the Transmission powerline corridors and proposed substation sites.

10.7.5 Amphibians

Amphibians are viewed to be good indicators of changes to the whole ecosystem because they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). According to Carruthers (2009), frogs occur throughout southern Africa. No protected amphibian or NEMBA protected species are expected to occur in the study area.

10.7.6 Invertebrates

Butterflies are a good indication of the habitats available in a specific area (Woodhall 2005). Although many species are eurytopes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify.

10.7.7 Birds

The project area falls within the northern section of KZN and the region is well known for its large wetlands, river systems, grassland hills, bushveld and diverse micro-habitats. 58 of Southern Africa's endemic and near endemic avifaunal species are found within the project area, many of them confined to the grassland, riparian and wetland systems. Although the summer months are more productive for the diversity of species due to the arrival of breeding migrants, winter provides large congregations of water birds around some of the nationally important wetlands found within or close to the project area.

The site falls within the Maputaland-Pondoland Centre of Endemism, which is a biodiversity hotspot. There is an Important Bird Area (IBA) within the current

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proposed project area, namely; the Ithala Game Reserve. There are a further three IBAs in close proximity, namely the Hluhluwe–Umfolozi National Park, the Pongola Nature Reserve and the Mkhuze Game Reserve which forms part of the greater Isimangaliso Wetland Park.

Collectively these IBAs would constitute some of the most avifaunal rich and diverse areas in South Africa. Many of the areas outside these IBAs will have similar habitat and species will therefore not be restricted to the protected areas.

The Ithala Game Reserve is located 15 km from the town of Louwsburg south of the Pongola River. This IBA is known to support more than 300 bird species, a diversity that can be attributed to its variety of habitat it supports including Ithala Quartzite Sourveld Grassland vegetation (Mucina and Rutherford, 2006). In the higher altitude areas, the vulnerable Southern Bald Ibis (*Geronticus calvus*), Blue Crane (*Anthropoides paradiseus*) and several large bird of prey species including the endangered White-backed Vulture (*Gyps africanus*), Lappet-faced Vulture (*Torgos tracheliotos*), Martial Eagle (*Polemaetus bellicosus*), Bateleur (*Terathopius ecaudatus*) and Tawny Eagle (*Aquila rapax*) occur. African Grass Owl (*Tyto capensis*) occurs in the grassland areas. (Birdlife.org.za).

The Pongola Nature Reserve IBA is located 30 km south-east of Pongola town. The Pongola River flows in from the north-west and only a small section of the river lies inside the reserve. The vegetation predominantly consists of Zululand Lowveld (Mucina and Rutherford, 2006). The associated wetlands are important for wetland-dependent birds such as the Pink-backed Pelican (*Pelecanus rufescens*) which has bred there in the past, making this one of only two sites in South Africa where it does so.

Globally threatened species include the endangered vulture species such as Lappet-faced Vulture (*Torgos tracheliotos*), White-headed Vulture (*Trigonoceps occipitalis*), White-backed Vulture (*Gyps africanus*) and Martial Eagle (*Polemaetus bellicosus*). Regionally threatened species are Marabou Stork (*Leptoptilos crumeniferus*), African Marsh Harrier (*Circus ranivorus*), African Grass Owl (*Tyto capensis*) and Tawny Eagle (*Aquila rapax*). Biome-restricted species include White-throated Robin-Chat (*Irania gutturalis*), Gorgeous Bush-Shrike (*Telophorus viridis*) and Rudd's Apalis (*Apalis ruddi*).

The Mkuze IBA is located on the western edge of the Isimangaliso Wetland Park which is both a Ramsar Site and a World Heritage Site. Here a number of large pan systems exist and therefore the IBA is home to a number of Red Data Listed wetland and aquatic species. There are important water courses and wetlands that are associated with the river systems in the central and southern region of the study

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area, as well as in the east within the Mkhuze Game Reserve. These wetlands may well be seasonal but occasionally inundated with water and associated with the “Subtropical Alluvial Vegetation” vegetation type (Mucina & Rutherford 2006). The larger rivers and associated sandbanks provide habitat for various wading species including, Lapwings, Plovers, Stilts and Sandpipers.

Rivers and drainage lines also represent important flight paths for many species. These areas will be very important for assorted water bird species, and construction of the new powerline in close proximity to these areas should be avoided.

The Hluhluwe–Umfolozi IBA is located 20 km north-west of the town Mtubatuba, at the junction of the coastal plain and the foothills of the KZN interior. The local vegetation is classified as Zululand Lowveld and Northern Zululand Thornveld (Mucina and Rutherford, 2006). This region to the south of the proposed project area is known to support more than 400 bird species, about 46% of the species found in the southern African sub-region (birdlife.org.za). The bird diversity within the region can be attributed to the variety of habitats in this area. This diversity includes a number of important populations of large, widespread Red Data Listed birds of prey that have suffered outside the protected areas.

Large terrestrial species found here and are susceptible to powerline collisions include Black Stork (*Ciconia nigra*), Woolly-necked Stork (*C. episcopus*), African Openbill (*Anastomus lamelligerus*) and Saddle-billed Stork (*Ephippiorhynchus senegalensis*). Several endangered vulture species that are rare outside South Africa's large parks are locally common here.

Various sensitivity zones have been identified on a desk top level, associated with protected areas and IBAs, including potentially pristine or secondary grassland, bushveld/thornveld and sand forest, wetlands, pans and rivers. Avifaunal input into the EMPr will be compiled via a screening site visit with a focus on these sensitivity zones. This will help to identify the areas for marking and areas to install deflectors to mitigate for bird collisions, once the final route is chosen.

The desktop specialist study shows bird sensitive areas to be widespread throughout the study area. During the site visit this species list will be fine-tuned depending on infield observations and confirmation of the habitats associated with the proposed project area.

The South African Bird Atlas Project data (SABAP2) has recorded a total of 29 Red Data species according to the International Union for Conservation of Nature (IUCN, 2016), these comprise 3 Endangered species, 11 Vulnerable species and 13 Near-

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threatened species and are presented in the Avifauna Specialist Study in **Appendix H**.

10.8 IDENTIFICATION OF ENVIRONMENTAL SENSITIVITIES

In terms of ecological sensitivity, the following features are assessed to determine how sensitive the habitat identified within the transmission line corridors is:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

Terrestrial conservation priorities highlighted in the Terrestrial Systematic C-Plan for the Province (EKZNW, 2010). According to this plan, the majority of the project site and proposed corridors fall within areas known as Biodiversity areas, all the alternatives cross Critical Biodiversity areas 1 Mandatory, or Critical Biodiversity areas Optimal. The existing protected area network is not affected by the corridors or sub stations.

Biodiversity Priority Areas (BPAs) refer to natural areas that are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. The importance of the biodiversity features in BPAs and the associated ecosystem services is sufficiently high that, if their existence and condition are confirmed, the likelihood of a fatal flaw for new development projects is high (i.e. development projects are likely to be significantly constrained or may not receive necessary environmental authorizations).

10.8.1 Critical Biodiversity Areas including Centres of Endemism

The powerline corridors fall within the Maputaland-Pondoland Centre of Endemism, this is a biodiversity hotspot. Stretching along the east coast of southern Africa, from southern Mozambique through KZN and the Eastern Cape in South Africa, the recently recognized Maputaland-Pondoland-Albany Hotspot is an exceptionally diverse area.

The hotspot is the meeting point of six of South Africa’s eight major vegetation types. The region boasts an unusually high number of unique species and ecosystems, with one type of forest (sand forest), six types of bushveld and five types of grassland restricted to the hotspot, as well as an entire vegetation type called “subtropical thicket.”

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The hotspot is a refuge for the critically endangered Black Rhino. It is estimated that only 3,600 Black Rhino remaining in the wild (compared with 65,000 animals recorded in the 1970s), most of which are restricted to this hotspot.

The hotspot is also home to most of South Africa's natural forests, and with nearly 600 tree species it has the highest tree diversity of any temperate forest in the world. The region is home to the 'Big Five' game animals (elephant, lion, rhino, leopard and Cape buffalo).

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan.

10.8.2 Sensitivity and Conservation Planning Tools

There are several assessments for South Africa as a whole, as well as on provincial levels that allow for detailed conservation planning as well as meeting biodiversity targets for the country's variety of ecosystems. These guides are essential to consult for development projects, and will form an important part of the sensitivity analysis. Areas earmarked for conservation in the future, or that are essential to meet biodiversity and conservation targets should not be developed, and have a high sensitivity as they are necessary for overall functioning. In addition, sensitivity analysis in the field, based in much finer scale data can be used to ground truth the larger scale assessments and put it into a more localised context, once field work is complete.

10.8.3 Protected areas

Officially protected areas, either provincially or nationally that occur close to a project site could have consequences as far as impact on these areas are concerned. Protected areas that occur within the broader study area (South African Protected Areas Database (2016) are presented on **Figure 10.3**.

10.8.4 Nationally Threatened Ecosystems

The list of national Threatened Ecosystems has been gazetted (NEM:BA: National list of ecosystems that are threatened and in need of protection) and result in several implications in terms of development within these areas (**Figure 10.4**).

10.8.5 National Protected Areas Expansion Strategy

The National Protected Areas Expansion Strategy (NPAES) are areas designated for future incorporation into existing protected areas (both National and informal protected areas). These areas are large, mostly intact areas required to meet biodiversity targets, and suitable for protection. They may not necessarily be

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proclaimed as protected areas in the future and are a broad scale planning tool allowing for better development and conservation planning (**Figure 10.5**).

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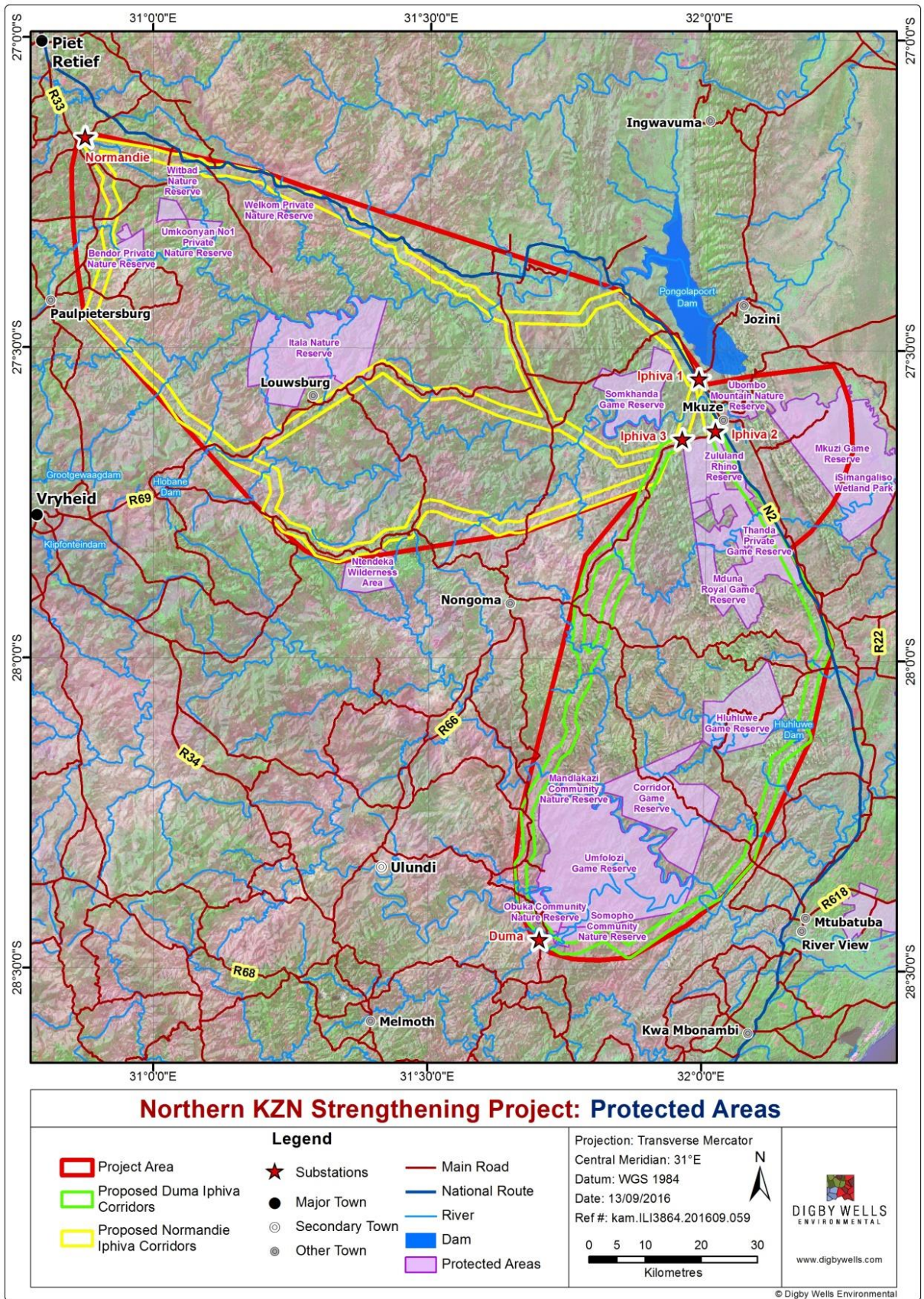


Figure 10.3: Protected area in relation to the study site

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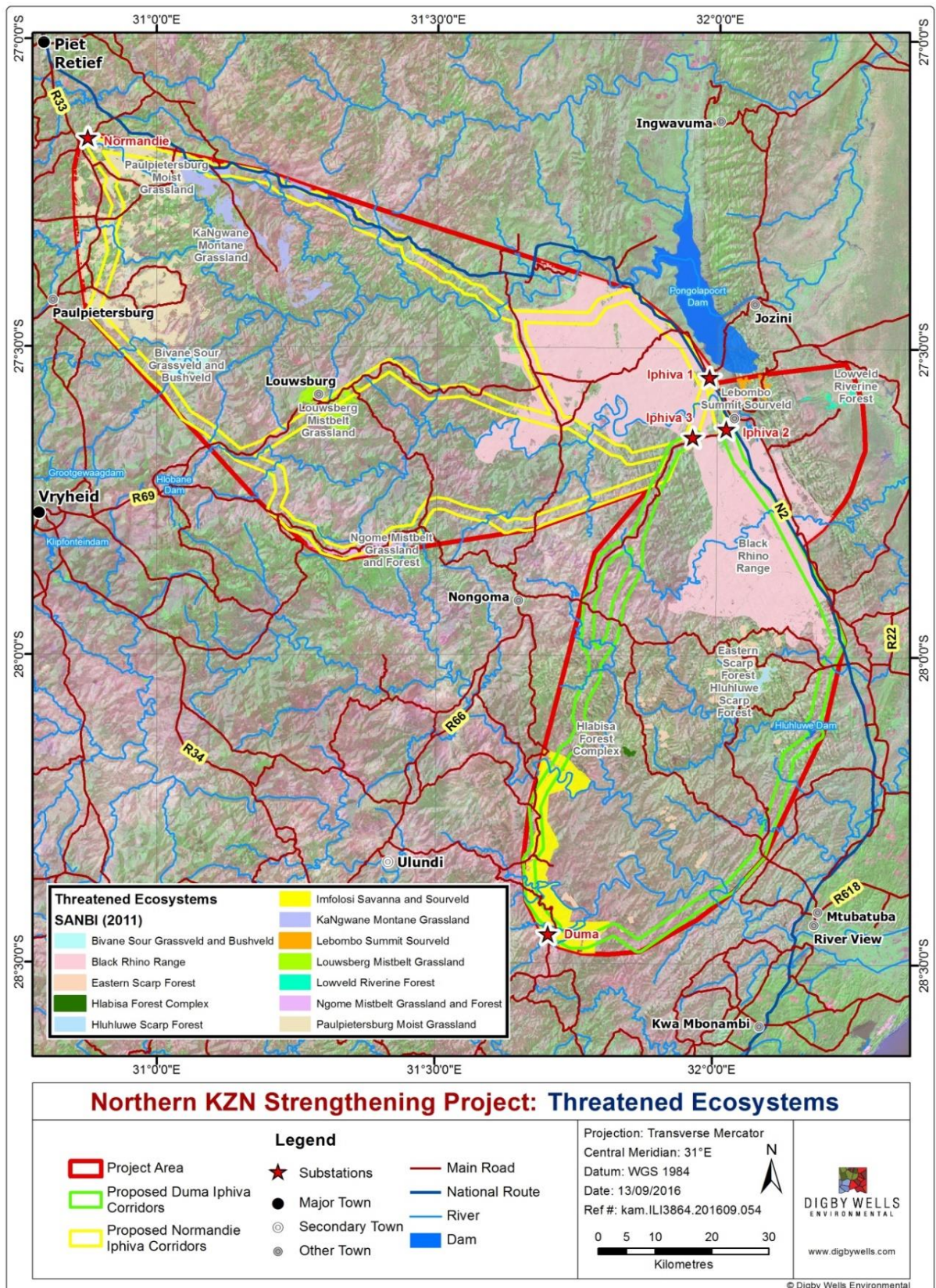


Figure 10.4: Nationally Threatened Ecosystems

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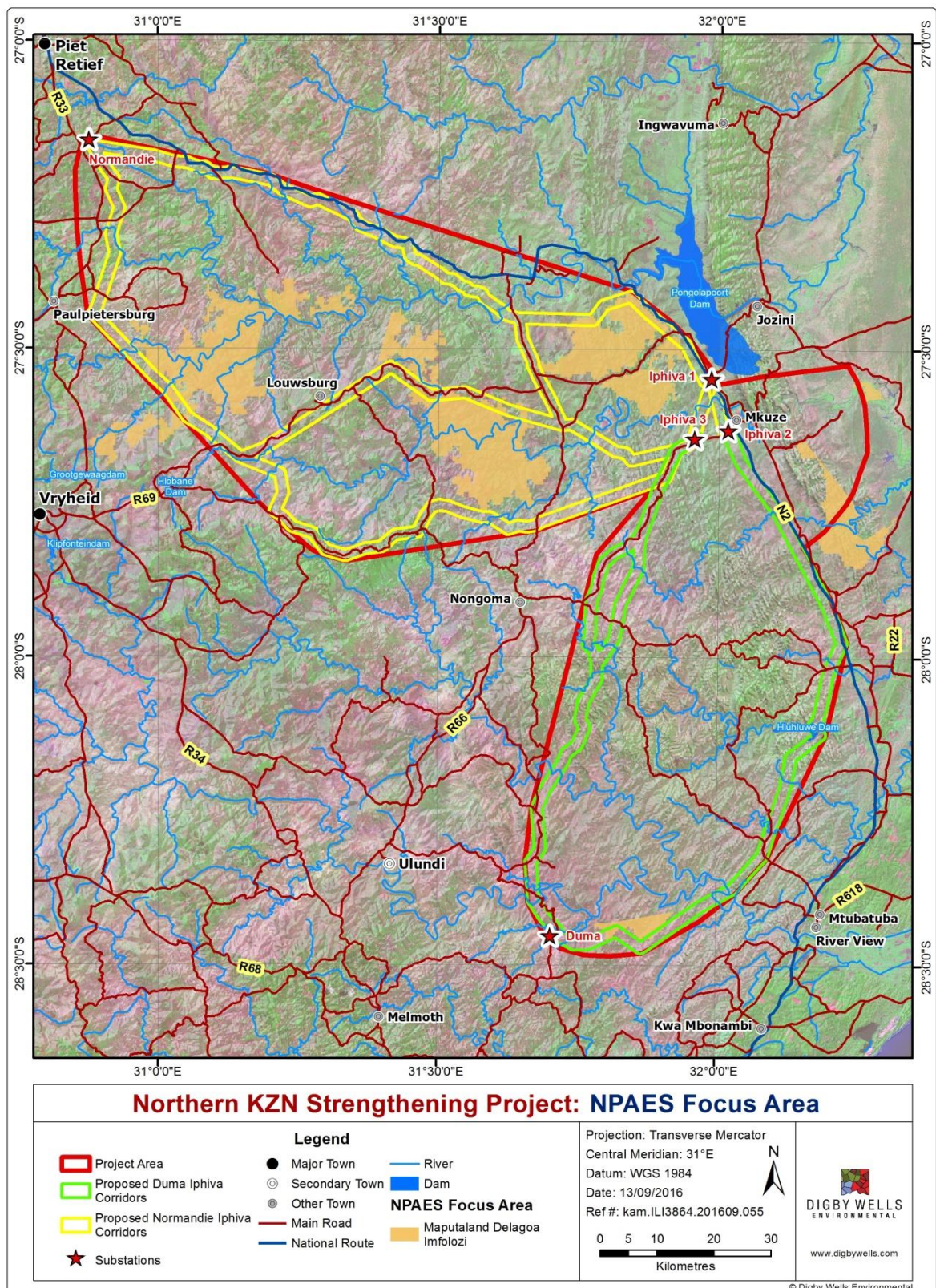


Figure 10.5: NPAES Focus Areas

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10.9 HERITAGE

The baseline profile and identified heritage resources show that the study area is underlain by palaeontologically sensitive area and known heritage resources and events span from the Stone Age through to the historical period.

Lithostratigraphic units underlying the study area are considered to be of high sensitivity. While surface disturbance through project related activities are unlikely to expose fossiliferous material, rock outcrops would need to be surveyed to identify any potential fossil heritage.

Archaeological resources associated with the Stone Age, rock art and farming community period have been identified in the region. *In situ* archaeological sites and heritage resources are more likely to be identified in areas that have been minimally disturbed through anthropogenic processes. Open / undisturbed areas are therefore considered to be of high sensitivity, where minimally disturbed areas, such as field, or heavily disturbed areas such as urban / settlements are considered to be of medium and low sensitivity respectively.

Heritage resources associated with the historical period that have been identified in the study area include the following:

- Battlefields;
- Monuments and memorials;
- Historic built structures; and
- Burial grounds and graves.

With the exception of the identified battlefield, the majority of the heritage resources associated with the historical period occur within urban / settlement areas that have been altered through time via anthropogenic processes. While the individual resources themselves may be considered to have a high cultural sensitivity, the proposed development will like have a negligible impact to these resource types.

10.10 LAND USE

The majority of the study area's land use consists of:

- **Commercial farming** - large sugarcane plantations occur around Pongola as well as an area on the R66 towards Nongoma, where the R66 crosses the Mkuze River. Croplands coincide with the more evenly sloped areas.
- **Forestry** - Significant forestry areas occur in the following high-lying areas:
 - Areas north of Frischgewaagd; and
 - Along the R69 to Louwsburg.

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- **Dispersed rural settlement** - informal housing settlements (villages) and single isolated homesteads are scattered throughout the study area, coinciding with subsistence agriculture.
- **Larger formalised towns** - these include Louwsburg, located more towards the west of the study area and Pongola, located towards the north of the study area.
- **Existing infrastructure** – The presence of infrastructure such as roads, rail and powerlines affect the visual sensitivity of the landscape. These features will be mapped during the EIA phase as part of the baseline description.
- **Conservation / game farming** – there are large areas in the study area with formal status under NEM:PAA.

10.11 SOCIO-ECONOMIC CHARACTERISTICS

The study area is mostly located in the KZN province, with a small portion located in the Mpumalanga Province. There are only a few large towns in the area. The rest of the area consists of settlements in areas under traditional leadership, commercial farms as well as some game reserves.

For the baseline description of the area data from Census 2011, Community Survey 2016, municipal IDP's and websites were used. It must be noted that some of the municipalities amalgamated or were incorporated in other municipalities on 3 August 2016. As the most of the data is based on the 2011 demarcation boundaries, these are used for a description of the area (**Table 10.2**) (**Figure 10.6**).

The results should be viewed as indicative of the population characteristics in the area and should not be interpreted as absolute.

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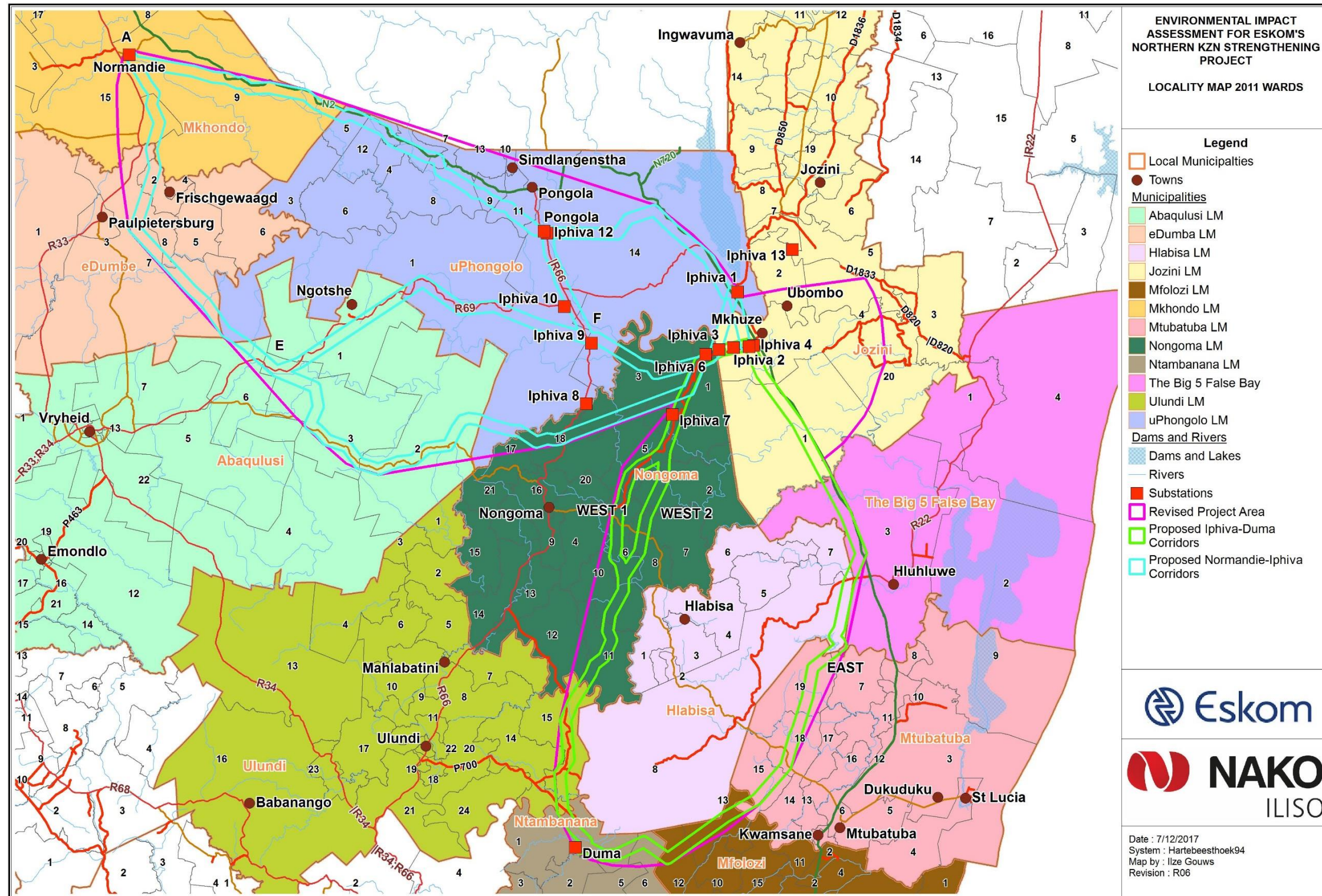


Figure 10.6: Locality with 2011 municipal and ward boundaries

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Table 10.2: Project area in municipal context (2011 demarcation boundaries).

Province	District Municipality	Local Municipality	Wards
Mpumalanga	Gert Sibande	Mkhondo	9, 15
KZN	Zululand	eDumbe	2, 4, 5, 6, 7, 8
		uPhongolo	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
		Abaqulusi	1, 2, 3, 4, 5, 6, 7
		Nongoma	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 17, 18, 19, 20
		Ulundi	14, 15

All the land that was owned or belonged to the KZN Government is held by the Ingonyama Trust (www.ingonyamatrust.co.za) since 1994. The mandate of the trust is to hold the land for “the benefit, material welfare and social well-being of the members of the tribes and communities” living on the land. The Zulu King is the sole trustee of the land. The Ingonyama Trust Board administers the affairs of the Trust and the Trust land. Most, if not all, the land in KZN that is under traditional authority belongs to the Ingonyama Trust.

Settlement patterns in the study area are scattered and dwellings consist mostly of brick structures or traditional structures. Most people have isiZulu as home language.

Basic and social infrastructure is limited and does not meet the needs of the entire population in the area. Municipalities in the area are faced with challenges that urban municipalities do not have. The settlement patterns make it extremely challenging to provide infrastructure such as piped water and sanitation. Road infrastructure in general needs some upgrading and the conditions of the roads make it challenging to reach the communities that need to be served. In some areas relationships with traditional leadership provides an additional challenge. As there are few employment opportunities in these areas, many males have migrated to urban areas in search of employment, resulting in a community that stays behind with more females than males, as well as a very young population group. Other challenges include poverty, unemployment, illiteracy and skills levels and crime.

Most of the municipal areas have shown an increase both in the number of people as well as the number of households. In most areas the household sizes have decreased. This can be due to children leaving their parents’ house to stay on their own and start families of their own.

The area is characterised by high levels of poverty as well as deprivation on a number of dimensions which mostly related to access to basic services. Education levels are low and there are very few employment opportunities. In areas under traditional leadership, subsistence farming is a very important livelihood strategy and informal trading plays a much greater role in survival than in urban areas.

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In terms of commercial farming, sugar cane and forestry are concerns when it comes to the presence of powerlines. Sugar cane needs to be burnt, and as such cannot be planted below powerlines. Although there are other methods to harvest sugar cane, those are more expensive and labour intensive. Fire is a great risk in terms of forestry, and a spark or a snapped powerline could cause extensive damage. Fire is often used as a retribution measure in some areas, and this might also cause damage to powerlines.

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11. IMPACT AND RISK ASSESSMENT

GN 982 Appendix 1:

- (i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including—
 - (i) a description of all environmental issues and risks that were identified during the EIA process; and
 - (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;
- (j) an assessment of each identified potentially significant impact and risk, including—
 - (i) cumulative impacts;
 - (ii) the nature, significance and consequences of the impact and risk;
 - (iii) the extent and duration of the impact and risk;
 - (iv) the probability of the impact and risk occurring;
 - (v) the degree to which the impact and risk can be reversed;
 - (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and
 - (vii) the degree to which the impact and risk can be avoided, managed or mitigated;

11.1 APPROACH

For this project, authorisation of a corridor (approximately 500 m wide) within which a 36 m servitude for the powerline can be acquired will be applied for. The acquisition of the servitudes and identification of the tower positions will only be undertaken after Environmental Authorisation (EA) has been received. The EA will therefore be obtained without doing detailed ground surveys of the full corridors by the different specialists. The commenting authorities are expected to stipulate that further studies will be required during implementation. The DEA is expected to issue the authorisation with the detailed studies (walk-down) to be done during implementation as conditions.

11.1.1 Regulated activities and the scope of Impact Assessment

The NEMA 2014 EIA Regulations require authorisation for specific listed **activities** only. The EMPr, however, required in terms of these Regulations, however, requires the management of a broader set of aspects. The impact assessment, therefore, needs to extend beyond these activities.

11.1.2 Activities, Aspects and Impacts

Environmental **impacts** occur as a result of an activity, that through the associated **aspects** bring about changes in the environment. The significance of such changes is a direct function of the intensity of the aspects in combination with the sensitivity or vulnerability of the receiving environment. Environmental impacts are defined as ‘changes’ in the environment, where the requirement of an EIA process is to characterise the changes and the significance of the changes for decision-making.

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The Regulations (GN 982 Appendix 2 item 2 (i) (ii) to (v), as amended by Appendix 2 item 2(h)(ii), (iii), (iv) of GN 326 of 7 April 2017) require that aspects be described and assessed in the impact assessment.

Environmental aspects can be understood as resource use, such as land, water, fuels etc., waste and pollution such as dust, noise, solid waste, spills etc., and social aspects such as jobs and spending.

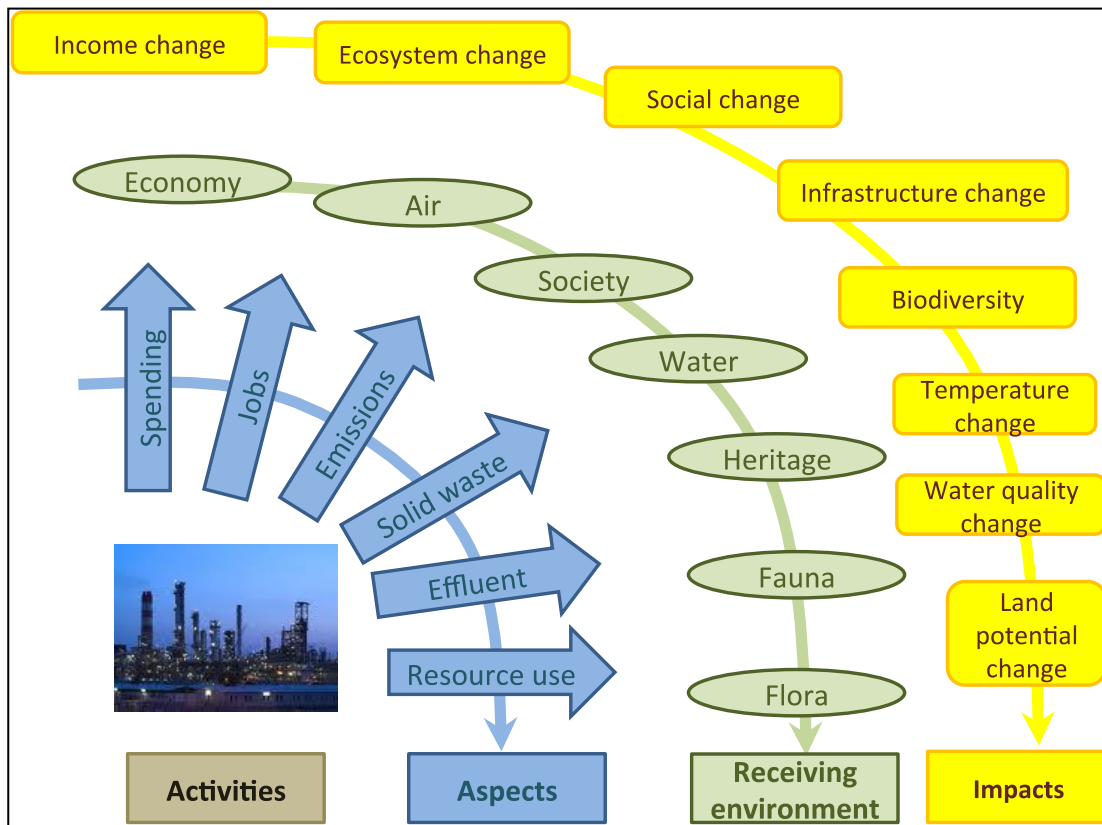


Figure 11.1 Schematic presentation of how activities bring about environmental and social aspects, which result in changes to the receiving environment, which are defined as impacts

Source: O'Beirn, S: Draft Good Practice Manual, prepared for IAAsa, 2017

The aspects that have been identified for the project are listed in **Table 11.1**.

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Table 11.1: Aspects to be assessed by specialists

Aspect Category		Aspect	Specialist study that will address this aspect
Resource use		Water	None
		Energy	None
		Land (land transformation)	Fauna and Flora, Avifauna, Heritage, Wetlands, Agricultural potential, Visual Impact Assessment and Social
		Raw materials	None
Waste and pollution		Atmospheric emissions	None
		Effluent	None
		Solid/liquid wastes	None
		Energy emitted (noise, light)	Visual Impact Assessment
Socio-Economic		Jobs	Socio-economic
		Spending	Socio-economic
		Skills	Socio-economic

11.2 ASPECTS TO BE ASSESSED BY SPECIALISTS

The following specialist studies have been undertaken:

- Fauna and Flora (see **Section 12.1** for a summary);
- Avifauna (see **Section 12.2** for a summary);
- Wetlands (see **Section 12.3** for a summary);
- Heritage (see **Section 12.4** for a summary);
- Agricultural potential (see **Section 12.5** for a summary);
- Social (see **Section 12.6** for a summary);
- Visual (see **Section 12.7** for a summary); and
- Economic (see **Section 12. 8** for a summary).

11.3 ASSESSMENT METHODOLOGY

The key issues identified informed the terms of reference of the specialist studies. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. The significance of the potential impacts has been considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

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A description of the nature of the impact, any specific legal requirements and the stage (construction or operation) have been detailed in the specialist studies given. A separate EIA will be required at a later stage for decommissioning.

The following criteria have been used to evaluate significance:

- **Nature:** This is an appraisal of the type of effect the activity is likely to have on the affected environment. The description includes what is being affected and how. The nature of the impact will be classified as positive or negative, and direct or indirect.
- **Extent:** This indicates the spatial area that may be affected (**Table 11.2**).

Table 11.2: Geographical extent of impact

Rating	Extent	Description
1	Site	Impacted area is only at the site – the actual extent of the activity.
2	Local	Impacted area is limited to the site and its immediate surrounding area
3	Regional	Impacted area extends to the surrounding area, the immediate and the neighbouring properties.
4	Provincial	Impact considered of provincial importance
5	National	Impact considered of national importance – will affect entire country.

- **Duration:** This measures the lifetime of the impact (**Table 11.3**).

Table 11.3: Duration of Impact

Rating	Duration	Description
1	Short term	0 – 3 years, or length of construction period
2	Medium term	3 – 10 years
3	Long term	> 10 years, or entire operational life of project.
4	Permanent – mitigated	Mitigation measures of natural process will reduce impact – impact will remain after operational life of project.
5	Permanent – no mitigation	No mitigation measures of natural process will reduce impact after implementation – impact will remain after operational life of project.

- **Intensity / severity:** This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (**Table 11.4**).

Table 11.4: Intensity of Impact

Rating	Intensity	Description
1	Negligible	Change is slight, often not noticeable, natural functioning of environment not affected.
2	Low	Natural functioning of environment is minimally affected.

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Rating	Intensity	Description
		Natural, cultural and social functions and processes can be reversed to their original state.
3	Medium	Environment remarkably altered, still functions, if in modified way. Negative impacts cannot be fully reversed.
4	High	Cultural and social functions and processes disturbed – potentially ceasing to function temporarily.
5	Very high	Natural, cultural and social functions and processes permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

- **Potential for irreplaceable loss of resources:** This is the degree to which the project will cause loss of resources that are irreplaceable (**Table 11.5**).

Table 11.5: Potential for irreplaceable loss of resources

Rating	Potential for irreplaceable loss of resources	Description
1	Low	No irreplaceable resources will be impacted.
3	Medium	Resources can be replaced, with effort.
5	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

- **Probability:** This is the likelihood or the chances that the impact will occur (**Table 11.6**).

Table 11.6: Probability of Impact

Rating	Probability	Description
1	Improbable	Under normal conditions, no impacts expected.
2	Low	The probability of the impact to occur is low due to its design or historic experience.
3	Medium	There is a distinct probability of the impact occurring.
4	High	It is most likely that the impact will occur
5	Definite	The impact will occur regardless of any prevention measures.

- **Confidence:** This is the level of knowledge or information available, the environmental impact practitioner or a specialist had in his/her judgement (**Table 11.7**).

Table 11.7: Confidence in level of knowledge or information

Rating	Confidence	Description
1	Low	Judgement based on intuition, not knowledge/ information.
2	Medium	Common sense and general knowledge informs decision.
3	High	Scientific / proven information informs decision.

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- **Consequence:** This is calculated as extent + duration + intensity + potential impact on irreplaceable resources.
- **Significance:** The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. consequence x probability = significance). The maximum value which can be obtained is 100 significance points (**Table 11.8**).

Table 11.8: Significance of issues (based on parameters)

Rating	Significance	Description
1-14	Very low	No action required.
15-29	Low	Impacts are within the acceptable range.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.
	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.
	High	Impacts are of great importance, mitigation is crucial.
81-100	Very high	Impacts are unacceptable.

- **Cumulative Impacts:** This refers to the combined, incremental effects of the impact, taking other past, present and future developments in the same area into account. The possible cumulative impacts will also be considered.
- **Mitigation:** Mitigation for significant issues will be incorporated into the EMP.

Digby Wells undertook the Fauna and Flora, Avi-fauna, Wetlands and Heritage specialist studies. Their methodology differs quite significantly from the above and their matrix has a rating range that extends from -147 to +147. A table that converts the Digby Wells significance ratings to the NAKO ILISO scale is included in **Table 11.9**.

Table 11.9: Conversion of Digby Wells to NAKO ILISO Scoping Systems

NAKO ILISO Rating	NI Significance	NI Description	DWE Rating	DWE description	DWE Significance
1-14	Very low	No action required.	3 – 35	Negligible	A small positive impact. The impact will result in medium to short term effects.
					An acceptable negative impact for which mitigation is desirable but not essential.
15-29	Low	Impacts are within the acceptable	36 – 72	Minor	An important positive impact.

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NAKO ILISO Rating	NI Significance	NI Description	DWE Rating	DWE description	DWE Significance
		range.			An important negative impact which requires mitigation.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.	72 – 90	Moderate	A beneficial impact which may help to justify the implementation of the project.
45-59	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.	91 – 108		A serious negative impact which may prevent the implementation of the project.
60-80	High	Impacts are of great importance, mitigation is crucial.	109 – 127	Major	A very beneficial impact which may be sufficient by itself to justify implementation of the project.
81-100	Very high	Impacts are unacceptable.	128 – 147		A very serious negative impact which may be sufficient by itself to prevent implementation of the project.

11.4 FINDINGS OF IMPACT ASSESSMENTS

Detailed assessment tables have been included in each specialist study (**Appendices D to K**) and are summarised in **Tables 11.10 to 11.46**.

11.4.1 Fauna and Flora

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present. The resultant impacts are listed in **Tables 11.10** and **11.11**.

Table 11.10: Potential Impacts of Construction of the 132kV Distribution Lines Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of floral species/vegetation types and biodiversity			

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Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Prior to mitigation/ management			
Duration	Permanent (7)	Total loss of floral species/vegetation will occur on selected footprint sites.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site (pylon infrastructure).	
Intensity x type of impact	Serious (4)	The footprint of I-D covers multiple undisturbed vegetation types.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. 			
Post- mitigation			
Duration	Permanent (5)	Project life.	Moderate (negative) – 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of the pylons.	Moderate (negative) – 84
Extent	Provincial (5)	Species/habitat loss will only occur within the project site, and will be limited to the corridor but will extend across a very long corridor.	

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Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Intensity x type of impact	High (4)	Natural vegetation occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral species of special concern. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland). ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant species of special concern are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery. 			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Minor (negative) – 55
Extent	Municipal area (4)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Ongoing - negative (4)	Dependent on sensitivity of the specific site.	
Probability	Likely (5)	Rehabilitation with correct species and techniques are critical for success.	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Alien vegetation establishment			
Prior to mitigation/ management			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	

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Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	Rating	Motivation	Significance
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place. 			
Post management			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		

Table 11.11: Summary of Impact Ratings for fauna and flora

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse	Direct loss of floral species/vegetation types and biodiversity	Moderate (negative)
2	GN983 (28) – Institutional Developments	Loss of species of special concern (protected species)	Low (negative)
3	GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Alien vegetation establishment	Very Low

11.4.2 Avi-fauna

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present. The resultant impacts are listed in **Tables 11.12 and 11.13.**

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Table 11.12: Potential Impacts of Construction of the 132kV Distribution Lines Infrastructure

Activity and Interaction Construction of infrastructure require site clearing			
Dimension	Rating	Motivation	Significance
Impact Description: Direct loss of avifauna habitat and biodiversity			
<i>Prior to mitigation/ management</i>			
Duration	Permanent (7)	The risk to avifauna will be permanent.	Moderate (negative) – 105
Extent	Limited (3)	Risks are only associated with the pylon infrastructure and the transmission lines.	
Intensity x type of impact	Serious (5)	The footprint of distribution lines cover dispersion areas of multiple bird species of special concern.	
Probability	Definite (7)	It is likely bird fatalities will occur.	
Nature	Negative		
Mitigation/ Management actions			
<ul style="list-style-type: none"> ▪ A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. ▪ The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; ▪ An Avifauna Specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); ▪ Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of Bird diverters; and ▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action; ▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; 			
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Activity and Interaction Construction of infrastructure require site clearing			
Dimension	Rating	Motivation	Significance
<ul style="list-style-type: none"> It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes. 			
Post- mitigation			
Duration	Permanent (5)	Infrastructure will be present for the life of the project.	Moderate (negative) – 77
Extent	Limited (3)	Mitigation measures could limit bird and powerline interaction.	
Intensity x type of impact	Moderate (-3)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction: Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Permanent (7)	The risk to avifauna will be permanent.	Moderate (negative) – 105
Extent	Limited (3)	Risks are only associated with the pylon infrastructure and the transmission lines.	
Intensity x type of impact	Serious (5)	The footprint of distribution lines covers dispersion areas of multiple bird species of special concern.	
Probability	Definite (7)	It is likely bird fatalities will occur.	
Nature	Permanent (7)	The risk to avifauna will be permanent.	
Mitigation/ Management actions			
<ul style="list-style-type: none"> A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; An Avifauna Specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; 			

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Activity and Interaction: Construction of infrastructure require vegetation clearing)			
Dimension	Rating	Motivation	Significance
		<ul style="list-style-type: none"> ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of Bird diverters; and ▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action; ▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; ▪ It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and ▪ Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes. 	
Post management			
Duration	Permanent (5)	Infrastructure will be present for the life of the project.	Moderate (negative) - 77
Extent	Limited (3)	Mitigation measures could limit bird and powerline interaction.	
Intensity x type of impact	Moderate (-3)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Table 11.13: Summary of Impact Ratings for Avi-fauna

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse	Direct loss of avifauna habitat and biodiversity as a result of vegetation clearing	Low (negative)
2	GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area	Loss of species of special concern (protected species) due to habitat clearing	Low (negative)

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	GN 984 (12) – Clearing vegetation in sensitive area		
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11.4.3 Wetlands

Among the impacts associated with the proposed Project are minor potential impacts to soil and water quality as a result of the ingress of hydrocarbons and mechanical spills associated with moving machinery required for the construction activities.

Larger impacts include compaction of soils, loss of natural vegetation due to site clearing activities and the increased potential for erosion and sedimentation in the construction and operational areas and resulting in impacts further downstream. With unregulated use of existing dirt roads across wetlands and indiscriminate driving and movement of heavy machinery across wetland areas, vegetation establishment will be hindered and erosion will be promoted. These impacts have the potential to increase sediment loads being deposited on river bends and levees, which in turn may result in the establishment and further spread of invasive hydro-phytic plants and loss of stream flow and natural refuge areas in the aquatic systems further downstream. Alterations to the natural hydrology and geohydrology of the area should infrastructure not be adequately installed and compaction of soils take place may also result in a loss of the wetland integrity of these systems.

Any temporary storage or dumping of construction materials and/or cleared vegetation and topsoil within wetland areas, has the potential to result in loss of stream connectivity, loss of refuge areas, alterations to the terrain profiles of the areas and the creation of preferential flow paths, which may result in sedimentation, alterations to the vegetation structure of the area, encourage alien vegetation encroachment and result in increased erosion and sedimentation potentials.

Removal of vegetation and disturbance of soils in the vicinity of the project footprint is likely to give rise to an increased potential for encroachment by robust pioneer species and alien invasive vegetation species, further altering the natural vegetation profiles of the wetlands encountered in the vicinity of the project footprint.

Since the location of service and access roads is not yet clear, it is not possible to determine the impacts of this activity. However, due to the extent of the study area and the considerable distribution of wetland areas, it is expected that direct loss of wetlands will take place, in addition to the following impacts:

- Increased sedimentation;
- Compaction of wetland soils;
- Altered wetland hydrology;
- Onset of erosion; and
- Establishment of AIPs.

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Minimal site clearing will take place for the establishment of towers; however, this will result in disturbance to wetlands where they are crossed. The activity is expected to incur a low intensity impact covering a minimal extent but the impact will be permanent. Further to this, the following impacts are expected:

- Increased sedimentation;
- Onset of erosion; and
- Establishment of AIPs.

When the towers are constructed and strung, it is expected that there may potentially be increased vehicular movement and general disturbance in wetland areas along the powerline routes. As a consequence, the following impacts are expected:

- Compaction of soils;
- Increased sedimentation; and
- Onset of erosion.

However, for 132 kV powerlines, the towers are spaced 200 to 250 m apart and Eskom avoids placing a tower in a wetland, not only for ecological reasons, but also because it is technically not desirable. Thus, towers will only be placed in a wetland if a particular wetland is wider than 250 m for the 132 kV powerlines.

During the operational phase, no direct impacts to wetlands are expected to occur, however, potential risks are a risk of hydrocarbon spillage into wetland areas. This will result in water quality deterioration and habitat modification. Maintenance vehicles and access through-out wetlands may also impact on wetlands (vehicles stuck/people movement etc.) and indirect risk of poaching and fires.

Cumulative impacts occur from in-combination effects of various impacts on wetland resources acting within a host of processes that result in an incremental effect. The importance of identifying and assessing cumulative impacts is that the whole is often greater than the sum of its parts. This implies that the total effect of multiple stressors or change processes acting simultaneously on a system may be greater than the sum of their effects when acting in isolation.

To gauge the potential cumulative impacts on wetland resources effectively, one must consider the affected catchment areas holistically, as well as the number of existing and proposed developments within the respective affected catchment areas. The proposed Project and associated infrastructure does not occur in isolation from its surrounds, and these must be taken into account.

The proposed Project traverses an extensive area, which is likely to affect a number of wetland resources of varying degrees of sensitivity as well as to varying degrees of extent. In addition, impacts related to agricultural cultivation and grazing activities and impacts from increasing urbanisation, roads, dams and other anthropogenic activities within each catchment have begun to place increasing pressure on the wetland resources present.

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Table 11.14: Potential Impacts of the Construction Phase

Dimension	Rating	Motivation	Significance
Activity and Interactions: Site access and disturbance			
Prior to Mitigation/Management			
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 36
Extent	Local (3)	Limited to the immediate development site and its immediate surroundings.	
Intensity x type of impact	Minor loss and/or effects to biological or physical resources (2)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in some loss and/or damage to physical or biological resources or highly sensitive environments, resulting in a limited loss of ecosystem function.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands and flora present are considered probable.	
Nature	Negative		
Post-Mitigation			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) - 18
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Minimal to no loss and/or effect to biological or physical resources (1)	Should the appropriate management and mitigation measures be employed, impacts are expected to be minimal in the operational phase of the proposed project.	
Probability	Unlikely (3)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	
Nature	Negative		

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Dimension	Rating	Motivation	Significance
Activity and Interactions: Site clearing activities for construction of substations, towers and access roads			
<i>Prior to Mitigation/Management</i>			
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 78
Extent	Municipal area (4)	Will affect the whole municipal area.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Highly probable (6)	Should no precautionary measures be implemented, <80% probability impacts to the wetlands and flora present will occur.	
Nature	Negative		
<i>Post-Mitigation</i>			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) - 30
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Unlikely (3)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	

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Dimension	Rating	Motivation	Significance
Nature	Negative		
Dimension	Rating	Motivation	Significance
Activity and Interactions: Construction of substations, towers and access roads			
<i>Prior to Mitigation/Management</i>			
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 78
Extent	Municipal area (4)	Will affect the whole municipal area.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Highly probable (6)	Should no precautionary measures be implemented, <80% probability impacts to the wetlands and flora present will occur.	
Nature	Negative		
<i>Post-Mitigation</i>			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Minor (negative) – 40
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	

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Dimension	Rating	Motivation	Significance
Probability	Probable (4)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	
Nature	Negative		

The tables below represent the impact rating for the operational phase of the proposed project.

Table 11.15: Potential Impacts of the Operational Phase

Dimension	Rating	Motivation	Significance
Activity and Interactions: Site access and roads for maintenance			
<i>Prior to Mitigation/Management</i>			
Duration	Project life (4)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Minor (negative) – 52
Extent	Local (3)	Limited to the immediate development site and its immediate surroundings.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Unlikely (3)	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.	
Nature	Negative		
<i>Post-Mitigation</i>			
Duration	Project life (5)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Negligible (negative) – 8

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Dimension	Rating	Motivation	Significance
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the decommissioning phase.	
Intensity x type of impact	Minimal to no loss and/or effect to biological or physical resources (1)	Should the appropriate management and mitigation measures be employed, impacts are expected to be minimal in the operational phase of the proposed project.	
Probability	Highly unlikely (1)	Expected never to happen. <1% probability.	
Nature	Negative		

Table 11.16: Summary of Impact Ratings for Wetlands

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse	Impacts on wetlands during construction due to site access and disturbance	Very Low (negative)
2	GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road	Impacts on wetlands during construction due to site clearing activities for construction of towers and access roads	Very Low (Negative)
3	GN 984 (4) – New Roads in sensitive area	Impacts on wetlands due to Construction of towers and access roads	Low (Negative)
4	GN 984 (12) – Clearing vegetation in sensitive area	Impacts on wetlands due to Site access and roads for maintenance purposes during the operational phase	Very Low (Negative)

11.4.4 Heritage

Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods; and
- Burial grounds and graves.

A summary of the assessments is presented in **Tables 11.17 to 11.19**.

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Table 11.17: Assessment summary for archaeological resources with a medium CS

IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Highly detrimental (-16)	Significance: Minor - negative (-48)
Extent	Province/ Region (5)	The manifested impacts will result in changes to the archaeological record of the region which is presently, relatively unknown or under researched		
Intensity x type of impact	Moderately high - negative (-4)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a medium CS classified as a moderately high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation. 				

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IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	Rating	Motivation		
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 11.18: Assessment summary for archaeological resources with a high CS

IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Extremely detrimental (-20)	Significance: Minor - negative (-60)

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IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS

Dimension	Rating	Motivation
Extent	National (6)	The manifested impacts will result in changes to the archaeological record which is presently, relatively unknown or under researched. These sites may contribute to the understanding of the national pre-history.
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.

MITIGATION:

It is recommended:

- A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and
- A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation.

POST-MITIGATION

Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will	Consequence: Negligible (3)	Significance: Negligible - positive (21)
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IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	Rating	Motivation		
		be immediate		
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 11.19: Assessment summary for burials, monuments and memorials with a high CS

IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS				
Dimension	Rating	Motivation		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Extremely detrimental (-21)	Significance: Minor - negative (-63)

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IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS

Dimension	Rating	Motivation		
Extent	International (7)	The manifested impacts may result in changes to the heritage resources that may: - Be associated with Next-of-Kin across international borders; and - Have international reputational risks and repercussions.		
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
<p>It is recommended:</p> <ul style="list-style-type: none"> - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMP as a condition of authorisation. 				
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)

IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS				
Dimension	Rating	Motivation		
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 11.20: Summary of Impact Ratings for Heritage

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines	Direct impact to archaeological resources with medium Cultural Significance	Very Low (positive)
2	GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments	Direct impact to archaeological resources with high Cultural Significance	Very Low (positive)
3	GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Direct impact to burials, monuments and memorials with high Cultural Significance	Very Low (positive)

11.4.5 Agricultural Potential

The assessment of the impacts on agricultural resources for the planning, construction and operational phases are presented in **Tables 11.21** and **11.22**.

Table 11.21: Planning and Construction Phase 132kV Powerlines

Impact	Description:	Mitigation
Disturbance of topsoil with		Avoid:

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construction of roads and footprint of towers			Minimise: Dust generation						
			Restore/Rehabilitation: Revegetate disturbed areas with natural vegetation. Install surface water drainage structures to minimise erosion						
			Compensate/Offset:						
	Nature	Extent	Duration	Intensity	Potential for irreplaceable loss	Probability	Confidence	Consequence	Significance
1. Iphiva-Pongola 132 kV powerline									
Without Mitigation	1	1	1	2	3	4	3	7	28
With Mitigation	1	1	1	2	3	3	3	7	21
2. Iphiva-Pongola 132 kV powerline to tie into existing line, double circuit with Iphiva-Hluhluwe 132 kV powerline									
Without Mitigation	1	1	1	2	3	4	3	7	28
With Mitigation	1	1	1	2	3	3	3	7	21
3. Iphiva-Makhathini 132 kV powerline double circuit with Iphiva-Mbazwane 132 kV powerline									
Without Mitigation	1	1	1	2	3	4	3	7	28
With Mitigation	1	1	1	2	3	3	3	7	21
4. Iphiva-Makhathini 132 kV powerline double circuit with Iphiva-Mbazwane 132 kV powerline Alternative									
Without Mitigation	1	1	1	2	3	4	3	7	28
With Mitigation	1	1	1	2	3	3	3	7	21
5. Temporary loop from Existing 132 kV powerline to the Candover Switching Station									
Without Mitigation	1	1	1	2	3	4	3	7	28
With Mitigation	1	1	1	2	3	3	3	7	21

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Table 11.22: Operational Phase 132kV Powerlines

Impact Disturbance of topsoil with construction of roads and footprint of towers	Description:		Mitigation						
			Avoid:						
			Minimise: Dust generation						
			Restore/Rehabilitation: Revegetate disturbed areas with natural vegetation. Install surface water drainage structures to minimise erosion						
			Compensate/Offset:						
	Nature	Extent	Duration	Intensity	Potential for irreplaceable loss	Probability	Confidence	Consequence	Significance
1. Iphiva-Pongola 132 kV powerline									
Without Mitigation	1	1	1	1	1	2	3	4	8
With Mitigation	1	1	1	1	1	2	3	4	8
2. Iphiva-Pongola 132 kV powerline to tie into existing line, double circuit with Iphiva-Hluhluwe 132 kV powerline									
Without Mitigation	1	1	1	1	1	2	3	4	8
With Mitigation	1	1	1	1	1	2	3	4	8
3. Iphiva-Makhathini 132 kV powerline double circuit with Iphiva-Mbazwane 132 kV powerline									
Without Mitigation	1	1	1	1	1	2	3	4	8
With Mitigation	1	1	1	1	1	2	3	4	8
4. Iphiva-Makhathini 132 kV powerline double circuit with Iphiva-Mbazwane 132 kV powerline Alternative									
Without Mitigation	1	1	1	1	1	2	3	4	8
With Mitigation	1	1	1	1	1	2	3	4	8
5. Temporary loop from Existing 132 kV powerline to the Candover Switching Station									
Without Mitigation	1	1	1	1	1	2	3	4	8
With Mitigation	1	1	1	1	1	2	3	4	8

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Mitigation									
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Table 11.23: Summary of Impact Ratings for Agricultural potential

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Disturbance of topsoil with construction of roads and footprint of towers during construction	21 (Low negative)
2		Disturbance of topsoil with construction of roads and footprint of towers during the operational phase	8 (Very Low – negative)

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11.4.6 Social

Table 11.24: Qualitative discussion of social impacts in the Planning Phase

Impact	Stakeholder group	Description
Uncertainty	All	<p>The presence of two alternatives creates uncertainty with the potentially affected landowners as they need to keep the possibility of the change in land use in mind when planning future activities. Very few people want to spend money on expansions or improvements on land that may not be available to them in the relatively near future.</p> <p>Eskom should attempt to finalise the route selection as soon as possible and swiftly enter into negotiations with the relevant land owners. Once the land negotiations have been finalised, it is important that the project should started and completed as soon as possible. Before construction has started there is always the possibility of a change in plans or priorities, which would result in prolonging uncertainty. Eskom should have a communication strategy in place to keep stakeholders up to date with the process.</p>

Table 11.25: Quantitative assessment of social impacts in the Planning Phase

Impact Description			Mitigation					
Uncertainty			Avoid					
			Minimise	Attempt to finalise route selection and start project as soon as possible.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21
<i>West Option</i>								

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Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21

Table 11.26: Qualitative discussion of social impacts in the Construction Phase

Impact	Stakeholder group	Description
Traffic impacts	All	During construction there will be an increase in the use of local roads, farm roads and transport systems. Slow vehicles on the road carrying infrastructure and equipment can lead to frustration and impatience with other road users. Eskom should attempt to transport equipment during off-peak times to have as little impact on traffic as possible. An increase in heavy vehicles on the road can lead to an increase in accidents.
Impacts on livelihoods	Commercial Farmers	A livelihood refers to the way of life of a person or household and how they make a living, in particular, how they secure the basic necessities of life, e.g. their food, water, shelter and clothing, and live in the community (Vanclay et al., 2015). Any aspect that impacts on the ability of a farmer to make a living from his/her land can be seen as an impact on his/her livelihood. The Distribution lines pass through sugar cane fields outside Mkuze. Sugar cane is mostly burned before being harvested. When powerlines run over the fields, it can be problematic, as the smoke can conduct the electricity from the lines to the ground, creating a hazard for the farmers and their workers. Green harvesting is possible, but is much more expensive. If the farmers lose productive land, it cannot simply be replaced, as there are permitting implications and limited availability of additional land. Planning of the route should take place in consultation with the farmers in order to have the least impact on their activities.
Negative community relations	All	Negative community relations can develop when Eskom's employees or contractors behave in a way that cause harm, or could potentially cause harm to the members of

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		<p>the community. If Eskom does not diligently maintain their servitudes, it could for example create a fire hazard. Contractors leaving gates open or drive off road or litter could result in harm to crops or livestock.</p> <p>Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.</p>
Impact relating to construction workers and newcomers	Commercial farmers	The presence of construction workers and construction camps in the area lead to an increase of strangers in the area. Opportunistic criminals can make use of the opportunity to steal livestock and commit crimes in the area.
	Urban communities	A temporary increase in economically active people in the area can have a positive impact on trade and businesses that offer accommodation. Construction workers often just spend the most necessary amounts and send the rest of the money home to their families.
Creation of jobs	Local communities	<p>Local communities have expectations that some of their members will be employed during the construction phase. Although they realise that the project will require specialised skills that they don't have, they are of the opinion that there should be a few jobs that require unskilled or semi-skilled labour that members from the community could perform.</p> <p>Where possible, Eskom should recruit local labour for unskilled or semi-skilled positions on the project. Preference should be given to locals that are currently unemployed. The recruitment process should be agreed with local leadership structures. Potential jobs should be advertised in an accessible way and no false expectations should be created.</p>

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		Indirect employment/entrepreneurship opportunities must be enhanced. Eskom and the contractor must support local entrepreneurs as far as possible. Eskom should consider a local economic development programme that can stretch across the entire project. An example would be to buy a mobile kitchen, and train women along the construction route to cater for the construction forces. This kitchen can move with the labour force and women in different areas will be given the opportunity to get trained and earn an income.
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Table 11.27: Quantitative assessment of social impacts in the construction phase

Impact Description Traffic impacts			Mitigation					
			Avoid	Attempt to transport equipment during off-peak times. Put rules and consequences in place for employees and contractors in terms of road use.				
			Minimise					
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	3	1	1	1	3	2	6	18
With Mitigation	3	1	1	1	2	2	6	12
<i>West Option</i>								
Without Mitigation	3	1	1	1	3	2	6	18
With Mitigation	3	1	1	1	2	2	6	12

Impact Description Impacts on livelihoods		Mitigation	
		Avoid	Minimise
		Avoid relocation of people as far as possible by careful design of the placement of infrastructure.	
		Minimise impacts on livelihoods by selecting the route with the lowest impact on livelihoods.	

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			Restore/Rehabilitate					
			Compensate/Offset	Compensate stakeholders for loss of productive land as well as the associated loss of livelihood if it is not possible to restore the livelihood.				
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	2	5	5	5	5	3	17	85
With Mitigation	2	5	3	3	4	2	13	52
<i>West Option</i>								
Without Mitigation	2	5	5	5	5	3	17	85
With Mitigation	2	5	3	3	4	2	13	52

Impact Description Negative community relations			Mitigation						
			Avoid						
			Minimise	Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.					
			Restore/Rehabilitate						
			Compensate/Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>East Option</i>									
Without Mitigation	3	2	3	5	3	3	13	39	
With Mitigation	3	2	2	1	2	2	8	16	
<i>West Option</i>									
Without Mitigation	3	2	3	5	3	3	13	39	
With Mitigation	3	2	2	1	2	2	8	16	

Impact Description Impacts relating to construction camps and			Mitigation					
			Avoid					

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newcomers			Construction camps should be set up in line with International best practice. There should be rules and consequences in place for their employees and contractors with reference to these issues. Employees and contractors should be briefed in advance to inform them of what is expected of them.					
			Minimise					
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	3	5	4	3	4	2	15	60
With Mitigation	3	5	3	3	3	2	14	42
<i>West Option</i>								
Without Mitigation	3	5	4	3	4	2	15	60
With Mitigation	3	5	3	3	3	2	14	42

Impact Description Creation of jobs			Mitigation					
			Avoid					
			Where possible, Eskom should recruit local labour for unskilled or semi-skilled positions on the project. Preference should be given to locals that are currently unemployed. The recruitment process should be agreed with local leadership structures. Potential jobs should be advertised in an accessible way and no false expectations should be created. Indirect employment/entrepreneurship opportunities must be enhanced. Eskom and the contractor must support local entrepreneurs as far as possible. Eskom should consider a local economic development programme that can stretch across the entire project. An example would be to buy a mobile kitchen, and train women along the construction route to cater for the construction forces. This kitchen can move with the labour force and women in different areas will be given the opportunity to get trained and earn an income.					
			Minimise					
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	3	1	2	1	3	2	7	21
With Mitigation	3	1	2	1	2	2	7	14
<i>West Option</i>								

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Without Mitigation	3	1	2	1	3	2	7	21
With Mitigation	3	1	2	1	2	2	7	14

Table 11.28: Qualitative discussion of social impacts in the Operational Phase

Impacts	Stakeholder group	Description
Negative community relations	All	<p>Negative community relations can develop when Eskom’s employees or contractors behave in a way that cause harm, or could potentially cause harm to the members of the community. If Eskom does not diligently maintain their servitudes, it could for example create a fire hazard. Contractors leaving gates open or drive off road or litter could result in harm to livestock or crops. The same applies to areas where game are kept. Some of the game reserves keep rhinos and the presence of contractors could increase the risk of poaching.</p> <p>Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.</p>

Table 11.29: Quantitative assessment of social impacts in the Operational Phase

Impact Description Negative community relations	Mitigation	
	Avoid	
	Minimise	Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.
	Restore/Rehabilitate	

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			Compensate/Offset					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance
<i>East Option</i>								
Without Mitigation	3	3	3	3	3	2	12	36
With Mitigation	3	3	2	1	2	2	9	18
<i>West Option</i>								
Without Mitigation	3	3	3	3	3	2	12	36
With Mitigation	3	3	2	1	2	2	9	18

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Table 11.30: Summary of Impact Ratings for Social impacts and risks

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	<p>Planning and pre-construction phase: The presence of two alternatives creates uncertainty with the potentially affected landowners as they need to keep the possibility of the change in land use in mind when planning future activities. Very few people want to spend money on expansions or improvements on land that may not be available to them in the relatively near future.</p> <p>Eskom should attempt to finalise the route selection as soon as possible and swiftly enter into negotiations with the relevant land owners. Once the land negotiations have been finalised, it is important that the project should started and completed as soon as possible. Before construction has started there is always the possibility of a change in plans or priorities, which would result in prolonging uncertainty. Eskom should have a communication strategy in place to keep stakeholders up to date with the process.</p>	21 (Low negative)
2		Traffic Impacts during construction	12 (Very Low – negative)
3		Impacts on livelihoods during construction	85 (very high negative without mitigation) 52 (Medium-High negative with mitigation)
4		Negative Community Relations during construction	16 (Low negative)
5		Impacts relating to construction camps and newcomers during construction	West – 42 (Medium-low negative) East – 16 (Low negative)
6		Creation of jobs during construction	14 (Very low – positive)
7		Negative community relations during the Operational Phase	18 (Low negative)

11.4.7 Visual

Table 11.31: Impact ratings for 132 kV distribution powerlines

Impact Description: Visual Impact as a result of the various 132 kV distribution powerlines			Mitigation						
			Avoid						
			Minimise						
			Restore/ Rehabilitate						
			Compensate/ Offset						
Nature	Extent	Duration	Intensity	Potential for Irreplceable loss	Probablility	Confidence	Consequence	Significance	
V-Dx-1: Iphiva-Pongola 132 kV powerline to tie into existing line, double circuit with Iphiva-Hluhluwe 132 kV powerline									
Without Mitigation	2	5	4	5	5	3	16	79	
With Mitigation	2	4	3	4	4	3	13	52	
V-Dx-2: Iphiva-Makhathini 132 kV powerline double circuit with Iphiva-Mbazwane 132 kV powerline									
WEST									
Without Mitigation	2	5	3	3	5	3	13	65	
With Mitigation	2	4	3	2	4	3	11	44	
EAST									
Without Mitigation	2	5	4	3	5	3	14	69	
With Mitigation	2	4	3	2	4	3	11	44	
V-Dx-3: Existing 132 kV powerline to the Candover Switching Station									
Without Mitigation	2	5	3	3	5	3	13	67	
With Mitigation	2	4	3	2	4	3	11	44	
V-Dx-4: Iphiva-Pongola 132 kV powerline									
Without Mitigation	2	5	2	3	5	3	12	60	
With Mitigation	2	4	2	2	4	3	10	40	

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Table 11.32: Summary Impact Ratings for Visual impacts

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (28) – Institutional Developments	Visual impact of Iphiva-Pongola (1) / Iphiva-Hluhluwe 132 double circuit powerline (all above ground)	52 (Medium High - negative)
2		Visual Impact of Iphiva-Makhathini / Iphiva Mbazwane 132 kV double circuit (west) (above ground)	44 (Medium Low – negative)
3		Visual Impact of Visual Impact of Iphiva-Makhathini / Iphiva Mbazwane 132 kV double circuit (east) (above ground)	44 (Medium Low – negative)
4		Visual Impact of Loop-in to the Candover Switching Station	44 (Medium Low – negative)
5		Visual impacts of the Iphiva-Pongola (2) 132 kV powerline	40 (Medium-Low – negative)

11.4.8 Economic

Table 11.33: Assessment of the impact of the Iphiva-Pongola 132 kV Powerline on a reduction in property value

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerline and pylons in such a manner that it is not visible from tourism areas. The powerline should be constructed on the boundary of farms. Powerline across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	5	3	5	4	3	14	56	
Negative, direct with mitigation	1	4	3	3	3	3	11	33	

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Table 11.34: Assessment of the impact of the Iphiva-Pongola 132 kV Powerline on a reduction in property value of adjacent properties

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerlines is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			Mitigation						
			Avoid	The powerline should not be constructed on property used for tourism activity.					
			Minimise	Place the powerline and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	2	5	3	4	4	3	14	56	
Negative, direct with mitigation	1	4	3	3	3	3	11	33	

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Table 11.35: Assessment of the impact of the Iphiva-Pongola 132 kV Powerline on a reduction in economic value

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct & indirect without mitigation	3	5	3	4	4	3	15	60	
Negative, direct & indirect with mitigation	2	4	2	3	3	3	11	33	

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Table 11.36: Assessment of the impact of the Iphiva-Pongola 132 kV Powerline on a loss in tourism

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
						Potential for Irreplaceable loss	Probability	Confidence	Consequence
Nature	Extent	Duration	Intensity						
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	3	5		3	4	4	3	15	60
Negative, direct with mitigation	2	4		2	3	3	3	11	33

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Table 11.37: Combinations of burying and multi-circuit towers in the P234 Corridor

	Iphiva-Duma West	Iphiva-Duma East
All above ground (132k V powerlines on double circuit towers)	1	2
Burying 4 x 132 kV powerline and construct 1 x 400 kV powerline next to them	3	4
Bury all of the lines	(same as 3)	5
Bury the 400 kV powerline and construct 132 kV above ground on double circuit towers next to it	(same as 1)	6
One tower with 1x400 kV and 2x 132kV powerlines and 1 x 132kV powerline buried	N/A	7

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Table 11.38: Impact of the alternatives in the P234 corridor on a reduction in property value

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.				Mitigation							
				Avoid	The powerlines should not be constructed on property used for tourism activity.						
				Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.						
				Restore/Rehabilitate							
				Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.						
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance			
<i>Alternative 1</i>											
Negative, direct	1	5	5	5	5	3	16	80			
<i>Alternative 2</i>											
Negative, direct	1	5	5	5	5	3	16	80			
<i>Alternative 3</i>											
Negative, direct	1	5	4	5	5	3	15	75			
<i>Alternative 4</i>											
Negative, direct	1	5	4	5	5	3	15	75			
<i>Alternative 5</i>											
Negative, direct	1	3	2	1	2	3	7	14			
<i>Alternative 6</i>											
Negative, direct	1	5	5	5	5	3	16	80			
<i>Alternative 7</i>											
Negative, direct	1	5	5	5	5	3	16	80			

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Table 11.39: Impact of the alternatives in the P234 corridor on a reduction in property value for adjacent properties

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the substation is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)				Mitigation					
				Avoid	The powerlines should not be constructed on property used for tourism activity.				
				Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.				
				Restore/Rehabilitate					
				Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.				
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Alternative 1</i>									
Negative, direct	2	5	4	5	5	3	16	80	
<i>Alternative 2</i>									
Negative, direct	2	5	4	5	5	3	16	80	
<i>Alternative 3</i>									
Negative, direct	2	5	3	5	5	3	15	75	
<i>Alternative 4</i>									
Negative, direct	2	5	3	5	5	3	15	75	
<i>Alternative 5</i>									
Negative, direct	1	3	2	1	2	3	7	14	
<i>Alternative 6</i>									
Negative, direct	2	5	4	5	5	3	16	80	
<i>Alternative 7</i>									
Negative, direct	2	5	4	5	5	3	16	80	

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Table 11.40: Impact of the alternatives in the P234 corridor on a reduction in economic value

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a substation, the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/ Rehabilitate						
			Compensate /Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Alternative 1</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 2</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 3</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 4</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 5</i>									
Negative, direct & indirect	1	3	2	2	2	3	8	16	
<i>Alternative 6</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	
<i>Alternative 7</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	

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Table 11.41: Impact of the alternatives in the P234 corridor on a loss in tourism employment

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.				Mitigation					
				Avoid	The powerlines should not be constructed on property used for tourism activity.				
				Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.				
				Restore/ Rehabilitate					
				Compensate /Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.				
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>Alternative 1</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 2</i>									
Negative, direct & indirect	4	5	4	5	5	3	18	90	
<i>Alternative 3</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 4</i>									
Negative, direct & indirect	4	5	3	5	4	3	17	68	
<i>Alternative 5</i>									
Negative, direct & indirect	1	3	2	2	2	3	8	16	
<i>Alternative 6</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	
<i>Alternative 7</i>									
Negative, direct & indirect	4	5	3	5	5	3	17	85	

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Table 11.42: Impact of the Iphiva-Pongola (2) 132 kV Powerline on a reduction in property value

Impact Description: Construction & operational phase impact - A reduction in property value for the affected property.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	1	3	3	2	3	8	16	

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Table 11.43: Impact of the Iphiva-Pongola (2) 132 kV Powerline on a reduction in property value of adjacent properties

Impact Description: Construction & operational phase impact - A reduction in property value for the adjacent properties if the powerlines is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes).			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	1	3	3	2	3	8	16	

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Table 11.44: Impact of the Iphiva-Pongola (2) 132 kV Powerline on a reduction in economic value

Impact Description: Construction & operational impact - reduction in economic value for the economy. Due to the establishment of a powerline the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct & indirect without mitigation	1	1	3	3	2	3	8	16	

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Table 11.45: Impact of the Iphiva-Pongola (2) 132 kV Powerline on a loss in tourism employment

Impact Description: Construction & operational phase - a loss in tourism employment is associated with the loss in productive land.			Mitigation						
			Avoid	The powerlines should not be constructed on property used for tourism activity.					
			Minimise	Place the powerlines and pylons in such a manner that it is not visible from tourism areas. The powerlines should be constructed on the boundary of farms. Powerlines across the middle of conservation areas will lead to a decrease in aesthetic appeal of the area.					
			Restore/Rehabilitate						
			Compensate/Offset	Market related compensation for the affected property should be provided where the powerline is developed. Additionally discussions with landowners to their preferred configuration if their property is affected.					
Nature	Extent	Duration	Intensity	Potential for Irreplaceable loss	Probability	Confidence	Consequence	Significance	
<i>132kv Pongola-Iphiva corridor</i>									
Negative, direct without mitigation	1	1	3	3	2	3	8	16	

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Table 11.46: Summary of Impact Ratings for Economic impacts

1	Listed Activities	Impact Description	Significance after mitigation
	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Reduction in property value for the affected properties in the construction and operational phases.	Iphiva-Pongola (2) – 33 (Medium-Low) 1.P234 all above ground and I-D West – 80 (High negative) 2.P234 all above ground and I-D East – 80 (High negative) 3. P234 Burying 4 x 132 kV with 400 kV above ground and I-D West – 75 (High negative) 4. P234 Burying 4 x 132 kV with 400 kV above ground and I-D East 75 (High negative) 5. P234 Bury all lines – 14 (Very low negative) 6. P234 Bury 400 kV with 132 kV above ground – 80 (High negative) 7. P234 One tower -80 (high negative) Loop-in to the Candover Switching Station – 16 (Low negative)
2		Reduction in property values for adjacent properties in the construction and operational phase	Iphiva-Pongola (2) – 33 (Medium – Low) 1.P234 all above ground and I-D West – 80 (High negative) 2.P234 all above ground and I-D East – 80 (High negative) 3. P234 Burying 4 x 132 kV with 400 kV above ground and I-D West – 75 (High negative) 4. P234 Burying 4 x 132 kV with 400 kV above ground and I-D East (High Negative) 5. P234 Bury all lines – 14 (Very low negative) 6. P234 Bury 400 kV with 132 kV above ground -80 (High negative) 7. P234 One tower – 80 (Nigh negative) Loop-in to the Candover Switching Station – 16 (Low negative)
3		Reduction in economic value for the economy in the construction and operational phases	Iphiva-Pongola (2) 132 kV – 33 (Medium-Low – negative) 1.P234 all above ground and I-D West – 90 (Very High negative) 2.P234 all above ground and I-D East – 90 (Very High negative) 3. P234 Burying 4 x 132 kV with 400 kV above ground and I-D West – 68 (High negative) 4. P234 Burying 4 x 132 kV with 400 kV above ground and I-D East – 68 (High negative) 5. P234 Bury all lines – 16 (Low

	Listed Activities	Impact Description	Significance after mitigation
			negative) 6. P234 Bury 400 kV with 132 kV above ground – 85 (High negative) 7. P234 One tower – 85 (High negative) Loop-in to the Candover Switching Station – 16 (Low negative)
		Loss in tourism employment during construction and operation	Iphiva-Pongola (2) – 33 (Medium-Low) 1.P234 all above ground and I-D West – 90 (High negative) 2.P234 all above ground and I-D East – 90 (High negative) 3. P234 Burying 4 x 132 kV with 400 kV above ground and I-D West – 68 (High negative) 4. P234 Burying 4 x 132 kV with 400 kV above ground and I-D East – 68 (High negative) 5. P234 Bury all lines – 16 (Low negative) 6. P234 Bury 400 kV with 132 kV above ground – 85 (Very High negative) 7. P234 One tower –85 (very high negative) Loop-in to the Candover Switching Station – 16 (Low negative)

12. SUMMARY OF FINDINGS AND RECOMMENDATION OF THE SPECIALISTS STUDIES

GN 982 Appendix 1:

- (k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;

12.1 FAUNA AND FLORA

The Fauna and Flora Specialist Study was undertaken by Rudi Greffrath (**Appendix G**). The Terms of Reference of the fauna and flora screening and comparative specialist study was to evaluate the presence of sensitive species and landscapes/habitat present that could be affected by the various options available for the project infrastructure. Thereafter to determine the preliminary impacts on these natural resources and recommend mitigation measures to alleviate negative impacts. The consideration of alternative for the project infrastructure, from a biodiversity perspective, centred on the ecological sensitivity present in each alternative.

In terms of ecological sensitivity, the following features were assessed to determine how sensitive the habitats identified within the alternatives are:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status and wetlands.

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present.

Table 12.1: Activities and Impacts of 132 kV Infrastructure Considered

Activity	Impact
Site clearing for infrastructure placement	Direct loss of floral species/vegetation types and biodiversity.
	Loss of species of special concern (protected species).
	Alien vegetation recruitment

12.1.1 Management Objectives

Management objectives will be to prevent the loss of important/protected landscapes, species of plants and animals (such as those with Red Data Status, National and Provincial). This is achieved by avoiding destruction of areas where these species are located. In the case of plants, if this is not possible relocation of protected plants is required.

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The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

The ecosystem present must be preserved, this includes areas not directly affected by project activities, and can be achieved by limiting project activities to areas where they are essential. Rehabilitation plans must be initiated during construction to minimise disturbed areas. Habitat/vegetation degradation must be prevented through the implementation of Eskom's alien invasive plant management strategy.

12.1.2 Management Actions and Targets

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012):

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*;
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines; and
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

Eskom's invasive plant management strategy must be implemented to preserve natural habitat.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The Environmental Manager must ensure that after the construction site is rehabilitated, there are no rubble piles remaining.

Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Manager must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted if they are not successful.

Destruction of vegetation should be limited to the areas essential for the development if construction is finalised the environmental officer must ensure the construction areas are

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rehabilitated. Areas of erosion must be marked and attended to before the following wet season starts.

Rehabilitation of disturbed areas should take place within a week of construction, all bare patches of soil should be vegetated, preferably with pioneer species which will colonise open and disturbed areas relatively quickly, and prevent erosion and alien vegetation establishing. Community awareness should be implemented as part of the stakeholder engagement procedure to create awareness of biodiversity and preservation of natural habitats.

12.1.3 Alternatives

The east routing of the Iphiva-Makhathini / Iphiva-Mbazwane powerline was found to be on the footslopes of the Ubombo Mountain range where the topography has made the majority of this alternative unsuitable to agriculture. The natural vegetation encountered here during the site visit was in pristine condition with no agricultural activities, rural housing, bush clearing or informal roads affecting the continuity of this vegetation type. The western alignment is therefore recommended.

The level of ground disturbance (and by default vegetation removal) that is required to either bury or erect above ground pylons is the major factor that is considered for the fauna and flora preferred alternative. As the burying of powerlines will necessitate a larger footprint of vegetation or habitat to be disturbed, this option is not preferred. The maintenance of the buried lines will require disturbance to vegetation that has been restored, this will negatively affect the carrying capacity and species richness of the disturbed area.

Assessment tables are included in **Chapter 11**.

12.2 BIRDS

The consideration of alternative corridors from an avifaunal perspective, was primarily determined by the ecological sensitivity present based on the following:

- Presence or absence of Red Data or protected bird species;
- Presence or absence of exceptional Avifaunal species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems protected areas, such as IBAs, Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

The results of the comparison of alternatives is that the west routing alternative for the Iphiva-Makhathini / Iphiva-Mbazwane distribution line is preferred, and that all below ground design options along the P234 corridor.

The following mitigations are suggested:

- A walk through of the servitude once the tower positions have been identified should be conducted by a suitable qualified avifauna specialist in order to determine the presence

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of any threatened, protected, endemic bird species of special concern within or in close proximity to the towers. Nesting sites of any protected bird species must also be determined during this walkthrough.

- The Avifauna specialist should provide recommendations regarding the placement of Bird diverters based on the walk through;
- Where powerlines are constructed in parallel, pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action;
- Where the possibility or risk of a 'flash-over' occurs additional mitigation measures that increase the visibility of the powerline should be instituted.
- Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; and
- It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design, particularly the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes.

12.3 WETLANDS

The following baseline and background information was researched and used to understand the study area on a desktop level:

- The Ramsar Convention;
- NFEPA (Nel et al., 2011);
- Water Management Areas (WMA) and Quaternary Catchments; and
- The KZN 2012 Critical Biodiversity Areas Map.

Desktop delineations based on the available contour and topographic data, as well as detailed aerial imagery were applied to the proposed powerline corridors to provide an indication of the potential extent of the wetland areas likely to be present. Limited in-field verification of these systems took place.

Eskom avoids placing towers in wetlands for technical reasons. Most of the wetlands are narrow enough for the conductors to be strung over them. Direct loss of wetlands, increased sedimentation, compaction of wetland soils, altered wetland hydrology, onset of erosion, and the establishment of alien invasive plant species is expected to result from the clearing of vegetation for the construction of access roads and towers foundations, as well as the increased vehicular activity associated with the stringing of the powerlines.

During the operational phase, no direct impacts to wetlands are expected to occur, however, potential risks include hydrocarbon spills and indirect risk of poaching and fires.

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The objectives of the following management measures for the construction and operational phases are to preserve wetland functionality and integrity for the duration of the proposed project and that activities do not expand out of the general footprint area and cause degradation of surrounding wetland areas:

- As far as possible all infrastructures are placed outside of wetland/riparian areas and their associated 32 m zones of regulation;
- Limit the footprint area to what is absolutely essential in order to minimise impacts as a result of vegetation clearing and compaction of soils;
- Disturbed areas must be rehabilitated;
- Ensure that no incision and canalisation of the wetland features present takes place as a result of the proposed project activities;
- All erosion noted within the project footprint should be remedied immediately and included as part of the ongoing rehabilitation plan;
- All soils compacted as a result of project activities should be ripped/scarified (<300mm) and profiled;
- Permit only essential personnel within the 32m zone of regulation for all wetland features identified;
- All areas of increased ecological sensitivity should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel;
- No unnecessary crossing of the wetland features and their associated buffers should take place and the substrate conditions of the wetlands and downstream stream connectivity must be maintained;
- Where crossings cannot be avoided, it is advised that the crossing points be optimised as far as possible to cross at the narrowest points and that flow not be obstructed as a result of any crossings;
- Wherever possible, restrict construction activities to the drier winter months to avoid sedimentation of the wetlands and the aquatic resources further downstream;
- No material may be dumped or stockpiled within any rivers, tributaries or drainage lines in the vicinity of the proposed project footprint.
- No vehicles or heavy machinery may be allowed to drive indiscriminately within any wetland areas and their associated zones of regulation. All vehicles must remain on demarcated roads and within the project area footprint;
- All vehicles must be regularly inspected for leaks;
- Re-fuelling must take place on a sealed surface area away from wetlands to prevent ingress of hydrocarbons into topsoil;
- All spills should be immediately cleaned up and treated accordingly;
- Appropriate sanitary facilities must be provided for the duration of the decommissioning activities and all waste must be removed to an appropriate waste facility;
- Monitor all systems for erosion and incision.

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The significance of the impacts of site access and disturbance and clearing after mitigation was assessed to be Negligible for both the construction and operational phases.

Burying powerlines in wetlands will have the most significant impact, and above-ground powerlines are recommended.

12.4 HERITAGE

The Heritage Specialist Study (**Appendix F**) was undertaken by Justin du Piesanie from Digby Wells. The Terms of Reference (ToR) of the specialist heritage study was to complete a Heritage Screening Assessment to comply in part with the KZNHA and NHRA to predict preliminary heritage impacts and outline activities to be undertaken in the subsequent phases of the Project as a condition of authorisation.

The greater cultural landscape is expected to contain heritage resources spanning from palaeontological through to contemporary living heritage resources. Various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to: Archaeological resources from various time periods; and Burial grounds and graves.

The Heritage Resources identified during the field survey are presented in **Table 12.2 and Figure 12.1**.

Table 12.2: Identified heritage resources from the field survey

Site Name	Latitude	Longitude	Heritage Resource Type	Infrastructures
ILI3864/001	-27.634005	32.016514	Archaeological - Kraal	57m from Iphiva / Pongola and Iphiva / Hluhluwe Double Circuit Line
ILI3864/002	-27.649434	31.93692	Burial Grounds & Graves	37m from Iphiva / Pongola 132 kV
ILI3864/003	-27.64916	31.93713	Historical Built Environment	13m from Iphiva / Pongola 132 kV
ILI3864/004	-27.648168	31.787028	Burial Grounds & Graves	400m from Iphiva / Pongola 132 kV
ILI3864/005	-27.650433	31.791483	Burial Grounds & Graves	405m from Iphiva / Pongola 132 kV

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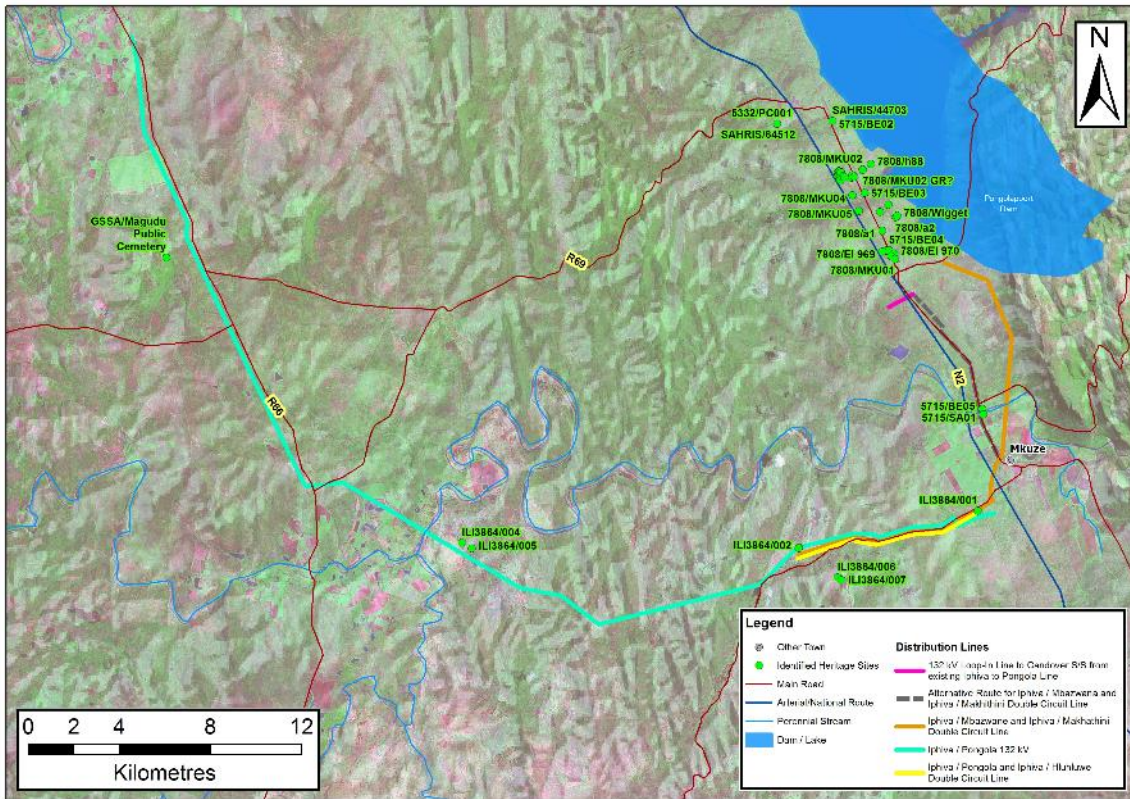


Figure 12.1: Distribution line site-specific study areas with identified heritage resources

A Summary of the Cultural Significance of each heritage resource type is presented in **Table 12.3**. A summary of the detailed assessments is presented in **Appendix F**.

Table 12.3: Summary of Cultural Significance of heritage resource types in the study area

Very High
Palaeontological resources associated with the Karoo Supergroup lithology's
Burial grounds and graves
High
Archaeological LFC sites with good integrity
Historic battlefields
Monuments and memorials
Natural
Medium High

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Archaeological MSA sites with good integrity
Historical built environment associated with living groups with good integrity
Intangible / living heritage sites
Medium
Historical built environment not associated with living groups with good integrity
Negligible
Archaeological MSA sites with poor integrity
Archaeological LFC sites with poor integrity
Historical built environment associated with living groups with poor integrity
Historical built environment not associated with living groups with poor integrity

The assessor determined the cultural significance of the landscape to be medium based on criteria defined in Section 3 of the NHRA.

The following project related activities are expected to have the greatest likelihood of direct impacts on heritage resources:

- Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures;
- Construction and/or upgrading of access roads; and
- Stringing of conductors.

A summary of the assessment is presented in **Table 12.4**.

The following recommendations were made:

- Exemption from further palaeontological assessment and the inclusion of a Fossil Chance Find Procedure in the EMPr;
- A detailed heritage walk-down and impact assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities to identify any heritage resources that may be impacted upon;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources;
- Recommendations contained within the visual assessment must be considered to reduce the intensity of the powerlines visibility;
- The final HIA must be submitted to SAHRA and Amafa for approval prior to construction activities; and
- A project specific Chance Finds Protocol, inclusive of the fossils finds procedure as detailed below be included in the EMP and as a condition of authorisation.

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12.4.1 Fossil Chance Find Procedure

- Surface excavations should be monitored by a geologist in areas defined as having a high palaeontological sensitivity and any fossil material disturbed should be put aside and the palaeontologist called to inspect the material within a reasonable timeframe to minimise delays to the project. The geologist should also review visual references and descriptions of relevant palaeontological material.
- If it is not feasible for the palaeontologist to visit the site timeously then digital photographs of good quality and resolution should be sent to the palaeontologist to assess and make recommendations.
- From visits or photographs supplied the palaeontologist must make the following recommendations:
 - Material is of no value so development can proceed, or
 - Fossil material is of some interest where a representative sample should be carefully collected with the necessary permits as regulated by Chapter IV of GN R 548 before the development may proceed. The collected samples must be incorporated into a recognised repository (e.g. Ditsong Museum, Council for Geosciences, Pretoria; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg) to comply with the requirements of the Regulations to the Act; or
 - Fossils are scientifically important and the palaeontologist must obtain the necessary permits as regulated by Chapter IV of GN R 548 to study the fossiliferous material in situ, where necessary excavate incorporate into a recognised repository. The development may not proceed in the identified area.

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Table 12.4: Summary of potential impacts to heritage resource types by project related activities

Impact	Pre-mitigation:						Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Archaeological resources with medium significance	Permanent	Province/Region	Moderately high negative	Highly detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Archaeological resources with high significance	Permanent	National	Extremely high negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Battlefields with high significance	Project Life	Limited	High negative	Moderately detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Burials, monuments and memorials with high significance	Permanent	International	Extremely high negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Living heritage sites with high significance	Permanent	Province/Region	Extremely high negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive

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12.5 AGRICULTURAL POTENTIAL

The investigation of agricultural potential involved the collation of climate, geology, topography information and determining the broad soil groups of the area as background for further interpretation. Properties of the soil groups, soil depth, clay content, soil restrictions as well as land capability classes were considered. The soil investigation was based on a field investigation and additional available information from the Land Type Survey of the Institute of Soil Climate and Water, as well as other relevant information.

The soils in the project area were then classed in four land capability/potential classes, namely:

- Soils of intermediate suitability for arable agriculture;
- Soils not suitable for arable agriculture, but suitable for forestry or grazing;
- Soils of poor suitability for arable agriculture; and
- No dominant class.

Properties like clay content and susceptibility to erosion is highly dependent on the parent material. The mudstone underlying this area can give rise to soils severely susceptible to erosion when exposed. Exposed surfaces should therefore be limited or prevented. It should be covered with any vegetation even for short periods.

Arable crop production is not restricted by the climate of the area but may become risky in the areas with lower and irregular rainfall patterns.

The corridors of the Iphiva-Pongola (1) / Iphiva-Hluhluwe double circuit powerline, the loop to Candover switching station, the Iphiva-Mbazwane / Iphiva-Makhathini double circuit and the alternative route for Iphiva-Mbazwane and Iphiva-Makhathini double circuit powerline have a land capability with soils of intermediate suitability for arable agriculture. The majority of soils in the Iphiva-Pongola (2) 132 kV corridor are either not suitable for arable agriculture, but suitable for forestry or grazing (largest part), of intermediate suitability for arable agriculture (in the north and eastern parts of the corridor), or of poor suitability for arable agriculture (in the north western parts of the corridor).

The specialist has no objections to the project from the agricultural and soil potential standpoint.

Recommendations include that all land disturbed by Eskom should be vegetated and left in the condition it was before the construction of the powerlines and that no disturbed areas should be left uncovered to prevent erosion. The powerlines should be constructed on farm boundaries as far as possible, specifically in areas where land is used for forestry.

The number of roads and road crossings should be kept to a minimum.

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The western corridor of the Iphiva/Makhathini – Iphiva/Mbazwane 132 kV powerline has less impact on agriculture. Above-ground powerlines are preferred to buried.

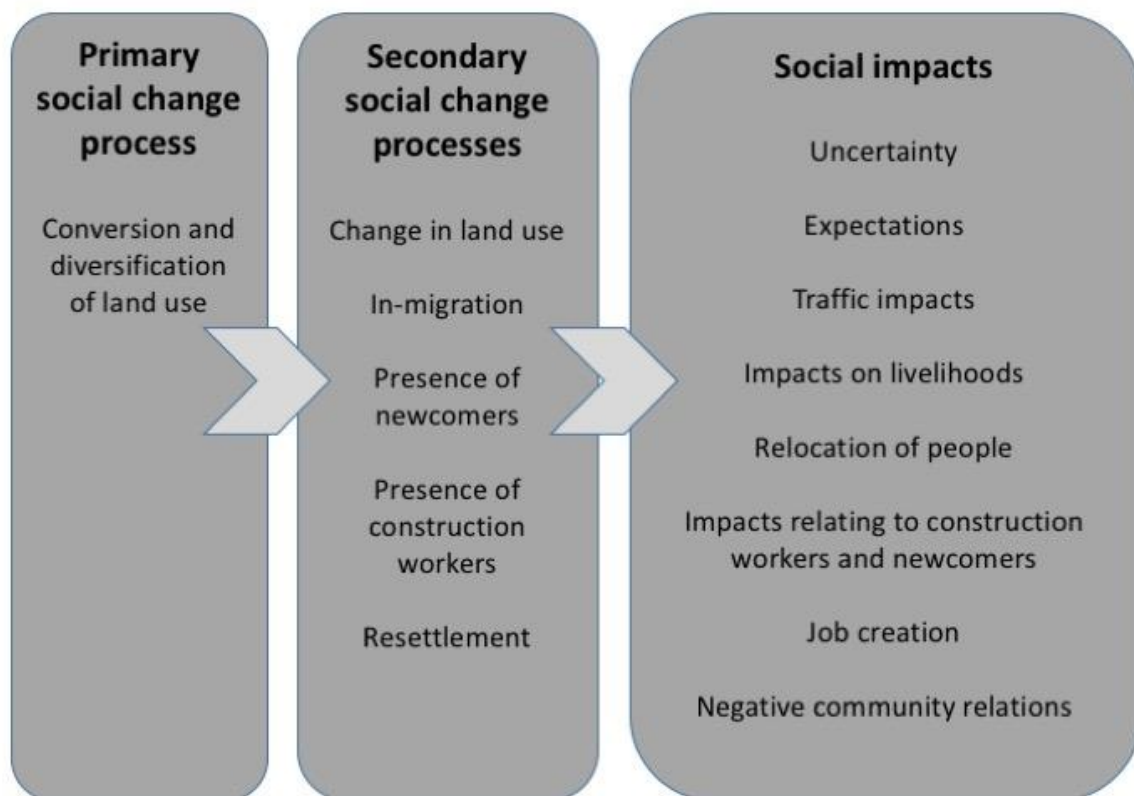
12.6 SOCIAL

The social specialist identified the following key stakeholder groups potentially impacted by the project:

- Communities under traditional authority;
- Commercial farming;
- Tourism establishments; and
- Surrounding urban areas.

The proposed project activities set into motion certain social change processes, and these change processes can lead to the experience of social impacts. Social impacts are context specific and may be experienced differently by different groups in the area. The social environment is very dynamic and is constantly changing.

The following change processes and impacts have been identified for the proposed project:



The following mitigation and management measures are recommended by the social specialist:

- Appoint a Community Liaison Officer;
- Compile and implement a community relations strategy;
- Compile and implement a communication strategy;

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- Compile and implement a grievance mechanism;
- Compile and implement an employment policy;
- Compile and implement a CSI strategy;
- Compile and implement a road use policy;
- Construction camps should be established in accordance with international best practice;
- Compile and implement a policy for conduct of employees and contractors;
- Compile and implement an access control policy specifically for protected and game reserve areas;
- Join local fire protection agencies and have and implement a firefighting strategy;
- Have and implement a strategy for community safety and security,
- Have and implement a HIV and life skills strategy;
- Compile and implement a relocation and compensation policy in accordance with international best practice; and
- Appoint a relocation specialist should relocation be required.

The social specialist concluded that the project will make an important contribution to the supply of electricity in Northern KZN and will be of service to many previously disadvantaged communities. She therefore recommends that the project as a whole should proceed, but in the process attempt to minimise negative social impacts to the immediate environment, keeping in mind the current economic climate and broader societal picture in terms of expenditure. The western route for the Iphiva-Makhathini/Iphiva-Mbazwane double circuit powerline is recommended as well as all above ground powerline along the P234.

12.7 VISUAL

The Visual Impact Assessment is based on the Oberholzer (2005) guideline that draws on best practice in EIA and provides guidance applicable to visual specialist assessments. Projects-specific receptor (viewer) sensitivity is based on accepted international practice, previous experience of the visual specialists, social specialist and the economic specialist.

-Guest houses, game lodges and nature-based tourism in protected areas dependent upon a pristine visual resource for tourism value are considered to have a High viewer sensitivity, rural (commercial farming) homesteads a Moderate viewer sensitivity, and National / provincial road users where other infrastructure is present and transformation has already taken place, Formal settlements (such as Pongola / Mkuze / Ulundi) and informal settlements / villages (likely considers transmission lines as a sign of progress) a Low viewer sensitivity.

The greatest factor that influenced visual impact for this project was the presence of conservation areas, due to their dependence upon the landscape as visual resource as income generator for tourism-related activities. The avoidance and minimisation of the visual impact was mostly focused around reducing impact on these areas.

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Impacts were identified for each of the viewer groups against each of the infrastructure components. Visibility and visual exposure were combined in the GIS viewsheds generated. These aspects and visual intrusion were combined to calculate the intensity / magnitude of each impact. The visual intensity was then combined with pre-defined impact assessment aspects such as the nature, duration, extent to determine the significance of each impact before and after mitigation.

The visual specialist recommended that the following components of 132 kV powerlines be authorised:

- Iphiva-Pongola (2) (no alternative corridor);
- Iphiva/Hluhluwe – Iphiva Pongola (1) double circuit powerline (no alternative);
- Candover HV to existing 132 kV powerline (no alternative); and
- The Western alternative of the Iphiva/Makhathini – Iphiva-Mbazwane which relates to the existing land use (mostly farming) and existing other infrastructure (rail and road), thereby consolidating visual impact along one corridor.

The potential visual impacts associated with Distribution powerlines and associated infrastructure are related to alignment close to sensitive areas such as elevated ridges, koppies and wetlands that could be conserved as visual assets for tourist related activities. This was considered in the route selection process, where visual sensitivity was considered as a constraint to route alignment, thereby meeting the first step in the mitigation hierarchy, namely that of avoidance of the impact. Visual impacts are best mitigated in the planning and design phase, and to a lesser extent the construction phase

Mitigation strategies of visual impacts for this project proposed includes:

- Avoidance of lattice towers with visually intrusive footing designs, save for situations where strain towers are required, stability/geotechnical aspects play a role
- Where the route crosses over several ridges, running parallel to the proposed route, the alignment should be located in the lower section so that the ridge lines form a visual screen from both sides.
- The refined alignment should follow existing infrastructure corridors where the visual environment has already been compromised and avoid visually sensitive areas and receptors where practical.
- The placement and design of access roads, construction camps, security lighting, soil stockpiles and laydowns areas in a visually sensitive manner are important, as well as minimising vegetation clearance for construction.

With regards the possibility of burying powerlines along the P-234, although will reduce the visual impact, at the Integration meeting with the other specialists it was agreed that the overall impacts of burying the powerline are greater than the overall impacts of above-

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ground powerline. The impact ratings have therefore been done for above-ground powerlines.

12.8 ECONOMICS

TRADE were commissioned to conduct a specialist economic impact assessment, with a specific focus on tourism. The economy for the region entails a number of sectors. Tourism is not an economic sector in its own right, but is a complex and composite sector comprising mainly of the following sectors: accommodation, transportation, food and beverages, cultural and recreational activities. The activities undertaken by the tourist relate with the travel, destination, and entertainment activities and expenditure that tourists make. The tourism sector contributes approximately 6% to the value of economic activity for all goods and services produced within a geographical area for the regional economy. This is slightly higher than the national average. The total number of people employed in tourism amounts to approximately 4.6% of all employment within the regional economy. The tourism value of the region is estimated at R1.9 billion for the geographical area for 2016, and employment amounts to approximately 9 831 for the corresponding year.

In terms of locational theory, various land uses / economic activities reveal distinctly different location preferences (and sensitivities). In this context, the concept of highest and best use is important. In a free market society, on-going competition between different land uses is regulated by the market mechanism. Every site in the urban system has a highest and best economic use and equilibrium in the market will only be reached when the highest and best uses are allocated to a site. Tourism is a major role-player for the properties under consideration in the study area. This highest and best economic use is a function of physical and economic factors. Physical factors refer to the location of the site, the size thereof, visibility etc. Economic factors mainly refer to the productivity of the land use, including the return on investment and site rent achievable. The visual quality of the area has an economic value in that it enables the tourism activity to take place and as a result generate economic value.

The agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand. The intensity of the economic impact for tourism activity will be different for each property/activity and depends on inter alia the:

- **Land use type** – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far possible, be eliminated from the preferred alignment.
- **Powerline route** – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.

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- **Size of the property** – A powerline that transcend properties diagonally or through the middle, for property smaller than 200 ha – tips an argument for expropriation
- **Existing infrastructure** – Do not place powerlines over or in close proximity to tourism infrastructure.
- **Visibility of the new structure** - Place the powerlines / pylons and the substation in areas where it is not visible from tourism areas/hides/etc.
- **Market related compensation** for the affected property should be provided where the powerline is developed.
- Landowners should be **consulted** about their preferred configuration if their property is affected.

Once a servitude for the powerlines is finalised it will be possible to quantify the impact on individual property values. A registered property valuer should assess each individual affected property to determine the value impact, if any.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales. The alternatives where the negative economic impact is lowest is preferred.

Impacts (**Table 12.5**) are measured in terms of:

- **Production:** refers to the value of output generated in the economy as a result of the existing tourism activity.
- **Employment:** reflects the number of jobs created by the tourism activity.
- **Household Income:** refers to the income by households as a result of their involvement in the activity and downstream beneficiation production.

Table 12.5: Summary of economy wide economic impact

Project Component	Total hectare within reserve/ lodge/ game farm	Economy-Wide Economic Value	Employment	Household Income
P234 Corridor	948 ha	R 11.2 million for production	44 jobs	R 5.3 million
Iphiva-Pongola (2) 132 kV powerline	2 510 ha	R 29.7 million	116 jobs	R 14 million
132 kV Loop in to Candover	0 ha			

The economic specialist found that the construction and operation of the Iphiva-Pongola (2) 132 kV powerline will have a medium-low significant impact after mitigation on:

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- Property value for the affected and adjacent properties;
- Loss in tourism employment; and
- Reduction in the economic value of the regional economy as a result of a reduction in tourism activities and future expansion/investment in tourism activity may also be impacted due to the loss in productive land.

The alternatives along the P234 were assessed and the loss in property value, tourism employment and reduction in economic value were found to have impacts with significances varying from low to very high, depending on the specific circumstances.

The loop-in to the Candover Switching station has a Low significance impact for all of the economic impacts assessed as listed above.

The economic specialist found that burying the powerlines along the most sensitive stretch of the P 234 corridor will mitigate most of the negative economic impacts. The economic specialist recommended that the project be authorised on condition that a property valuer is appointed to quantify the value impact for directly affected properties with appropriate compensation, and that a cost comparison analysis between burying the powerline and overhead powerlines is undertaken. If the costs are similar, then the powerlines should be buried in high value tourism areas.

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13. ENVIRONMENTAL IMPACT STATEMENT

GN 982 Appendix 1:

- (l) an environmental impact statement which contains—
- (i) a summary of the key findings of the EIA;
 - (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and
 - (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

The following 132 kV powerlines that form part of a larger project to strengthen and alleviate current and future network constraints are included in this application:

- Iphiva – Pongola (1) 132 kV powerline to tie in with the existing powerline, double circuit with Iphiva / Hluhluwe;
- Iphiva – Pongola (2) 132 kV powerline;
- Iphiva / Makhathini 132 kV powerline double circuit with Iphiva / Mbazwane; and
- 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line.

The following key issues were identified:

- Impacts on areas protected by National and Provincial legislation resulting in loss of plants and animals of conservation value and a loss in the income from and value of the facilities, primarily due to visual impacts;
- Impacts on the rich and diverse fauna and flora (specifically large birds);
- Impacts on land use, particularly for sugar cane farmers and forestry;
- Impacts on Heritage Resources;
- Social impacts;
- Economic,
- Impacts on the biophysical environment resulting from access roads;
- Construction Impacts; and
- Cumulative impacts.

This Basic Assessment Report uses input from specialists to assess the key impacts, determine their significance, and recommend appropriate measures to mitigate negative impacts and enhance benefits. The specialist studies that have been undertaken are summarised in **Chapter 11**. A summary of the positive and negative impacts identified is included in **Chapter 10**. Aspects recommended to be included as conditions of the authorisation are listed in **Chapter 13** and mitigation measures recommended have been included in the Draft EMPr. An extensive PPP that complies with the requirements of GN

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982 has been undertaken and is documented in **Chapter 7** with substantiation in **Appendix C**.

The no-project alternative, ie.without these132 kV powerlines, Eskom Distribution will have to implement localised rotational load shedding in order to avert a 132 kV system voltage collapse from as early as 2019. This will impact 40 000 customers.

One of the 132 kV Distribution powerlines considered in this assessment, namely, the Iphiva-Makhathini / Iphiva-Mbazwane Distribution powerline has an alternative route. **The western corridor of the Iphiva-Makhathini / Iphiva-Mbazwane Distribution powerline** was found by specialists to have the least significant environmental impacts and is recommended for authorisation. The difference in impact between the western and eastern corridors is very small, and if the same landowners are affected and are in agreement, then the Eastern corridor can be implemented.

One of the key issues that landowners affected by the proposed project have raised is the impact on the eco-tourism activities and knock-on effects including decline in property values, loss of jobs, reduced budgets for conservation of animals. Interaction with the landowners highlighted that the project could be opposed should this aspect not be adequately addressed. The design alternative of burying cables for sections of the 132 kV powerlines in areas where the visual impact is of concern, which is along the P 234 road (the Bangonomo Road) between the Manyoni Private Game Reserve and proposed Zimanga Private Game Reserve was therefore assessed. The inclusion of a more detailed economic assessment of the impacts on tourism was also commissioned.

The economic specialist found that the development of the Distribution powerlines will be a significant investment for and have a positive impact on the economy. This is related to the construction and maintenance of the infrastructure as well as positive spin-off impact due to increased electricity supply. Investment costs were estimated to be in the order of R 2 million per km for single circuit lines and R 4 million for double circuit lines above ground. The cost of burying the lines is understood to be higher but no value was provided.

The economic specialist found that the impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales. The economic specialist found that the loss in property value, tourism employment and reduction in economic value were found to have impacts with significances varying from low to very high along the P234 corridor, depending on the specific circumstances (design and route). The economic specialist found that burying the powerlines along the most sensitive stretch of the P 234 corridor will mitigate most of the negative economic impacts on eco-tourism affected properties.

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As the cost of buried lines is higher, the investment value and positive impacts on the economy is also expected to be higher. However, the opportunity cost associated with the additional investment for buried lines could result in inefficient use of capital for the economy. Whether the additional cost of burying lines to reduce the possible impacts on existing tourism is necessary or not cannot be answered at this stage, as the exact costs exact route of the powerlines are not known.

The economic specialist recommended that the project be authorised on condition that a property valuer is appointed to quantify the value impact for directly affected properties with appropriate compensation, and that a cost comparison analysis between burying the powerline and overhead powerlines is undertaken. If the costs are similar, then the powerlines should be buried in the high value tourism areas.

The visual and avi-fauna specialists found that burying the powerlines would reduce the impacts on directly affected eco-tourism properties and birds respectively, while the social, heritage, agricultural potential, fauna and flora and wetlands specialists found that burying the powerlines will have greater impacts on their aspects than above-ground powerlines.

The recommended corridors for the proposed powerlines are presented in **Figure 13.1**.

Should both the Normandie-Iphiva (2) 400 kV and Iphiva-Pongola (2) 132 kV be authorised and implemented, then Eskom Distribution and Eskom Transmission must co-ordinate implementation to ensure the best practical environmental option of both powerlines in the same corridor. This could include the option of multi-circuit towers.

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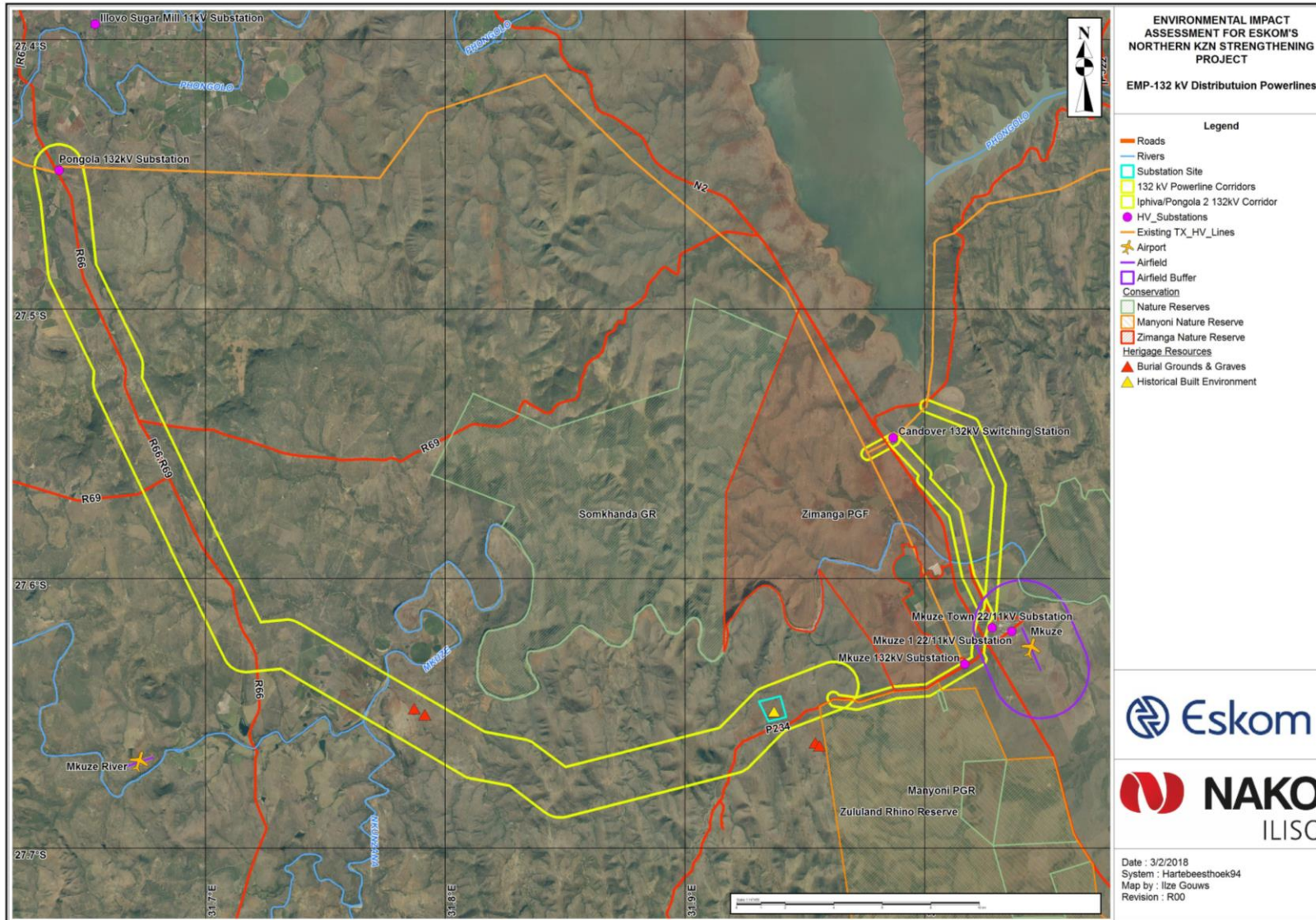


Figure 13.1: Recommended Distribution Powerlines

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14. ASPECTS TO BE INCLUDED AS CONDITIONS OF AUTHORISATION

GN 982 Appendix 1:

- (n) any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;

The following aspects are recommended conditions of the Environmental Authorisation:

The 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line is considered a temporary powerline and must be decommissioned as soon as the Iphiva Substation and associated 400 kV powerlines have been commissioned.

The western corridor of the Iphiva-Makhathini / Iphiva-Mbazwane Distribution powerline was found by specialists to have the least significant environmental impacts. The difference in impact between the western and eastern corridors is, however, very small, and if the same landowners are affected and are in agreement, then the Eastern corridor can be implemented. The EAP therefore recommends that both corridors be authorised, and that the landowner's preference be given priority in negotiation.

All above-ground powerlines along the P234, preferably with double circuit towers is recommended for authorisation.

The powerlines should be constructed on farm boundaries as far as possible, specifically in areas where land is used for forestry. Towers should be placed outside of wetland/riparian areas and their associated 32 m zones of regulation as far as is possible. Where powerlines are constructed in parallel, towers should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action. Lattice towers with visually intrusive footing designs should be avoided to reduce visual impacts, except for situations where strain towers are required or stability/geotechnical aspects play a role. Servitudes should avoid ridge, follow existing infrastructure corridors and avoid visually sensitive areas and receptors where practical.

Water Use Licences/Registrations must be obtained for any construction in an area regulated by the National Water Act (below 1:100 year floodline or 100 m from a watercourse and 500 m from a wetland).

A walk-down of the servitude once the tower positions have been determined, prior to any construction activities, must be undertaken by suitably qualified heritage, ecology and bird specialists. The specialist should recommend feasible design changes (i.e. moving tower positions within the approved corridor, preferably within the servitude if already negotiated)

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to further reduce impacts and identify any heritage resources that may be impacted upon, plants or animals that require rescue and sections of the powerlines that require bird diverters and towers that require bird guards. Areas with a high ecological sensitivity, wetlands and watercourses should be designated as “No-Go” areas and be off limits to all unauthorised vehicles and personnel. These findings must be documented on powerline profiles and incorporated into the EMPr.

The footprint area of towers must be limited to what is essential in order to minimise impacts as a result of vegetation clearing and compaction of soils. Removal of plants should be restricted to only those trees that pose a risk to the powerline. Protected trees within the servitude will necessitate that appropriate permits are applied for before these trees are damaged or removed. Physical damage to natural vegetation on the periphery of the servitude, in all riparian areas and areas with steep slopes must be avoided. No hunting is permitted by Eskom employees or contractors. No incision and canalisation of the wetland features should take place. No material may be dumped or stockpiled in any “No-Go areas. All vehicles must remain on demarcated roads and within the project area footprint. All land disturbed by Eskom should be vegetated and left in the condition it was before the construction of the powerlines and no disturbed areas should be left uncovered during construction to prevent erosion.

Exemption from further palaeontological assessment is recommended. A Fossil Chance Find Procedure must be included in the EMPr.

The social mitigation and management measures include appointing a Community Liaison Officer, compiling and implementing policies for employment, conduct of employees and contractors, road use, access control specifically for protected and game reserve areas, a relocation and compensation in accordance with international best practice, strategies for community relations, communication, Corporate Social Investment, safety and security, HIV and life skills, and a grievance mechanism. A relocation specialist should be appointed should relocation be required. Construction camps should be established in accordance with international best practice, and Eskom must join local fire protection agencies and have and implement a firefighting strategy.

A property valuer must be appointed to quantify the value impact of the powerlines along the P234 corridor for the proposed Zimanga and Manyoni Private Game Reserves.

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15. CONCLUSION AND RECOMMENDATIONS

The EAP recommends that the corridors within which servitudes for the construction and operation of the Iphiva/Pongola (1) - Iphiva/Hluhluwe double circuit 132 kV powerlines to tie in with the existing powerline, the Iphiva – Pongola (2) 132 kV powerline, the western corridor of the Iphiva / Makhathini - Iphiva / Mbazwane double circuit 132 kV powerline; and the 132 kV powerline loop-in to Candover Switching Station from the existing Impala / Normandie Line be authorised, with the conditions listed in **Chapter 14**.

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