

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Eskom is the South African utility that generates, transmits and distributes electricity. Eskom supplies about 95% of the country's electricity, and about 60% of the total electricity consumed in Africa. Eskom plays a major role in accelerating growth in the South African economy through the supply of high-quality electricity. Electricity is primarily generated in coal-fired power stations across the country. The electricity is transported from these stations along high voltage transmission power lines (usually 400kV, but also 220kV, 275kV, 533kV and 765kV lines) to Transmission substations or load centres. These substations then feed local distribution substations with power lines from 132kV and smaller voltage, from where electricity is distributed to communities and other users.

Eskom Group Capital Division is in the process of undertaking major infrastructure investments, including the construction of new substations and new transmission power lines. The transmission network supplying electricity to the Northern Cape and Free State Provinces requires strengthening to meet the growing demand in these provinces and to improve service quality and reliability. To address this situation Eskom has to construct a number of new transmission lines, linking its main generating facilities with the demand centres. The strengthening of the electricity network entails the phased construction of various 400kV transmission lines in the proposed Eskom Kimberley Strengthening Phase 4 Project.

The construction of a 400kV power line (among other project components) is a listed activity in terms of Section 24(5) of the National Environmental Management Act (NEMA), Act No 107 of 1998, as amended, and therefore requires environmental authorisation from the Department of Environmental Affairs (DEA). Eskom Transmission has therefore appointed Landscape Dynamics Environmental Consultants as an independent company, to conduct an Environmental Impact Assessment (EIA) to evaluate the potential environmental and social impacts of the proposed project and apply for Environmental Authorisation from the Department of Environmental Affairs.

1.2 PURPOSE AND CONTENT OF THE DOCUMENT

According to the NEMA 2010 regulations that apply to this application, a Scoping & Environmental Impact Assessment process is applicable.

The objectives of the Scoping Report were

- to identify the issues relevant to the activity for which authorisation is being applied for;
- to identify the potential impacts of the activity to enable authority to take into consideration the environmental effects of activities before development decisions are taken;
- to identify potential alternatives to the proposed activity to ensure the objectivity of the assessment process.
- to give all registered Interested & Affected Parties (I&AP's) the opportunity to comment on the preliminary findings and recommendation in terms of a viable route for the project.

The final Scoping Report submitted to the Department of Environmental Affairs (DEA) was approved on 15 April 2015. DEA advised that Landscape Dynamics could proceed with the tasks contemplated in the Plan of Study for the Environmental Impact Report as proposed in Chapter 8 of the Scoping Report.

The content of the Environmental Impact Report (EIR) is based on the above-mentioned approved Plan of Study and is summarised as follows:

- Confirmation of relevant legal requirement
- Project Description
 - a clear description of all the project components
 - relevant technical details;
 - a clear description of the final recommended route corridor with viable alternatives
- Final specialist investigations

Status quo reports were prepared by the specialists during the Scoping Phase. Environmental components that are more site-specific were only done in draft format. The purpose of these reports during the Scoping Phase was to identify obvious areas and/or “No Go” zones before the process has developed too far. Since the Draft Scoping Report was presented to all the I&AP’s, it was possible that the route corridors could be changed in which case the specialists had to revisit the site in order to prepare their final reports for the EIR.

The specialist reports already finalised during the Scoping Phase due to the macro area investigated (not being site-specific) include the following:

- Palaeontology Report
- Geotechnical Engineering Investigation
- Soil & Agricultural Potential Report

The following specialist reports were finalised for the Environmental Impact Report:

- Freshwater Study
- Terrestrial Fauna & Flora Study
- Bird Impact Report
- Heritage Impact Assessment
- Visual Impact Report
- Socio-economic, Tourism and Land Use Potential Impact

- Public Participation Programme

Proceedings, findings and recommendations of the Public Participation Programme (PPP) undertaken during the EIA Phase are summarised and includes the following:

- Distribution of the Draft EIR for comment;
- No comment that could change the outcome of the project as proposed during the Draft EIR phase was received and a second Public Open Day and/or Stakeholder Meeting(s) were not conducted;
- Continuous and direct liaison with the directly affected landowners and key stakeholders took place to strive to ultimately present route corridors (preferred and viable alternative) on which reasonable consensus have been reached.
- Distribution of the Final EIR is not required because no significant changes to the Draft EIR were made.

All comment, objections and concerns raised and submitted by the I&AP’s were addressed during the PPP and all proceedings, recommendations and correspondence is documented in the Final EIR (this document) which is submitted to DEA for their perusal and ultimately the issuing of the Environmental Authorisation.

- Impact Assessment

An impact assessment based on relevant issues and impact identified during both the Scoping and the EIR Phases is supplied in Chapter 6 of this EIR. Impact were evaluated and assessed in terms of extent; duration, probability; magnitude/intensity and significance.

- Environmental Management Plan

An Environmental Management Plan (EMP) had been compiled and is included as Appendix F of the EIR. The main objectives of the EMP are to confirm actions and mitigation measures to minimise expected negative impact and enhance positive impact during all development phases (design/pre-construction, construction, and post-construction/operation) in terms of community issues, construction site preparation, construction workers, habitat protection, security, etc. Communication channels and contact details are also be provided.

DEA will review the EIR and EMP and one of the following decisions may apply:

- Grant authorisation of the activity
- Refer the report for specialist review
- Request further information or specialist investigations
- Refuse the activity

Landscape Dynamics endeavours with this report to submit a comprehensive study containing all relevant data and information in order to enable informed, fair and responsible decision-making by DEA.

1.3 LEGAL REQUIREMENT

1.3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

This application is done in terms of the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations published in Government Notice No. R.543, June 2010. Environmental Authorisation is requested for the following listed activities:

Government Notice 544 (Listing Notice 1)	
<p>Listing Notice 1: Number 10 The construction of facilities or infrastructure for the transmission and distribution of electricity (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; (ii) or inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</p>	<p>The 400kV line affects a portion of the industrial area of Kimberley on municipal land.</p>
<p>Listing Notice 1: Number 11 The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50m² in size; (ix) slipways exceeding 50m² in size; (x) buildings exceeding 50m² in size; or (xi) infrastructure or structures covering 50m² or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>The proposed activities involve the construction of power lines of which the foundations plus associated structures would exceed 50m² – referring to concrete foundations for both the pylons plus cables. As well as a temporary access roads.</p> <p>The proposed pylon structure at this stage is either the Guyed V- Type with a total base width of 26 meters with pointed tower base in the centre; or the Cross-Rope Suspension Type with a distance between base towers of 21 meters.</p>

	<p>The aquatic features within the study area that would be affected consist of endorheic pans and associated wetland areas and drainage lines.</p> <p>The extent to which the watercourses would be affected could however only be determined once the final route design with placement of pylons had been done. A site walkover with the freshwater specialist at that stage will also further confirm the extent to which impact would occur.</p>
<p>Listing Notice 1: Number 18 The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from (i) a watercourse; (ii) the sea; (iii) the seashore; (iv) the littoral active zone, an estuary or a distance of 100 metres inland of the highwater mark of the sea or an estuary, whichever distance is the greater; but excluding where such infilling, depositing, dredging, excavation, removal or moving (i) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (ii) occurs behind the development setback line</p>	<p>It is proposed that the new substation should be placed in such a manner as to avoid impacting on pans and associated wetland areas - to be confirmed only during the design phase.</p> <p>The concrete foundations will exceed 5 cubic metres per pylon structure with cables and could affect the aquatic features occurring within the study area that consist of endorheic pans and associated wetland areas and drainage lines.</p> <p>The extent to which the watercourses would be affected could however only be determined once the final route design with placement of pylons had been done. A site walkover with the freshwater specialist at that stage will also further confirm the extent to which impact would occur.</p>

Government Notice 545 (Listing Notice 2)

<p>Listing Notice 2: Number 8 The construction of facilities of infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p>	<p>The proposed 400kV power line will run mostly outside urban areas and/or industrial complexes on agricultural and game farm land.</p>
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Government Notice 546 (Listing Notice 3)

<p>Listing Notice 3: Number 4 The construction of a road wider than 4 metres with a reserve less than 13.5 metres: In Free State and Northern Cape provinces</p> <p>i. In an estuary;</p> <p>ii. Outside urban areas in:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus Areas;</p> <p>(cc) 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>(dd) Sites or areas identified in terms of an International Convention;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ff) Core areas in biosphere reserves;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;</p> <p>(hh) Areas seawards of the development setback line or within 1 km from the high-water mark of the sea if no such setback line is determined.</p> <p>iii. In urban areas</p>	<p>The power line will run in close proximity of the Dronfield and Rooipoort Nature Reserves.</p> <p>Access roads wider than 4 metres for construction and maintenance are required.</p>
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<p>(aa) Areas zoned for use as public open space; (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for ' a conservation purpose (cc) Seawards of the development setback line or within urban protected areas</p>	
<p>GN 546, June 2010, Number 13 In Free State and Northern Cape provinces The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <p>(1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list;</p> <p>(2) the undertaking of a linear activity falling below the thresholds mentioned in Listing 1 in terms of GN R.544 of 2010.</p> <p>(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority. (b) National Protected Area Expansion Strategy Focus Areas (c)(i) In an estuary (c)(ii) Outside urban areas the following:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (dd) Sites or areas identified in terms of an International Convention; (ee) Core areas in biosphere reserves; (ff) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve; (gg) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.</p> <p>iii. In urban areas, the following:</p> <p>(aa) Areas zoned for use as public open space; (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose; (cc) Areas seawards of the development setback line; (dd) Areas on the watercourse side of the development setback line or within 100m from the edge of a watercourse where no such line has been determined.</p>	<p>The power line will run in close proximity of the Dronfield and Rooipoort Nature Reserves.</p> <p>The study area affects rural land of which some falls on game farms with an indigenous vegetation cover of 75% or more.</p> <p>The extent of the substation site had been confirmed as 5ha each. Eskom requires a servitude width of 55m (27,5m on either side of the line) which will have to be cleared of potential obstructions to the powerline and for construction, inspection and maintenance purposes. The total area to be cleared would exceed 1 hectare.</p>
<p>GN 546, June 2010, Number 14 The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: In Free State and Northern Cape provinces</p> <p>(1) purposes of agriculture or afforestation inside areas identified in spatial instruments adopted by the competent authority for agriculture or afforestation purposes; (2) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management Waste Act, 2008 (Act No. 59 of 2008) in which case the activity is regarded to be excluded from this list. (3) the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010.</p> <p>i) All areas outside urban areas</p>	<p>The study area affects rural land of which some falls on game farms with an indigenous vegetation cover of 75% or more.</p> <p>The extent of the substation site had been confirmed as 5ha each. Eskom requires a servitude width of 55m (27,5m on either side of the line) which will have to be cleared of potential obstructions to the powerline and for construction, inspection and maintenance purposes.</p> <p>The total area to be cleared would exceed 5 hectares.</p>
<p>GN 546, June 2010, Number 16 The construction of:</p> <p>(i) jetties exceeding 10m² in size; (ii) slipways exceeding 10m² in size; (iii) buildings with a footprint exceeding 10m² in size; or (iv) infrastructure covering 10m² or more where such construction occurs within a watercourse or within 32m of a watercourse,</p>	<p>The power line will run in close proximity of the Dronfield and Rooipoort Nature Reserves.</p> <p>The proposed activities involve the construction of power lines of which the foundations plus associated structures would exceed 10m² – referring to concrete</p>

<p>measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>In Free State and Northern Cape provinces</p> <p>i. In an estuary</p> <p>ii. Outside urban areas, in:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) World Heritage Sites;</p> <p>(dd) 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>(ee) Sites or areas identified in terms of an International Convention;</p> <p>(ff) Critically biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(gg) Core areas in biosphere reserves;</p> <p>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p> <p>(ii) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.</p> <p>iii. In urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, zoned for a conservation purpose; or</p> <p>(cc) Areas seawards of the development setback line.</p>	<p>foundations for both the pylons plus cables. As well as a temporary access roads.</p> <p>The proposed pylon structure is the Guyed V- Type with a total base width of 26 meters with pointed tower base in the centre.</p> <p>The aquatic features within the study area that would be affected consist of endorheic pans and associated wetland areas and drainage lines.</p> <p>The extent to which the watercourses would be affected could however only be determined once the final route design with placement of pylons had been done. A site walkover with the freshwater specialist at that stage will also further confirm the extent to which impact would occur.</p>
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In terms of the NEMA legislation application for environmental authorisation is lodged with the National Department of Environmental Affairs (DEA). DEA has to evaluate this Scoping Study and based on the findings and proceedings documented in the Scoping Report supply the Environmental Assessment Practitioner (EAP) with a decision to proceed with the EIA or to amend the Scoping Report.

The following departments and government institutions are key commenting authorities:

- Department of Economic Development, Tourism and Environmental Affairs, both Free State and Northern Cape Provinces: (Section Environmental Quality Management).
- Department of Water and Sanitation (DWS), Northern Cape Region (please note that the Free State DWS commented that this project falls outside of their jurisdiction and that the Northern Cape DWS has jurisdiction within the applicable catchment).
- The South African Heritage Resources Agency (SAHRA). They will advise whether authorisation is also required from the Free State and or Northern Cape Provincial Heritage Authority.

The NEMA can be regarded as the most important piece of general environmental legislation. It provides a framework for environmental law reform and covers three areas, namely:

- Land, planning and development;
- Natural and cultural resources, use and conservation; and
- Pollution control and waste management.

The law is based on the concept of sustainable development. The objective of the NEMA is to provide for co-operative environmental governance through a series of principles relating to:

- The procedures for state decision-making on the environment; and
- The institutions of state which make those decisions.

The NEMA principles serve as:

- A general framework for environmental planning;
- Guidelines according to which the state must exercise its environmental functions; and
- A guide to the interpretation of NEMA itself and of any other law relating to the environment.

NEMA principles are the following:

- Environmental management must put people and their needs first;
- Development must be socially, environmentally and economically sustainable;
- There should be equal access to environmental resources, benefits and services to meet basic human needs;
- Government should promote public participation when making decisions about the environment;
- Communities must be given environmental education;
- Workers have the right to refuse to do work that is harmful to their health or to the environment;
- Decisions must be taken in an open and transparent manner and there must be access to information;
- The role of youth and women in environmental management must be recognised;
- The person or company who pollutes the environment must pay to clean it up;
- The environment is held in trust by the state for the benefit of all South Africans; and
- The utmost caution should be used when permission for new developments is granted.

1.3.2 THE NATIONAL WATER ACT (ACT NO 36 OF 1998)

The National Water Act guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities which may impact on water resources through the categorisation of 'listed water uses' encompassing water extraction, flow attenuation within catchments as well as the potential contamination of water resources. The Department of Water & Sanitation (DWS) is the administering body in this regard.

Should the proposed activities associated with the substation or power line impact on water resources e.g. cross through rivers, the applicant would be responsible to obtain a Water Use License or General Authorisation for the activity from the regional office of DWS.

1.3.3 THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The proposed project falls within the scope of Section 38 of the National Heritage Resources Act, (Act 25 of 1999) and the applicable activities are:

- (a) the construction of a road, wall, power line, pipeline, canal or similar form of linear development or barrier exceeding 300m in length;
- (b) any development or other activity which will change the character of a site-
 - exceeding 5 000m² in extent
- (c) the re-zoning of a site exceeding 10 000m² in extent

1.3.4 ADDITIONAL ACTS, FRAMEWORKS AND GUIDELINES

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

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. Should protected species and ecosystems be impacted on by the proposed substation or power line, this Act may be applicable and the necessary measures should be taken for implementation.

Note should be taken of the **Alien and Invasive Species Regulations, 1 August 2014 (GNR 598)** which requires that all alien and/or invader plants declared as invaders/weeds, in accordance with the regulations, must be removed.

National Environmental Management: Protected Areas Act (No 57 of 2003)

The Act came into operation on 1 November 2004. The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. In 2004, the National Environmental Management: Protected Areas Amendment Act 31 of 2004 was promulgated to amend Act 57 of 2003 with regard to the application of that Act to national parks and marine protected areas. The NEM: Protected Areas Amendment Act was published for public information on 11 February 2005 and came into operation on 01 November 2005. The NEM: Protected Areas Act, as amended by the NEM: Protected Areas Act 31 of 2004 repeals sections 16, 17 & 18 of the ECA as well as the National Parks Act with the exception of section 2(1) and Schedule 1.

National Environmental Management: Air Quality Act, 2004 (No 39 of 2004)

Section 32 Control of dust; Section 34 Control of Noise; Section 35 Control of offensive odours.

The Constitution Act (No 108 of 1996)

Chapter 2 Bill of Rights; Section 24 Environmental rights; Section 25 Rights in property; Section 32 Administrative justice; Section 33 Access to information.

Expropriation Act (No. 63 of 1975)

Eskom has a policy of "willing buyer, willing seller", and therefore endeavours to purchase land where ever possible or necessary. However, the State and State-owned-enterprises can acquire the rights to use or possess the requisite land through the Expropriation Act (No 63 of 1975). The Expropriation Act requires the determination of compensation based on the principle of market value (i.e. what would the value be in the event of both a willing buyer and a willing seller trading the land). There is a suite of additional legislation, which, in conjunction with the Expropriation Act, could be used to determine the compensation value.

Occupational Health and Safety Act (Act No 85 of 1993)

This Act makes provisions that address the health and safety of persons working at the proposed substation and power line. The Act addresses amongst others the:

- Safety requirements for the operation of plant machinery;
- Protection of persons other than persons at work against hazards to health and safety, arising out of or in connection with the activities of persons at work;
- Establishment of an advisory council for occupational health and safety; and
- Provision for matters connected therewith.

The law states that any person undertaking upgrades or developments for use at work or on any premises shall ensure as far as is reasonably practicable that nothing about the manner in which it is erected or installed make it unsafe or creates a risk to health when properly used.

The Tourism Act, 1993 (Act No. 72 of 1993)

Policy and legislation governing tourism in South Africa emphasises the concepts of responsible tourism and sustainable tourism development. Tourism is legislated in terms of the Tourism Act (Act No. 72 of 1993), which was amended as the Tourism Amendment Act (Act No. 105 of 1996 and the Tourism Second Amendment Act no. 70 of 2000. The 1996 White Paper on Development and Promotion of Tourism in South Africa introduces the concept of "responsible tourism"; i.e. tourism with a responsibility towards the environment, through sustainable use of resources, involvement of local communities, and commitment to safety and security of all concerned. Taking this further, the drive towards "sustainable tourism" development emphasises the optimisation of benefits relating to tourism,

The Conservation of Agricultural Resources Act (No 43 of 1983)

Section 6: Implementation of control measures for alien and invasive plant species.

Atmospheric Pollution Prevention Act (No 45 of 1964) and regulations

Sections 27 – 35: Dust control.

Section 36 – 40: Air pollution by fumes emitted by vehicles.

Occupational Health and Safety Act (No 85 of 1993) and regulations

Section 8: General duties of employers to their employees.

Section 9: General duties of employers and self-employed persons to persons other than their employees.

National Forests Act (No 84 of 1998) and Regulations

Section 7: No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette.

Sections 12-16: These sections deal with protected trees, with the Minister having the power to declare a particular tree, a particular group of trees, a particular woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.

Fencing Act (No 31 of 1963)

Section 17: Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.

Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947) and regulations

Sections 3 to 10: Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard.

White Paper on the Energy Policy of the Republic of South Africa – 1998

Development within the energy sector in South Africa is guided by the White Paper on the Energy Policy, published by the Department of Minerals and Energy (DME) in 1998. This White Paper sets out five objectives for the further development of the energy sector. The five objectives are as follows:

- Increased access to affordable energy services;
- Improved energy governance;
- Stimulating economic development;
- -Managing energy-related environmental and health impacts; and
- Securing supply through diversity.

Furthermore, the Energy Policy identified the need to undertake an Integrated Energy Planning (IEP) process in order to achieve a balance between energy demand and resource availability, whilst taking into account health, safety and environmental aspects. In addition, the policy identified the need for the adoption of a National Integrated Resource Planning (NIRP) approach to provide a long-term cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies.

Department of Environmental Affairs Integrated Environmental Management Series

DEA's Information Series were drafted as sources of information about concepts and approaches to Integrated Environmental Management (IEM). IEM is a key instrument of NEMA and provides the overarching framework for the integration of environmental assessment and management principles into environmental decision-making. The aim of the information series is to provide general guidance on techniques, tools and processes for environmental assessment and management.

National Spatial Biodiversity Assessment

The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on their biophysical characteristics, which are ranked according to priority levels.

Protected species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the provincial departments responsible for environmental affairs.

All relevant Provincial Legislation and Municipal bylaws

National Department of Environmental Affairs: Guidelines

The National Department of Environmental Affairs has a set of guidelines that have to be adhered to during the EIA Process. The following guidelines are applicable:

- Companion Guideline for the Implementation of the Environmental Impact Assessment Regulations (Guideline 5), as published in Government Notice 805 of 10 October 2012.
- Public Participation Guideline for the Environmental Impact Assessment Process (Guideline 7), as published in Government Notice 807 of 10 October 2012.

Eskom Environmental Procedures

Eskom Environmental Procedures in terms of:

- Acquiring of servitudes
- Bush Clearing
- Access to properties

1.3.5 ESKOM PLANNING PROCESSES

The following section, although not legislative, provide supplementary information on some of Eskom's planning processes.

Integrated Resource Plan for Electricity (IRP) – 2010

The Integrated Resource Plan (IRP) is a long-term electricity capacity plan, which defines the need for new generation and transmission capacity for the country. The IRP outlines the concepts and development behind the IRP for the electricity industry in South Africa as well as the strategic objectives of the IRP including the policy and technical parameters that drive the planning process.

The **National Energy Act of 2008 (Act 34 of 2008)** obligates the Minister of Energy to develop and publish an IRP for energy. As electricity forms a sub-component of the energy sector the electricity IRP needs to be integrated into the outlook for energy. The system Operations and Planning Division in Eskom has been mandated by the Department of Energy (DoE), under the New Generation Capacity regulations, to produce the IRP for electricity in consultation with the DoE and the National Energy Regulator of South Africa (NERSA). The objective of the IRP is to develop a sustainable electricity investment strategy for generation capacity and transmission infrastructure for South Africa over the next 25 years. The investment strategy includes implications arising from demand-side management (DSM) and pricing, and including capacity provided by generators (Eskom and independent power producers).

The IRP is intended to:

- Improve the long term reliability of electricity supply through meeting adequacy criteria over and above keeping pace with economic growth and development;

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

1.4 PROJECT TEAM

1.4.1 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Landscape Dynamics Environmental Consultants has been appointed to apply for Environmental Authorisation on behalf of Eskom SOC Limited (Group Capital Division) for this project. Landscape Dynamics cc is an environmental consultancy firm, established in May 1997. The main line of business since that time up to the present date is the compilation of environmental impact assessments. Landscape Dynamics has a broad client base from both the private and government sectors which has developed over the past 17 years of professional services supplied. The operating base for Landscape Dynamics is the entire South Africa; with local representation in Gauteng, the Western Cape, Limpopo, Mpumalanga and Kwazulu-Natal.

The Environmental Assessment Practitioners (EAP's) for this project are Ms Annelize Grobler and Ms Susanna Nel.

The Landscape Dynamics' Company Profile as well as relevant condensed Curriculum Vitae's are attached in Appendix H.

1.4.2 PROFESSIONAL TEAM

The impact that this project might have on the environment could only effectively be assessed if all the environmental project components had satisfactorily been identified and considered. A multi-disciplinary approach was therefore required for this Environmental Impact Assessment.

The EIA Project Team members are the following (condensed CV's are attached in Appendix H):

Company Name	Contact Person(s)	Responsibility and/or Project Component
Landscape Dynamics CC	Ms Annelize Grobler Ms Susanna Nel	EIA Project Management Environmental Assessment Practitioners Public Participation Programme
AMP Property Management & Land Acquisition	Ms Anna-Marie Botha Ms Maritha Duvenage	Route verification Liaison with landowners Socio-Economic, Tourism and Land Use Potential Impact
Evolutionary Studies Institute, University of the Witwatersrand	Prof Marion Bamford	Palaeontology Impact Assessment
Geoset Geotechnical Engineers	Mr David van der Merwe	Geotechnical Engineering Investigation
Terra Africa Consult CC	Ms Marine Pienaar	Soils & Agricultural Potential Report

Blue Science (Pty) Ltd	Dr Toni Belcher & Mr Dana Grobler	Freshwater Impact Assessment Water Use License Applications
Enviroguard Ecological Services CC	Dr Leslie Brown	Terrestrial Fauna & Flora
Chris van Rooyen Consulting	Mr Chris van Rooyen	Bird Impact
Archaetnos Cultural & Heritage Resource Consultants	Dr Anton van Vollenhoven	Heritage Impact Assessment
Newtown Landscape Architects	Mr Graham Young	Visual Impact Assessment
Ivan Pauw & Partners Attorneys	Mr Travis Baikie	Legal Review

The EIA Project Team is supported by the following team members from within Eskom Group Capital Division:

Division within Eskom Group Capital Division	Contact Person(s)	Responsibility and/or Project Component
Eskom Project Development Engineer	Mr Fick Booyesen	Overall Project Management
Eskom Land Development: Manager	Mr Itumeleng Moeng	Project Management
Eskom Land Development: Environment	Ms Lindiwe Motaung	Applicant Representative & Environmental Manager
Eskom Land Development: Acquisition	Mr Koos van der Merwe	Compensation and Servitude Acquisition
Eskom Land Development: Survey	Ms Tinny Makaringe	Mapping
Eskom Land Development: Spatial	Mr Christo Bandehorst	Route Planning
Eskom Land Development: Project Planning	Ms Jamila Kombe	Project Planning
Eskom Land Development: Line Engineering Services	Mr Mdu Mthethwa	Line Designer
Eskom Land Development: Acquisition	Mr Koos van der Merwe	Acquisition

CHAPTER 2: PROJECT INFORMATION

2.1 NEED AND DESIRABILITY

In the past 15 years load has increased in the Hotazel-Kuruman-Kathu-Kimberley-Dealesville corridor by 32.5%. The forecast in this corridor anticipates a huge load growth as a result of high mining activities (diamond, manganese and iron ore mining), electrification and the establishment of small businesses in underdeveloped areas as well as increased housing densities and commercial development in developed areas. Growth is anticipated to quadruple in the next 25-30 years.

The existing network will not be able to support the Hotazel-Kuruman-Kathu-Kimberley-Dealesville corridor load past 2021, therefore strengthening will be required to support the forecasted load and potential renewable generation. In addition, changes in the generation pattern have resulted in Beta Transmission Substation, which is in the Free State Province and the starting point of the Kimberley Strengthening Phase 4 Project, becoming a stronger injection source to this corridor.

The role of grid planning flows from the Eskom Transmission License issued by NERSA of which the main scope of activities is to plan and augment the transmission system in accordance with the South African Grid Code. The Transmission Grid Code (GCD) stipulates that the transmission network shall be N-1 compliant. This implies that the transmission network must be able to supply the load under loss of any of the power lines or equipment. The existing network is currently not compliant and the problem will worsen as the load in the region increases. The solution proposed is to construct a 400kV ring feed supply.

2.2 PROJECT DESCRIPTION

2.2.1 LOCALITY & REGIONAL CONTEXT

The total Eskom Strengthening Phase 4 Project entails the construction of an approximate 390km 400kV power line. The line starts west of the town of Dealesville in the Free State and ends south of Kathu in the Northern Cape. The approximately 390km power line runs east to west, starting at the **Beta** Substation, connects to the **Boundary** Substation, then on to the **Ulco** Substation, connects at the **Olien** Substation, then **Manganore** Substation and ends at the **Ferrum** Substation. The Beta and Boundary Substations are situated in the Free State Province and the Ulco, Olien, Manganore and Ferrum Substations are all situated in the Northern Cape Province.

Due to the significant length and extensive study area across two provinces, the application for Environmental Authorisation for this project was divided into four different applications. These applications are as follows:

- Application 1 (DEA Reference No 14/12/16/3/3/2/647)
Eskom Kimberley Strengthening Phase 4 Project: **Beta to Boundary** (Free State Province)
- Application 2 (DEA Reference No 14/12/16/3/3/2/646)
Eskom Kimberley Strengthening Phase 4 Project: **Boundary to Ulco** (Free State and Northern Cape)
- Application 3 (DEA Reference No 14/1/16/3/3/2/645)
Eskom Kimberley Strengthening Phase 4 Project: **Ulco to Olien to Manganore** (Northern Cape Province)
- Application 4 (DEA Reference No 14/12/16/3/3/2/644)
Eskom Kimberley Strengthening Phase 4 Project: **Manganore to Ferrum** (Northern Cape Province)

**Note that this Scoping Report has ONLY been prepared for
Application 2 – the BOUNDARY-ULCO section of the project.**

The Boundary Substation and a short section of the line are situated in the Tokologo Local Municipality in the Free State Province. The line runs in a westerly direction and then enters the Northern Cape Province north of Kimberley. It runs through the areas of the Sol Plaatjies and the Dikgatlong Local Municipalities and ends at the town of Ulco (refer to the Route & Locality Map attached in Appendix A).

Different route alternatives had been considered during the course of the project. The properties that had initially been investigated by the proposed BOUNDARY-ULCO application included the following but were not necessarily limited to, various portions of the Farms Kareeboom, Tablefarm, Samaria, Picardi, Kenilworth Estate, Roodepan, Phoenix, Droogfontein, Plaas 193, Wildebeest Kuil, Platfontein, Nooitgedacht, De Hoop, Holsdam, Rosalind, Plaas 225, Barkly West 3010, Greeffputs, Plaas 172, Plaas 173, Rus en Vrede, Plaas 221, Karolusdrift, Delpoortshoop, Likatlong, Plaas 176, Plaas 216, Plaas 215, Pniel, Than, Waterkolk, Randt Plaats, Vogelstruis Pan, Klipfontein, Drooge Veldt, Mozib, Plaas 278, Plaas 293, Plaas 277, Plaas 232, Plaas 233, Plaas 217, Greeffputs 169, Plaas 222, Plaas 230, Longlands 231, Likatlong 317, Plaas 293 and Plaas 232.

The properties that are now affected by the Route One Corridor (Preferred) for the BOUNDARY-ULCO application– refer to Appendix A(4) - are the following:

Kareeboom 438 Restant, Tablefarm 242, Kareeboom 76, Kareeboom 76 Portion 2, Kenilworth Estate 71 Portion 12, Dorstfontein 77 Remainder, Samaria 75, Kenilworth Estate 71, Roodepan 70, Phoenix 184, Droogfontein 62 Restant, Plaas 193, De Hoop 65 Portion 5, De Hoop 65 Portion 3, De Hoop 65 Restant, De Hoop 65 Portion 5, River Bend Estate 288, Holsdam 229 Remainder, Holsdam 229 Portion 2, Rosalind 224 Restant, Barkly West 3010, Greeffputs 169 Portion 1, Plaas 222 Portion 1, Plaas 230 Remainder, Longlands 231 Portion 3, Longlands 231 Remainder, Plaas 221, Karolusdrift 219 Restant, Delpoortshoop, Likatlong 317 Remainder, Likatlong 317 Portion 1, Likatlong 317 Portion 2, Likatlong 317 Portion 4, Likatlong 317 Portion 9, Likatlong 317 Portion 12, Likatlong 317 Portion 5, Likatlong 317 Portion 6, Plaas 176 Portion 2, Plaas 176 Restant, Plaas 216 Portion 2, Plaas 216 Portion 6, Plaas 216 Portion 4, Plaas 216 Portion 3, Plaas 215 Portion 2, Plaas 215.

2.2.2 PROJECT COMPONENTS AND TECHNICAL INFORMATION

The project will consist of the construction of an approximately 100km 400kV power line from the Boundary Substation to the Ulco Substation, including a new Ulco TX (Transmission) Substation adjacent to the existing Ulco DX (Distribution) Substation.

A maximum area of 5 hectares is generally investigated and/or acquired for a transmission substation, although the actual footprint of the substation will be less than 5 hectares. The additional land is however necessary to allow for sufficient space for entries and exits of power lines from all directions.

Different pylon structures are being considered for this project. Find attached diagrams with their dimensions attached in Appendix B. They include the following, with the Guyed and Cross-Rope Suspension Type towers being the preferred option from Eskom's point of view at this stage:

- Guyed Suspension Type- Top width 23m; total base width 26 meters with pointed tower base in the centre, height average 33m
- Cross-Rope Suspension Type – Top width 29m; distance between base towers 21 meters, height up to 38m.
- Strain Tower Type – Top width 22,8m; base width 22,8; total base 55 meters; height average 33m
- Double Circuit (where more than one power line is carried via the same pylons) – Top width 12,6m; base width 8,05m; height average ranging between 30m and 61,22m

The proposed “double circuit” line is a worst case scenario. It will only be used where no other viable alternative is possible due to huge financial implications and construction constraints.

The final pylon structure will however only be determined during the design phase. The choice of pylon structure will be guided by the site-specific characteristics, i.e. geology, soils, topography, landowners' preference, etc. At this stage it does however appear as if the 'Cross-Rope Suspension Type' pylon is favoured by the engineers for this project specifically.

2.2.3 SERVITUDE DETAILS

The servitude width is 55m, with 27.5m on either side of the line. Note however that for the purpose of the Environmental Impact Assessment a route corridor width of 2km is being investigated for each alternative and a 2km wide route corridor will ultimately be authorised by DEA. This enables slight adjustments within the corridor during the corridor walk-down and servitude negotiations with the relevant landowners without having to enter into an additional environmental authorisation process.

It will be strived to reach reasonable consensus during the EIA process with the directly affected landowners with regards to the route and the 2km wide corridor across their properties. As soon as environmental authorisation has been obtained, Eskom will appoint independent evaluators and the process of negotiation in terms of compensation with the relevant landowners will take place. It is also during this process that site-specific issues will be addressed that include the following:

- Specific placement of pylons so as not to interfere with farming activities; infrastructure and sensitive environmental features;
- Access and control requirements (i.e. gates, fencing; access roads; etc.);
- Communication channels during ongoing maintenance and inspection of the power line (relevant personnel with contact details; etc.);
- Communication channels emergency situations (i.e. power failures; veld fires; etc.);
- Clearing of vegetation (i.e. selective clearing; what to do with the cuttings (removal or place in heaps for the landowner for firewood; etc.).

After all agreements had been finalised; the servitudes will be registered against the properties at the deeds office. The property remains that of the landowner, but Eskom will have the right to build and maintain a power line according to the servitude conditions referred to above.

2.2.4 METHOD STATEMENT

The construction of a transmission line involves the following actions:

Surveying (Pegging of tower positions)

- Resources: Surveyor, assistants, survey instruments, 4x4 vehicle, hammers, steel tapes and steel pins.
- The tower positions are pegged using a single steel pin knocked into the ground. The position is reached by utilising GPS co-ordinates taken from the tower staking table. Cross sections of the site will be taken to facilitate the calculation of the tower leg extensions.
- Whilst driving in the field, special care is taken not to drive through visible wet areas and drive through streams. Existing tracks are preferred and will be utilised as far as possible.
- In the event that access is not available or impossible, walking will be an option.
- The surveyor will note all available access routes and problem areas. Access routes will be investigated and agreed upon in writing by the Environmental Control Officer (ECO), where after they will be marked.

Geotechnical Soil Investigations

- Resources: Geotechnical engineer, assistant, operator, ladder, geological pick, 4x4 vehicle and excavator.

- Access routes are followed as agreed upon and marked to reach the tower positions. No multiple tracks will be allowed.
- The excavator will dig a trail pit to the approximate depth of 3m deep x 2m square.
- The topsoil will be removed and placed apart from the rest.
- Geotechnical engineer will climb down the hole by means of the ladder and classify the soil type and propose the tower foundation type to be installed.
- The hole will be backfilled with the excavated soil and then covered with the topsoil.
- In the event of probable oil spillage from the excavator (all vehicles and machinery will be equipped with drip-trays), spillage will be removed using a spill kit as required by environmental specification and disposed of at a registered dumping site.

Setting out of towers

- Resources: Surveyor, assistants, survey equipment, steel measuring tapes, hammers and 4x4 vehicle.
- Once the foundations have been designed and the drawings approved, the surveyor will peg the foundation as per the approved drawings, driving to the tower position via the approved access routes.
- Notes and photographs are to be taken of the position for record purposes both before and after construction.

Foundation Excavations

A site plan or a tower foundation excavation layout plan shall be drawn up as a basis for discussion between the Contractor and the Employer (Site Representative and Environmental Control Officer) resulting in a formal signed document of how the foundation will be excavated at a given site. There are three basic part of this layout plan:

Tower site information

The tower site information includes all the limitations and restrictions as per the Environmental Authorisation for access, operation and demobilisation of the equipment required to install the spread foundation (conventional foundation) such as:

- Restrictions on points of access to the tower position
- Equipment limitations on site
- Underground and overhead services
- Existing structures
- Clearing restrictions
- Presence of surface water
- Environmental restrictions

Foundation Construction Survey

The construction survey establishes the foundation centre hub, reference points, elevations and required depth of the excavations. Before the excavation of the foundation can start, the outline of the tower foundation is set out as per the approved foundation drawing and the depth of the excavation calculated. The centre of the leg excavation is established and the depth calculated in relation to the foundation hub. The foundation hub is used to control the depth of the excavation. (The four corners of the foundation excavation should match the dimensions of the concrete foundation slab if the concrete is cast against in-situ material).

Foundation Site Information

Foundation site information in compliance of the Environmental Authorisation includes the following:

- Access to the tower position;
- Foundation assembly site;
- Spoil pile management;
- Erosion control measurements.

Access to the foundation sites and the sequence of excavating each foundation must be planned to avoid the undercutting of other foundations. Access limitations may require that only one leg foundation may be done at a time; excavated, assembled, set and backfilled. Large spread foundations are often required, which require a spoil pile management plan. The excavated material is normally used for backfilling. The topsoil and fines need to be separated so that they can be replaced as topsoil and used adjacent to the foundation. All surplus material will be removed from site. Erosion control measures to be done in consultation with the ECO.

Excavation

The equipment and methods that are used for the excavation of the foundation depends on the type of soil that is encountered at the excavation site. The following types of soil can be encountered on site (TRMSCAAC1 rev 3):

- “Type 1”: competent soil with equal or better consistency than would be encountered in stiff cohesive soil;
- “Type 2”: less competent soil than “type 1” with weaker or equal consistency in firm to stiff cohesive soils;
- “Type 3”: dry loose non cohesive soil or very soft to soft cohesive soils;
- “Type 4”: submerged cohesion less and cohesive soils. This includes soils below the permanent water table, including soils below a re-occurring perched water table or permeable soils in low lying areas subjected to confirmed seasonal flooding.

Often a high water table will require dewatering of the excavation. Depending on the specific site conditions, open pumping, cut-off drains (trenches), or drainage pits may be necessary to remove the water. Should the water continue to run into or seep from the walls or the bottom of the excavation a sump hole may be dug at one of the corners of the foundation bottom and a small pump used in these pumping holes to keep the foundation dry during the construction of the foundation. Whenever personnel are in the excavations, the safety hazards shall be assessed. There must be good means of ingress and egress from the excavation. Excavated material shall be stock piled away from the edges of the excavation and round rocks and boulders will be preferably placed in a location and manner that will prevent them from rolling back into the excavation. The stability of the side walls shall be inspected to establish the soundness thereof in mitigating against the collapsing of the sides.

Foundation Preparation

After the excavation the stability of the foundation bottom shall be checked to ensure that the bearing capacity is adequate. In the case of foundations in soil type “3” and “4”, a blinding layer of not less than 50mm shall be cast as to have a firm and clean surface to work on. The excavation shall be kept free of water and mud.

Foundation Installation

All the reinforcing shall be placed using the specified bar sizes and spacing top and bottom before the stubs are placed in the centre of the foundation and the rake of the stub set at the required angles.

Foundation Setting

Once the reinforcing and the stubs have been placed the final setting are done. Measurement and levels are set to within the allowable tolerances and checked. Cover blocks are placed and checked that the specified cover is obtained from the bottom and sides of the excavation before first layer of concrete is cast. Successive layers are checked and cast after the cover to the shuttering is checked and released for concrete casting.

Concrete Placing

During the casting of concrete into the foundation slabs, plinths and columns care shall be taken to prevent any spillage of concrete from the concrete mixer trucks. Any spillage shall be cleaned and wasted concrete placed in special containers for this purpose and then disposed of at registered dumping sites. No washing or rinsing of the mixer drums will be undertaken on site. Rinsing will be disposed of in special constructed areas to contain the cement water in consultation with, and approval of the ECO.

Backfilling

Backfilling will be done in layers of 300mm utilising suitable excavated material. Should the excavated material not be suitable, imported material shall be used from approved borrow pits. The final layers shall be done with the topsoil separated from the rest of the excavated material.

Site Restoration

After the backfilling has been completed the excess soil shall be removed from site and dumped at an approved site as agreed with the ECO. The area around the excavation site shall be cleared of all debris and rubbish. The oversight of possible oil, cement and concrete spillage shall be cleared in the specified manner and properly disposed of. All site vehicles and equipment shall be equipped with the necessary oil drip trays.

Tower Assembly and Erection

Access to the Tower sites and the sequence of assembly and erection of each tower will be planned to avoid unsafe working conditions. All site vehicles and equipment shall be equipped with oil drip trays.

Stringing of Phase and Earth Conductors

Puller and Tensioner Site Information

Tower site information in compliance with the Environmental Authorisation will include the following:

- Access to the proposed Puller, tensioner and drum station positions as per the agreement and approval of the ECO.
- Access to tower positions to offload and dress towers with Insulators and Hardware.
- Access to Tower positions along the servitude to install the pilot ropes/ cables as per agreement with, and approval of the ECO.
- Possible clearing/ cutting of bush and trees that may foul the stringing of the conductors.

Installation of Pilot Cables

Once the stringing section (approximately 2000m to 3000m depending on the terrain) has been established and agreed upon, the pilot cables/ ropes are run out along the servitude and installed onto the stringing pulley blocks. Should access along the servitude be inadequate for the pulling vehicle due to the presence of wetlands or deep valleys, a light rope or fish line can either be walked through or pulled through by other approved means and the pilot cable then pulled along the servitude. Both ends of the pilot cable are attached to the Puller and the Tensioner, ready for pulling the phase and earth wire conductors.

Stringing Operation

The conductors (one phase at a time) are pulled through the tensioner from the drums and then attached to the Pilot cable. The puller then starts applying tension to the pilot cable to lift the cable off the ground, to a height of 1m to 3m to prevent any damage to the conductors by dragging them on the surface and the clearing of obstacles along the servitude.

Regulating and Sagging

Once stringing has been completed, the conductors are pulled to the required tension as per the sag and tension charts using a dynamometer of sag boards attached to the towers in a predetermined span. The conductors are made of dead-ends applied and attached to the strain towers. Suspension towers and the conductors are placed in the suspension clamps and the pulley blocks lowered to the ground for collection and installation on the following stringing section.

Site Rehabilitation

After the completion of the binding in of the conductors, all pulley blocks and ropes shall be removed from site using the access routes agreed upon. All rubbish will be collected and placed in the required bins for collection and disposal at registered dumping sites. Once the site has been cleared the ECO shall undertake an inspection to see that all the conditions as stated in the EA have been complied with and then sign off the

release. Special care shall always be taken when crossing wetlands and river streams in compliance with the requirements of the Water Use License. All site vehicles and equipment shall be equipped with oil drip trays.

2.2.4 DESIGN, CONSTRUCTION AND OPERATIONAL TARGETS

The construction phase for the proposed project will take approximately 24 months to complete and will entail the following process post authorisation:

- **Corridor walk-down:** This will be undertaken by both the Eskom Engineers and the relevant specialists (Fauna & Flora Specialist; Bird Impact Specialist; as well as the Heritage Impact Specialist). The purpose of this walk-down is to ensure that all site specific sensitivities are avoided. During this process the exact design and co-ordinates of the proposed pylons will be established.
- **Construction Camps:** The specific areas will be confirmed during the design phase of the project, also to be visited during the corridor walk-down. These construction sites will be secured by temporary fencing and 24-hour guarding personnel.
- **Vegetation clearance:** A 55 metre (27.5 metres on either side of the power line) servitude is required for the proposed 400kV power line. Tall trees will be cleared along the entire length of the servitude. Maintenance of the vegetation will be done by Eskom during the operational phase of the project.
- **Pylon footings:** Foundations will be laid for the footings of the pylons.
- **Steelwork structures:** The pylons will be erected in segments.
- **Stringing:** Once the pylons have been erected, cables will be strung between the pylons.
- **Feeder bays and Transformers:** Feeder bays and transformers will be erected on vacant land identified adjacent to the existing Ulco DX Substation where the new Ulco TX Substation will be built.

Since the proposed power line will be approximately 94km in length, the aforementioned tasks may occur simultaneously along the power line corridor.

Draft Scoping Report to I&AP's	December 2014
Final Scoping Report submitted to DEA	March 2015
Finalisation of all specialist studies	March-June 2015
Submission Draft EIR and EMP's to I&AP's	August 2015
Submission of Final EIR and EMP to I&AP's, if required	October 2015
Submission of Final EIR and EMP to DEA	October 2015
Environmental Authorisation	December/January 2016
Appeal period ending	January/February 2016
Servitude rights (valuations, negotiations and registrations)	March 2016 – March 2017
Detail Design and Detail Site Overview with Specialists	March 2016 – March 2017
Construction Period	March 2017 – March 2019

CHAPTER 3: ALTERNATIVES

3.1 NO GO ALTERNATIVE

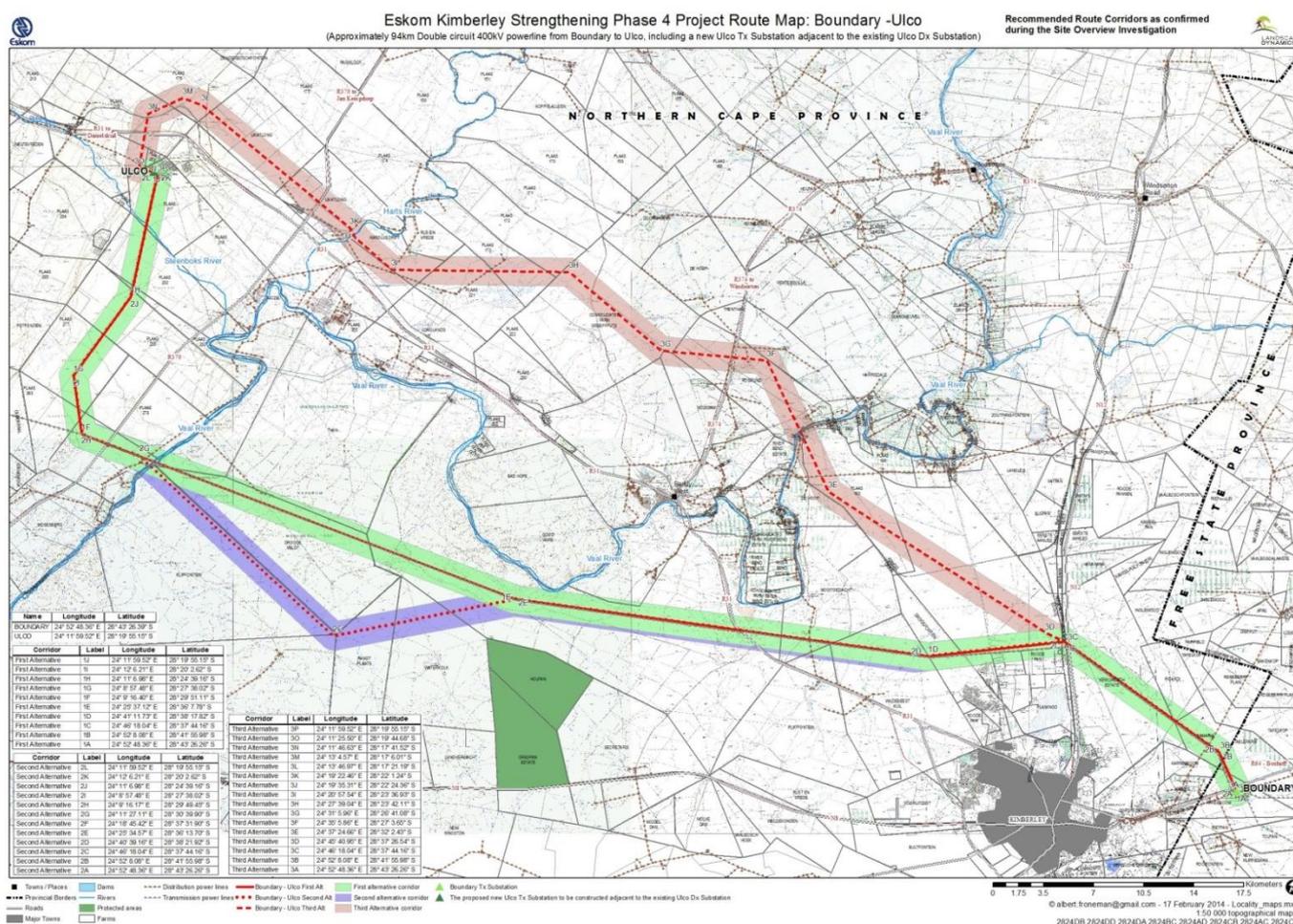
This is the “do nothing” alternative. Under these circumstances no power line will be constructed, a new substation will not be constructed and there would obviously be no changes to the environment.

With this alternative, current and future network constraints under N-1 contingency in the Northern Cape and Free State Provinces will not be alleviated. The reliability of electricity supply to the Northern Cape and Free State Provinces remain a significant concern unless other sources of power generation and transmission are identified and implemented within the very near future. It is important to realise that alternative sources of energy provision are also associated with significant project components and are also subject to relevant legal requirements for which the authorisation process can reasonable take between 12 and 24 months. With increasing economic activity and demand for electricity in these provinces, the regional impact of electricity failures would be significantly increasing.

The “No Go” option cannot be considered a responsible and viable alternative.

3.2 ROUTE ALTERNATIVES INITIALLY PRESENTED AND INVESTIGATED

The three route corridor alternatives initially investigated are the following (an A3 copy is attached as Appendix A(2)).



3.3 ROUTE DESCRIPTION

A general description of the macro area of all three route corridors is provided below.

The Boundary substation at the eastern extent of the study area is located approximately 12km east of Kimberley and the various power line alternatives run parallel, either north or south, of the R31 road between Kimberley and Ulco, looping around the town of Barkly West. The Ulco Substation at the western extent of the study area is located adjacent to the Ulco Mine.

The town of Kimberley is set in a relatively flat landscape with no prominent topographic features within the urban limits. Hills in the landscape are largely of an artificial nature, created by mining debris dumps associated with more than a century of diamond mining. Since the 1990s these dumps have been recycled and poured back into De Beers Mine, with certain mine dumps being preserved as part of the historic industrial landscape of Kimberley.

Land use within the study area consists largely of a mix of natural areas and game or livestock farming. A number of Eskom power lines already transect the landscape. Degraded and excavated areas are scattered throughout the area where either intensive agriculture or mining activities occur.

The Ulco plant is situated on a limestone deposit near Ulco. Here limestone is mined from shallow open pits and crushed on-site to produce cement clinker, the base feedstock for cement.

The surrounding rural landscape consists of relatively flat plains dotted with hills and slightly undulating plains with Ghaap Escarpment at Ulco in the west of the study area. Outcropping basement andesite rock is present to the north and north-west of the study area.

The study area consists of the following natural vegetation types: Kimberley Thornveld in the eastern half of the area, Schmidtsdrift Thornveld in the central portion, Ghaap Plateau to the west and patches of Vaalbos Rocky Shrubland to the south of the proposed routes. There are still large portions of these vegetation types remaining and as a result they are considered to be Least Threatened. Other vegetation that may be affected is that of Highveld Salt Pans and the riparian vegetation along the Vaal and Harts rivers. This Highveld Salt Pan vegetation type is considered Least Threatened and is scattered throughout South Africa where the rainfall ranges between 300mm and 500mm.

The aquatic features occurring within the study area consist of the lower Vaal and Harts rivers and some endorheic pans and streams or drainage lines.

In terms of rivers, the area is located in the Lower Vaal River Catchment at its confluence with the Harts River. Both of these rivers were significantly modified by the surrounding farming activities which has taken place within the riparian zones. Near the confluence of the Harts and Vaal Rivers at Delportshoop a major irrigation system, the Vaal-Harts Scheme was set up in 1933 where water drawn from both the Vaal and the Harts rivers at Warrenton approximately 50km north of the study area to provide water for the intensive irrigation of numerous smallholdings through a system of canals in an otherwise dry area of the country. As a result both rivers are significantly impacted within their lower reaches.

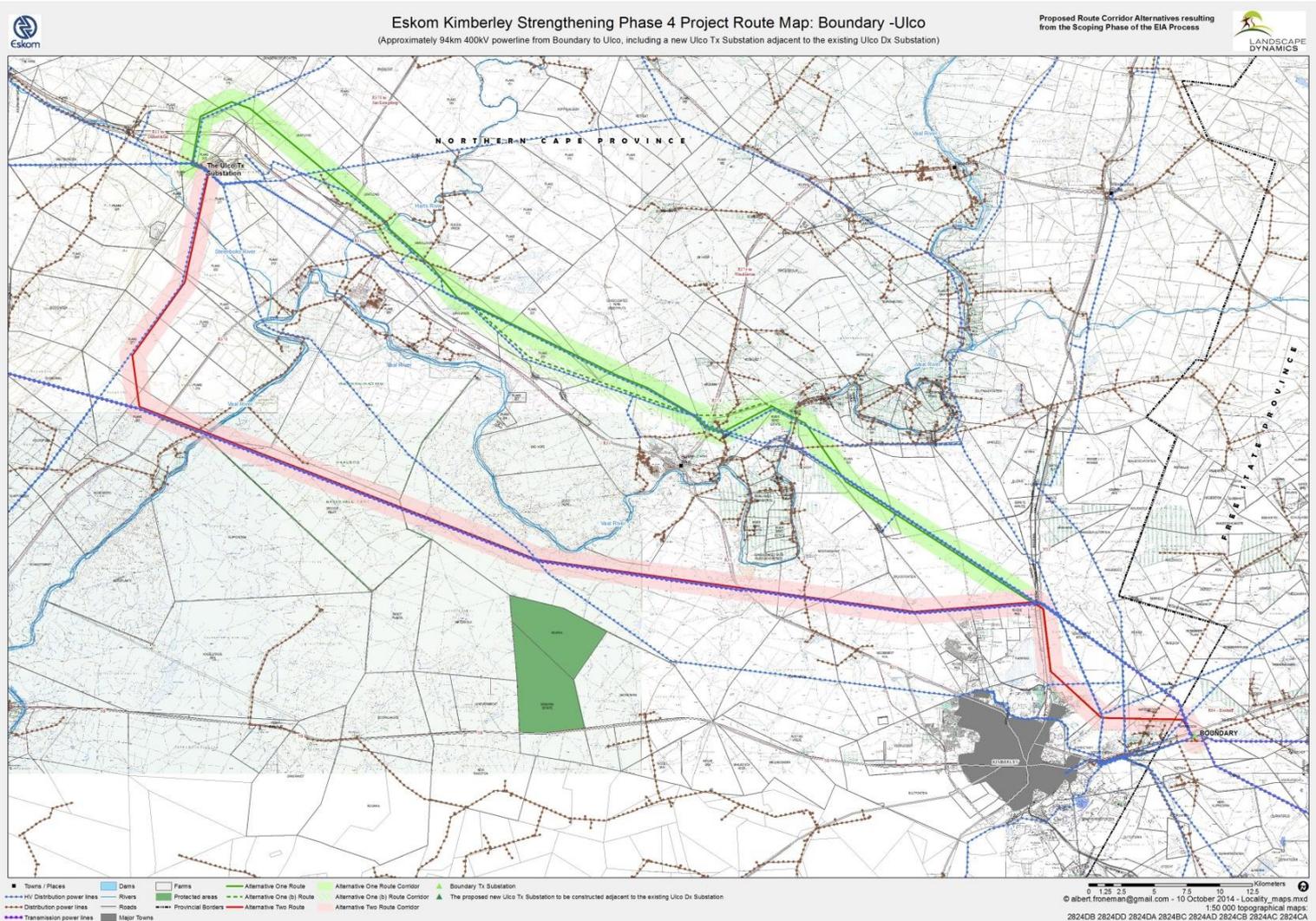
A wide variety of pan types occur throughout the study area namely salt pans, calcareous pans, gypsum pans, clay basin pans and other soils as well as fresh water pans. The pans vary slightly in condition and have been primarily disturbed by the grazing of livestock. Many of the pans have been modified into water storage structures while others contain roads, fences and power lines through them. Vegetation that can persist in these saline and seasonally inundated conditions consists of low grassy dwarf shrubland.

The ephemeral streams are only visible in the landscape as small grassy or earthen channels with little to no riparian associated vegetation. Larger streams have characteristic Sweet thorn *Acacia Karoo* trees along its banks.

In general the soils within the study area consist mostly of freely drained, structure-less red "Hutton" soils with a high base status that may have restricted soil depth, excessive drainage, high erodibility and low natural fertility. Along the Harts River and surrounding site floodplain and the lower Vaal River, the soils have a marked clay accumulation, are of a restricted depth and have slow water infiltration. In the western portion of the study area, the soils are shallow on rock with lime present.

3.4 RECOMMENDATION IN TERMS OF ROUTE CORRIDORS RESULTING FROM THE SCOPING PHASE

The three initially proposed routes were presented to all the stakeholders (government departments, municipalities and other) as well as directly affected landowners. The extent and detail of the community consultation is described in detail in Chapter 5. Extensive negotiations and constructive meetings took place with the affected parties and it was proposed to amend the proposed route corridors as supplied in the map below (an A3 copy is attached as Appendix A(3)). Note that only two route corridors are now proposed to be investigated in more detail during the Environmental Impact Phase. It was made clear during the consultation process that these proposed routes could still be amended or could even result in a combination of both routes, depending on the outcome of specialist investigations and further community consultation.



- **New Alternative 1**

This alternative heads west from the proposed new Boundary Substation towards the N12. Through this route the sensitive vulture restaurant and Camel Thorn Tree area on Dronfield is avoided by running on the similar position as the original Alternative 1, with the exception of deviations closer to farm boundaries as requested by the land owners in the area.

The route turns north parallel to the N12, after which it crosses the N12 and heads north-west similar to the original Alternative 1 route. The route then deviates to a more westerly direction and crosses the Vaal River parallel to an existing 66kV line. The route follows the Holsdam – Riverton 66kV power line bending in a south-western direction, then turning north-west parallel with the existing Weir – Gong-Gong 132kV power line and Holsdam – Ulco 1 132kV power line.

The alternative continues parallel to the last mentioned line, crossing over state owned properties. It bends parallel to the Kudu – Gong- Gong 132kV power line until it and continues straight until bending south towards the new proposed Ulco Tx Substation.

- **New Alternative 1A**

This alternative is similar to above-mentioned new Alternative 1 but deviates after crossing the Vaal River. This route continues straight and only bends parallel to the Holsdam farm boundaries. It then runs parallel to the Existing Weir – Gong-Gong 132kV and then parallel to the Kudu – Gong-Gong 132kV power line. The alternative then follows the same route as new Alternative 1 discussed above.

Advantages

- The route is adjacent to the road and existing infrastructure can be utilised during construction.
- Game farms like Matannu is avoided.

Limitations

- Sensitive areas, i.e. crossing of the Vaal River cannot be avoided.
- The proposed route will enter into the substation from the northern side, which will provide major challenges due to the topography of the area north of the site.

- **New Alternative 2**

This route follows the same route as suggested in the new Alternative 1. After crossing the N12 it follows the same route as the original Alternative 2.

Advantages

- Most of the route is along existing transmission power line servitudes and access roads and gates have already been established.

Limitations

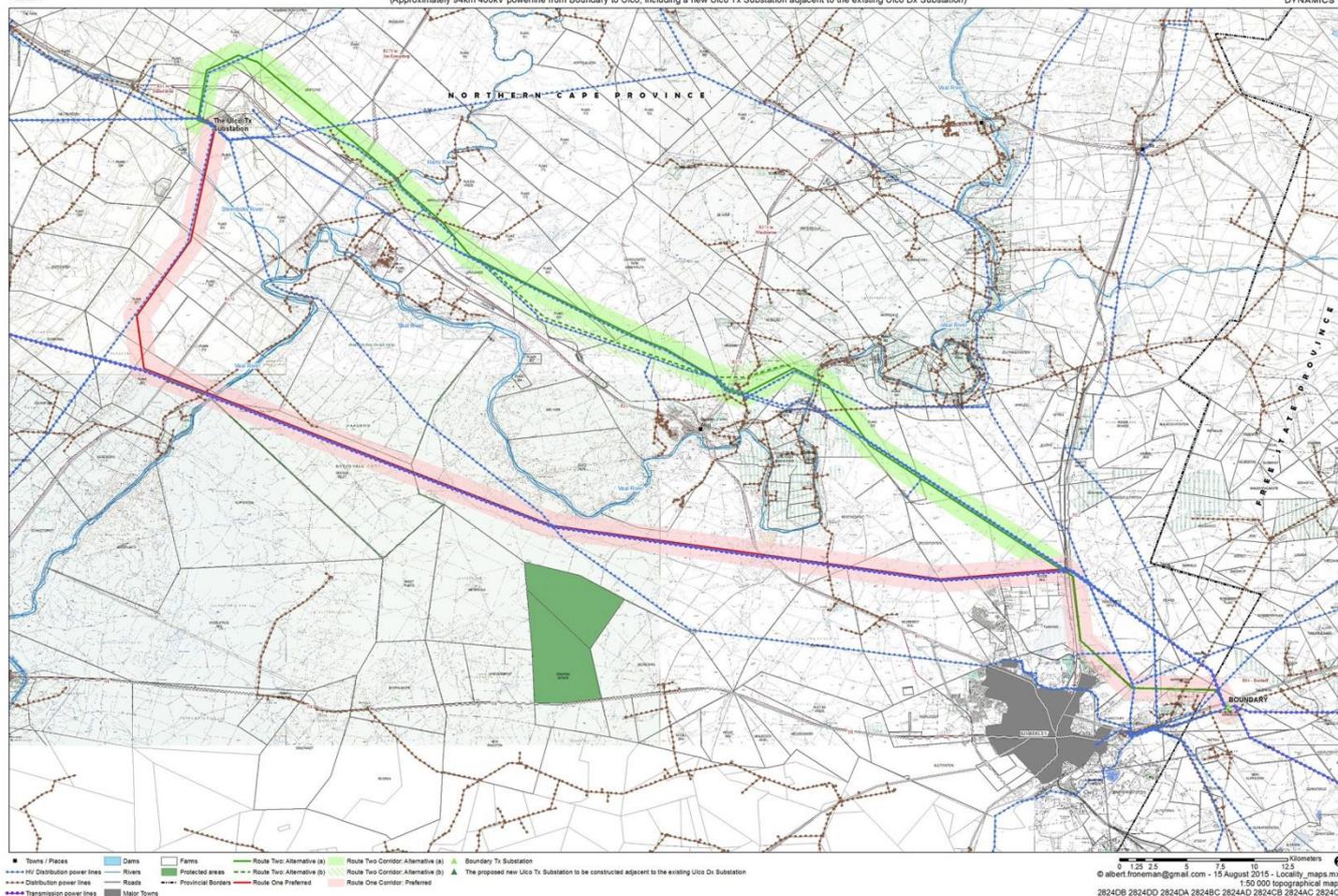
- Generally the land owners to the south of Ulco have had very negative experiences with Eskom and Eskom contractors.

3.5 DESCRIPTION OF THE ROUTE CORRIDORS PROPOSED FOR ENVIRONMENTAL AUTHORISATION

Attached in Appendix A(4) is an A3 copy of the “**Route Map with Preferred Route Corridor and Alternative Route Corridor**” that is proposed for Environmental Authorisation. Also attached as Appendix A(4) is the co-ordinates of the Preferred Route Corridor.



Environmental Impact Report : Proposed Route Corridors (Preferred and Alternative)
 Eskom Kimberley Strengthening Phase 4 Project Route Map: Boundary -Ulco
 (Approximately 94km 400kV powerline from Boundary to Ulco, including a new Ulco Tx Substation adjacent to the existing Ulco Dc Substation)



ROUTE ONE CORRIDOR (PREFERRED)

The southern route (pink corridor)

The area from the proposed new Boundary Substation, on the northern side of Kimberley, consists mainly of game farms including Dronfield Nature Reserve. This reserve has sensitive areas including Camel Thorn Trees and a vulture restaurant. The assistance of the land owners in this area insured an amended route that has minimum encroachment on the reserve.

After crossing the N12, the corridor runs on the northern side of the existing Boundary – Olien 1 and 2 275kV power line, passes on the south of the Droogfontein solar plant, it crosses over Droogfontein 62, Wildebeest Kuil 69, Platfontein 68, Nooitgedacht 66, Barkly West 3010, Drooge Veldt 292, Mozib 279, Plaas 278, Plaas 293. South of Barkly West the farms are mostly owned by the state and CPA's and mostly utilised for grazing purposes. The impact of the power line will thus mostly be limited to the area of the foundations of pylons. The corridor then turns north parallel with the existing Ulco – Herbert 132kV over Plaas 277, Plaas 233, Plaas 232 until the proposed new Ulco substation on Plaas 217.

Most of the route runs along existing power line servitudes and access roads and gates have already been established.

During consultation with land owners it became apparent that it will be preferred if the proposed power line can be as close as possible to farm boundaries and existing power lines and it must have the smallest possible impact on nature reserves.

It was possible to incorporate these requirements into the Preferred Route Corridor and this route also has a minimum impact on conservation areas and sensitive game farms. This route is therefore proposed for Environmental Authorisation.

ROUTE TWO CORRIDOR (ALTERNATIVE)

The northern route (green corridor)

On Droogfontein 62 and Plaas 93 the proposed corridor runs in a north western direction adjacent to Kimberley-Holsdam 132kV and then the Holsdam-Riverton 66kV there it crosses the river on De Hoop 65. Along the Vaal River, west from Kimberley, there are multiple irrigated lands. In these areas, special consideration is required regarding pylon placement.

On Holsdam 229 the proposed corridor will run parallel to the Holsdam-Ulco 132kV power line, crossing over Barkly West 3010, Greefputs 169, Plaas 222, Plaas 230, Longlands 231. The Kudu – Gong-Gong 132kV power line is then followed over Delpoortshoop, Karolusdrift 219 until Likatlong 317. The line continues straight until it bends on Plaas 176, in a south western direction to the proposed Ulco substation on Plaas 217.

Alternative 2A

This alternative is similar to alternative 1 but deviates after crossing the Vaal River.

The route continues straight and only bends parallel to Holsdam 229 farm boundaries. It then runs parallel to the existing Weir – Gong-Gong 132kV power line crossing over Barkly West 3010, Plaas 230. On Longlands 231 it joins up with alternative 2.

Advantages of this route are that it is adjacent to the road and existing infrastructure can be utilised during construction. Game farms like Matannu are avoided.

The final section of both of these routes is however very problematic because the proposed power line will enter into the substation from the northern side and the topography of the area will be a constraint and poses major challenges.

This route is not recommended.

CHAPTER 4: RECEIVING ENVIRONMENT

4.1 BIOPHYSICAL ENVIRONMENT

4.1.1 CLIMATE

The area is known for its warm dry summers (November-February) and mild to cold winters (June-August). The average midday temperatures for Kimberley range from 18°C in June to 32°C in January and can be below 0°C in winter. The erratic rainfall occurs mainly during summer in the form of thunderstorms. The rainfall varies between 250 and 700mm per year with the average annual rainfall for the area being 400mm.

4.1.2 GEOLOGY, SOILS & GROUNDWATER

An *Engineering Geological Investigation* was undertaken by Geoset CC and is attached in Appendix C(1). A summary thereof is provided below.

The proposed alternative corridors between the Boundary and Ulco Substations were investigated to determine the expected engineering geological properties that will influence the placement of pylons:

Topography

The site is located from flat areas to a gentle to low gradient slopes with small dolerite koppies or hills, with average elevations of 1250 MASL at the Boundary Substation and 1100 metres above mean sea level at the Ulco Substation, confirming the relative flatness of the area.

Site Geology

The general thickness of the soil cover will in general marginally decrease moving from east to west, and will increasingly be covered by recent Aeolian dune sand, underlain by calcrete. It is evident that the aeolian dune sand covers the calcrete which is found in depth, and it is mainly present in the north western last half of the route corridors.

The south-eastern area is underlain by recent Aeolian dune sand, underlain by calcrete or Karoo Supergroup sediment comprising Ecca Group consisting of shale, siltstone and sandstone of the Tierberg Formation. The shale is represented as micaceous mudrocks interbedded with infrequent carbonaceous mudrocks. Dolerite dykes and sills appear commonly along this area.

Andesitic lava of the Allanridge Formation (Ra), Platberg Group of the Ventersdorp Supergroup comprises the largest and centre portion of the corridors. It consists of amygdaloidal or porphyritic andesitic lava, quartzite and conglomerate, in many places covered by aeolian sand and calcrete gravel.

The last quarter of the corridors presented the Ghaap Plateau and Schmidtsdrift and Vryheid Formations of the Campbell Group of the Griqualand West Supergroup. The Ulco (Vgu) Member of the Ghaap Plateau was found north of Ulco and consist of fine grained dolomite and stromatolitic limestone with interbedded chert, with a banded iron formation at the top, underlain by the Vryburg Formation (Vv) comprising siltstone, shale, quartzite, gritstone and conglomerate.

Kimberlite pipes and fissures are also frequently indicated and their economic potential should be kept in mind.

The aeolian diamondiferous gravel (Qa) as well as the alluvium and scree (m) are associated with the river and paleo river systems, and in general only found near or at the Vaal, the Harts and Steenboks Rivers.

The geology map indicates some intrusive dolerite sills and dykes (Jd: dolerite) in general into the Ecca Group (Pt: shale, siltstone and sandstone) of the Karoo Supergroup sediment along the first eastern section from Boundary substation. These dolerite sills usually occur as small hills or koppies with slightly weathered to unweathered or fresh dolerite on top with some loose material or talus at the sloping sides of the koppies.

These dolerite dykes and sills are usually targeted as construction materials and should be adequate in providing efficient foundations for power pylons and also to be used as construction or founding materials. The specific contact zone between the dolerite and Karoo sediment usually has baked shale as indicator, and these zones should preferably not be used for the pylons as differential movement may contribute to unstable foundation conditions.

The upper soil may only consist of Aeolian dune sand and should be removed for construction on underlying competent bedrock or calcrete.

There are five old gypsum mines in the area and some economic deposits may occur along the corridors, and it should be addressed during the final geotechnical ground survey, should it be required. The locality of the four nearest gypsum mines were noted on the farms Wildebeest Kuil 69, between the road R31 to Barkly West and the proposed corridors and at the proposed crossing of the R31 and the proposed first and second preferred alternatives on the farm Pniel 281, on the farms Plaas 221 and Plaas 172.

Numerous Kimberlite pipes and fissures possibly containing diamonds were noted in the area, and diamonds are economically mined. There is an indication of a Kimberlite pipe on the farms Plaas 193 and Rosalin 224, near the power lines of the third alternative corridor, and outside the corridor on the farms Plaas 173, Plaas 172 and Plaas 171 where the Kimberlite were mined for diamonds. Two Kimberlite pipes also occur on the farm Longlands 231, with at least six Kimberlite pipes on the farms Bad Hope and Good Hope towards Barkly West. A large building sand and aggregate quarry is located next to the road R31 to Ulco, also on the farm Longlands 231.

No Kimberlite pipes and fissures were noted in the vicinity of the First and Second Alternative corridors, but alluvial diamond gravel was mined on the farm Droogveld at the old Vaalbos National Park that may still be economically viable. A large limestone quarry near Ulco is located next to the First and Second Alternative corridors.

The bedrock is in many portions covered by transported material which may consist mainly of dune sand.

Groundwater Conditions

Drainage mainly takes place through sheet wash and a few drainage channels and pans are present adjacent to the corridors. Drainage occurs in a south-westerly direction towards the Vaal River, a tributary to the Orange River. The confluence of the Harts River and Vaal Rivers were noted at the Third Alternative corridor not far southeast of Ulco, at Delportshoop. The river crossing needs extra attention and the 1: 100 year flood lines should be determined and used in spacing the pylons.

The permanent water table on site is expected to be deeper than 1,5m below natural ground surface.

A perched water table within the Aeolian sand may exist on shallow bedrock with low permeability characteristics of the rock mass, during long periods of consistent rain.

Soil Profiles

All terrain land forms or mapping units should be sampled and more than adequate characterization of each represented soil horizon should be determined through evaluation of the gathered information.

The typical natural soil profiles of the test pits with substantial soil cover must be represented as an overall impression by the profiler and the complete logs should be considered for specific details, and some photos should be taken of rock outcrop and shallow rock for a visual characterization.

In many areas difficult excavation can be expected along the corridors, and a competent TLB, pneumatic tools and even blasting may be required to reach installation depths for services, or for the placement of the pylons. Refusal of a normal TLB is expected in almost all test pits, typically at depths less than 1,5m. To ensure the stability of excavations, it will need standard sidewall protection in excavations exceeding 1,5m.

Slope Stability and erosion

The potential for lateral soil movement or erosion is medium, and the Aeolian sand can easily be washed away during thunderstorms. Except for local slope instability within opened trenches specifically within shale or layered mudstone, and the possible collapse of unstable open pit side walls encountered, no other slope instability is expected within these relative flat areas.

All open excavations exceeding 1,5m in depth must be supported.

Excavation classification with respect to services

Problems regarding excavatability can be expected along the routes, with some outcrop and sub outcrop areas possibly classified as medium hard rock excavation in restricted and non-restricted excavation (SANS 1200 D).

The area may be classified regarding excavation properties and it can range from easily excavated by hand to intermediate excavation where a competent TLB, pneumatic tools and even where blasting is required.

Unstable pit side walls may be encountered and to ensure the stability of excavations, it will need standard sidewall protection in excavations exceeding 1,5m.

Impact of the geotechnical character of the corridors on the placement of pylons

During the final engineering geological investigation it is essential to determine and quantify the extent of potential problems associated with the area.

The ideal conditions may be listed as follows:

- A smooth surface gradient with slopes less than 12E. Accessibility should not be restricted by topography (plateau areas).
- No potential for slope instability features - landslides, mud flows.
- Easy excavation for foundations and installation of pylons.
- Foundations above the ground water level or perched water table, with not too low permeability.
- Development above or outside the 1:100 year flood line.
- Adequate surface and subsurface drainage conditions, with minimal erosion potential.
- No presence of problematic soils, for example heaving clays, compressible clays, sand with some collapse potential, or dispersive soils, that will require expensive remedial measures.
- No potential for surface subsidence due to the presence of dolomite (sinkholes) or undermining.
- No damaging differential subsidence or movement (less than 5mm total movement at the surface allowed).
- The site should be placed away from potential pollutants such as waste disposal or sewer sites.

Evaluation for the placement of pylons

No seepage or the presence of perennial fluctuations of ground water was encountered on site, but a seasonal perched water table may exist on top of the bedrock or within the pedogenetic layer comprising nodular or hard pan calcrete.

Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures.

The area may contain low and low to medium expansive soil, and together with a medium compressible and a highly collapse potential, foundations will need special precautionary measures to minimize soil movement associated with a variation in moisture content of the soil.

Some problems regarding excavatability can be expected usually on the dolerite near or at the hills.

Retaining walls as well as slope stabilization measures are recommended on all constructed embankments exceeding 1,5m, as unstable pit walls may be encountered.

Storm water control measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments must be adequately compacted and vegetated with grass to limit any excessive erosion and scouring of the landscape.

Some mining activities on site or history of mining or contaminated land in the area were found, and gypsum mining as well as alluvial and Kimberlite diamond mining occur regularly in the area.

The likelihood for the development of borrow pits along the routes should be investigated to provide construction material.

All road building and construction materials will in the interim be sourced from established commercial activities in and around Kimberley and Ulco.

The placement of the Eskom pylons is possible along the routes if the recommended precautionary measures and possibly difficult excavation of service and foundation construction is anticipated.

Drainage

The corridors are located on shallow slopes less than 4%, with some steeper slopes next to the dolerite koppies, usually not affected by the placement of the pylons.

Drainage takes place through sheet wash, and prominent drainage channels intersects the corridors, with some pans and the Vaal River as well as the Harts River and the Steenboks River. Drainage generally occurs in a southwesterly (or northeasterly) direction towards the Vaal River, and then south to the Orange River.

No seepage or the presence of perennial fluctuations of ground water was encountered on site, but a seasonal perched water table may exist on top of the shallow bedrock sandstone, mudstone, lava, dolerite or where calcrete nodules or hard pan calcrete is expected.

Ground water in the form of seepage may be intersected in some test pits during the final field investigation, and some problems are foreseen and normal water tightening techniques such as damp course on foundation levels may be required.

The aeolian sand is expected to exhibit a moderate to high permeability, which possibly accounts for the absence of a connected network of proper drainage features between the pans.

Special care must be taken to ensure adequate surface drainage to prevent the accumulation of water next to structures. Storm water diversion measures such as ponding pools are recommended to control peak flows during thunderstorms. All embankments should be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape.

Development Zones

Provisional development zones were determined, indicating the expected geotechnical conditions of each site class: Potentially low to medium expansive and compressible and highly collapsible soil with thickness up to 750mm which classified as site class C2H1 (with up to 10mm differential movement measured at surface) requiring special foundations varying through to site class HCR (with less than 7,5mm soil movement measured at surface) requiring normal or modified normal construction or a soil raft, with associated site drainage provisions. Substantial financial implications are expected in Geotechnical Zone PR where scattered rock, shallow rock and rock outcrop are expected, but will possibly prove as excellent and stable foundation material for the pylons.

4.1.3 SURFACE WATER

A Freshwater Assessment was undertaken by BlueScience CC and is attached in Appendix D(3) based on the route map provided in Appendix A(3) "*Route Map of Corridor Alternatives resulting from the Scoping Phase*" and a Freshwater Constraints Map is provided in Appendix A5. A short summary thereof is provided below.

The freshwater assessment is intended to inform the authorisation process for the proposed Eskom Kimberley Strengthening Phase 4 Project. Three alternative routes were considered in the Scoping Phase (and described in detail in the Scoping Report) and two final routes considered for the Environmental Impact Phase, where a 2km wide corridor was investigated for all the route alternatives. A 5km radius was also considered around the substation sites.

The aquatic features occurring within the study area consist of the lower Vaal and Harts rivers and some endorheic pans and streams or drainage lines. The habitat integrity of the Lower Vaal and Lower Harts rivers within the study area is deemed to be in a largely to severely modified state while all of the other tributaries in the area are in a largely natural to moderately modified state. The riparian habitat tends to be more impacted by the surrounding farming activities. The pans in the study area are subjected to physical habitat modification with some flow and water quality modification largely as a result of the surrounding farming and peri-urban activities. In terms of the current ecological state of the wetland areas, they are as a whole considered being in a moderately modified state.

The ecological importance and sensitivity of the rivers within the study area is deemed to be high or moderate, with the Lower Vaal River upstream of the Harts River confluence having the highest ecological importance. The smaller drainage lines have a low ecological significance. The pans within the study area are in general small and of limited ecological importance.

Where the proposed power lines are located close to freshwater features it is proposed that a buffer of 50m from the centre of the drainage lines or from the top of bank of the Vaal, Steenbok and Harts rivers and approximately 500m (varies depending on wetland cluster) from the edge of the pans be implemented. Tributaries of the Vaal and Harts River occur more than 3km to the north and south-west of the existing substation. The new Ulco Substation should therefore preferably be located to the east of the existing substation.

Providing that the recommended mitigation measures are implemented (adherence to the proposed buffers adjacent to freshwater features, minimisation of impacts and rehabilitation of disturbed areas and the utilisation of the existing access roads where possible) the significance of the impact for all of the proposed activities of the alternatives of final route selection is expected very low, both within the construction and operation phases of the project.

A water use authorisation may need to be obtained from the Department of Water Affairs Northern Cape Regional Office for approval of the water use aspects of the proposed activities.

Selecting an alternative

Both Route One Corridor (Preferred) and Route Two Corridor (Alternative) would have impacts of a low significance on the freshwater features in the area. From an aquatic perspective both of these routes can be supported.

4.1.4 VEGETATION

A Vegetation and Faunal Report based on the route map provided in Appendix A(3) “Route Map of Corridor Alternatives resulting from the Scoping Phase” and an Ecological Sensitivity Map is provided in Appendix A5. The main findings are summarised as follows:

Vegetation Types

On a small scale the proposed routes fall within the savanna biome and within a larger regional scale the proposed routes are according to Mucina & Rutherford (2006) located within the Eastern Kalahari Bushveld Bioregion (SVk).

In terms of vegetation types the proposed routes include the Kimberley Thornveld (SVk4), Schmidtsdrif Thornveld (SVk6), a few Southern Kalahari Salt Pans (AZi4) and one small section of the Upper Gariep Alluvial Vegetation (AZa4) (Mucina & Rutherford 2006).

Kimberley Thornveld (SVk4)

The vegetation comprises a mixture of trees and shrubs and is characterised by the dominance of trees *Acacia erioloba*, *Acacia tortilis*, *Acacia karroo* and *Boscia albitrunca*.

From a conservation point of view it is regarded as being a least threatened vegetation type, though large areas are already transformed due to agricultural practices.

Schmidtsdrif Thornveld (SVk6)

The vegetation is dominated by the woody *Acacia mellifera*, *Searsia lancea*, *Acacia tortilis* and *Tarchonanthus camphoratus*.

From a conservation point of view it is regarded as being a least threatened vegetation type, although only 2% is statutorily conserved. The vegetation is mostly used for cattle and game (hunting) farming.

Southern Kalahari Salt Pans (AZi4)

These salt pans occur in areas with altitudes ranging between 1000-1600 metres above sea level. They form depressions in bottomland plains and lower-lying landscapes where the central parts can be seasonally inundated with water as a result of rainfall. In some areas the pans can be without water for several years depending on the rainfall. The central parts are normally open with little or no vegetation or in cases where water is present floating macrophyte vegetation can be present. The edges are normally sparsely covered with heavy grazing taking place by wildlife and domestic animals. The clayey (> 25% clay content) textured soil in these pans vary from dark coloured to lighter coloured soil, which are poorly drained.

From a vegetation point of view these areas comprise a mixture of herbaceous species such as *Zygophyllum tenue*, *Salsola scopiformis*, *Hirpicium gazanioides*, *Trianthema triquetra*, *Enneapogon desvauxii*, *Sporobolus coromandelianus* and *Eragrostis truncata* (Mucina & Rutherford 2006).

These pans are poorly conserved and under threat from agriculture activities. Grazing potential of these pans is relatively high comparing to the adjacent grassland plant communities.

Highveld Alluvial Vegetation (AZa 5)

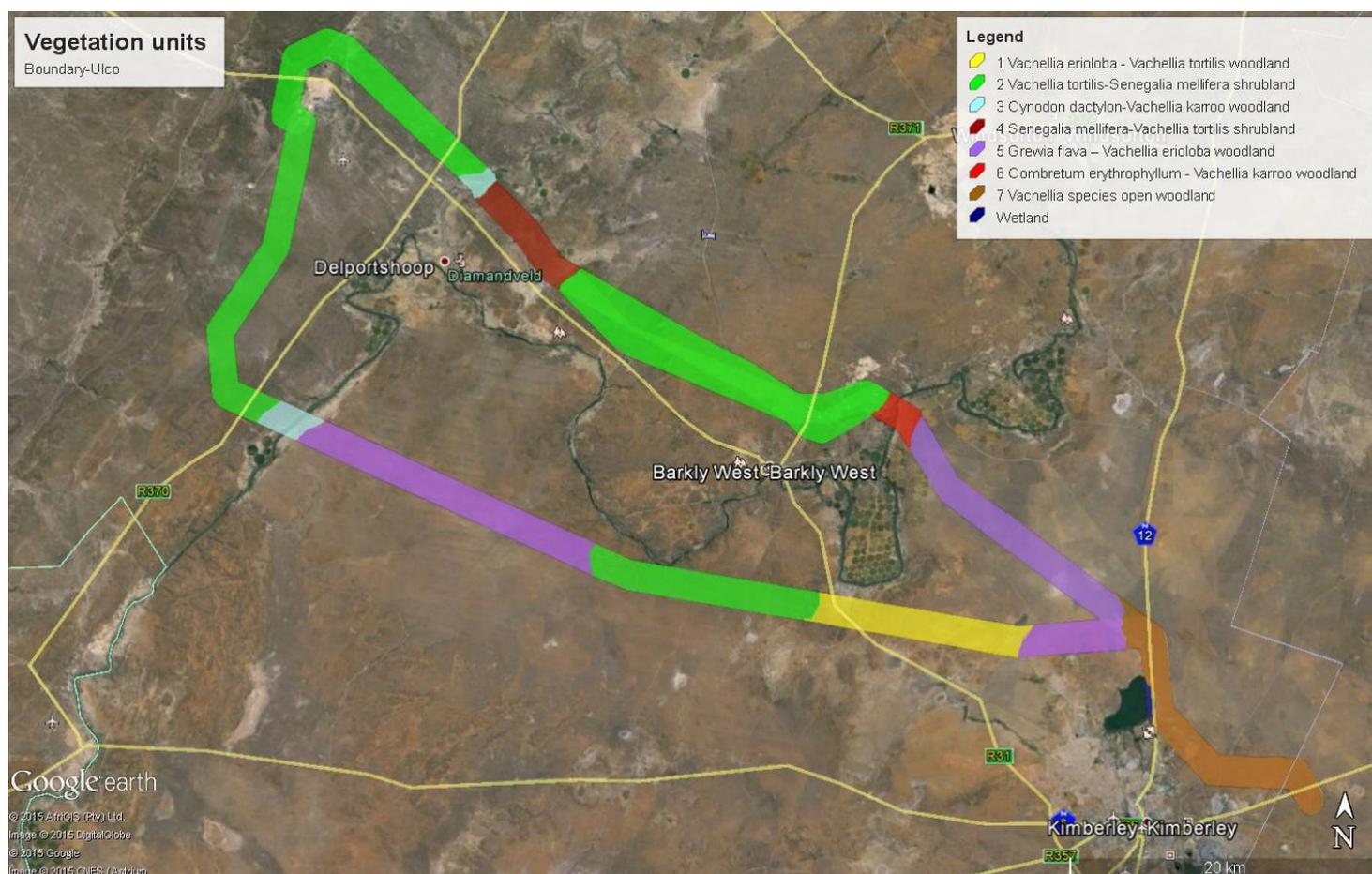
The vegetation consists mostly of *Acacia karroo* thickets, flooded grassland and, due to the disturbance caused by floods, various weeds and alien invasive plants are present.

These areas are regarded as being Least threatened with close to 10% being formally conserved. Unfortunately many of these areas are heavily grazed due to the palatable grass species occurring there.

Vegetation Units

Seven distinct vegetation units could be identified, namely:

1. *Vachellia erioloba* - *Vachellia tortilis* woodland
2. *Vachellia tortilis* - *Senegalia mellifera* shrubland
3. *Cynodon dactylon*-*Vachellia karroo* woodland
4. *Senegalia mellifera*-*Vachellia tortilis* shrubland
5. *Grewia flava* – *Vachellia erioloba* woodland
6. *Combretum erythrophyllum* - *Vachellia karroo* woodland
7. *Vachellia* species open woodland



1. *Vachellia erioloba* - *Vachellia tortilis* woodland

Soil	Red-yellow apedal soil, clay content of 6 to 25%.	Tree cover	10%
Topography	Floodplain	Shrub cover	35%
Land use	Livestock and free moving game	Herb cover	15%
Unit status	Natural to degraded	Grass cover	55%
Faunal spp.	Birds, insects	Rock cover	2%
Erosion			0%

Dominant spp.	<i>Trees Vachellia erioloba, V. tortilis</i> and the grasses <i>Heteropogon contortus</i> and <i>Aristida meridionalis</i>		
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Conservation value	Low-medium	Ecosystem functioning	Low-medium
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2. *Vachellia tortilis* - *Senegalia mellifera* shrubland

Soil	Rock and shallow stony soil, A horizon 6 to 12%.	Tree cover	5%
Topography	Crest (1) and Midslope (3)	Shrub cover	25%
Land use	Livestock and free moving game	Herb cover	2%
Unit status	Natural to degraded	Grass cover	30%
Faunal spp.	Birds, insects	Rock cover	80%
Erosion			5%
Dominant spp.	<i>Vachellia tortilis, Senegalia mellifera</i> and <i>Tarchonanthus camphoratus</i> and the grasses <i>Eragrostis lehmanniana</i> and <i>E. superba</i> .		

Conservation value	Low-medium	Ecosystem functioning	Low-medium
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3. *Cynodon dactylon*-*Vachellia karroo* woodland

Soil	Soil deeper than 1.2 m with clay content 15 to 35%.	Tree cover	2%
Topography	River (5)	Shrub cover	2%
Land use	Mining, irrigation, agriculture, livestock and free moving game	Herb cover	5%
Unit status	Natural to degraded	Grass cover	80%
Faunal spp	Various birds & insects, livestock and game	Rock cover	10%
Erosion			10%
Dominant spp	<i>Vachellia karroo</i> and <i>Searsia lancea</i> trees and the shrub <i>Diospyros lycioides</i> and the grass <i>Cynodon dactylon</i> and the reed <i>Phragmites australis</i> .		

Conservation value	Medium-high	Ecosystem functioning	Medium-high
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4. *Senegalia mellifera*-*Vachellia tortilis* shrubland

Soil	Rocky outcrop with shallow soil (< 0.25) with clay content 10 to 25%.	Tree cover	0%
Topography	Midslope (3)	Shrub cover	20%
Land use	Livestock and free moving game	Herb cover	55%
Unit status	Natural to degraded	Grass cover	3%
Faunal spp	Various birds & insects	Rock cover	30%
Erosion			50%
Dominant spp	<i>Senegalia mellifera, Vachellia tortilis, Ziziphus mucronata</i> and <i>Searsia lancea</i> trees and the shrub <i>Grewia flava</i> and the grasses <i>Stipagrostis uniplumis</i> and <i>Enneapogon cenchroides</i> and the forbs <i>Aptosimum albomarginatum, Felicia muricata</i> and <i>Pentzia globosa</i> .		

Conservation value	Medium	Ecosystem functioning	Medium
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5 *Grewia flava* – *Vachellia erioloba* woodland

Soil	Deep (> 1.2 m) alluvial and aeolian sand with clay content 6 to 15%.	Tree cover	10%
Topography	Midslope (3)	Shrub cover	15%
Land use	Livestock and free moving game	Herb cover	15%
Unit status	Natural to degraded	Grass cover	60%
Faunal spp	Various birds, insects, cattle & game	Rock cover	0%
Erosion			0%
Dominant spp	<i>Prominent tree Vachellia erioloba</i> . The prominent shrub species are <i>Grewia flava</i> , <i>Senegalia mellifera</i> . Prominent grasses are <i>Eragrostis lehmanniana</i> , <i>Schmidtia pappophoroides</i> and <i>Stipagrostis uniplumis</i>		

Conservation value	Medium	Ecosystem functioning	Medium
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6 *Combretum erythrophyllum* - *Vachellia karroo* woodland

Soil	Deep (> 1.2 m) poorly drained alluvial soil with clay content 15 to 35%.	Tree cover	35%
Topography	River floodplain and bank (5)	Shrub cover	10%
Land use	Mining and agriculture irrigation	Herb cover	15%
Unit status	Natural to degraded	Grass cover	25%
Faunal spp	Various birds & insects	Rock cover	None
Erosion			None
Dominant spp	Woody species <i>Vachellia karroo</i> , <i>Combretum erythrophyllum</i> , <i>Searsia pendulina</i> , <i>Salix mucronata</i> . The prominent grasses are <i>Setaria verticillata</i> and <i>Cynodon dactylon</i> . Large number of exotics are present.		

Conservation value	High	Ecosystem functioning	Medium-high
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7 *Vachellia* species open woodland

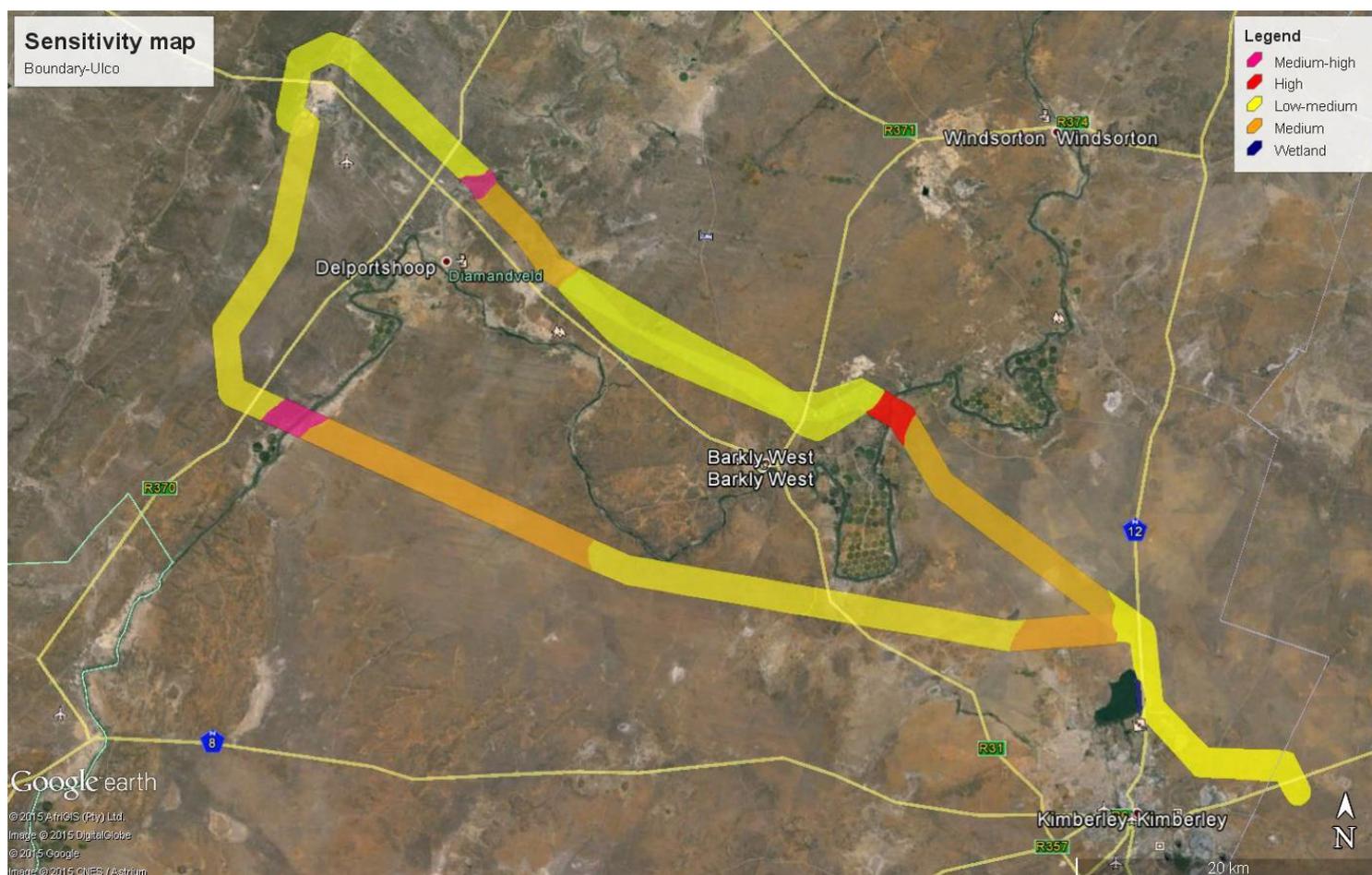
Soil	Red-yellow sand/clay	Tree cover	0%
Topography	Midslope (0-30)	Shrub cover	25%
Land use	Livestock and free moving game	Herb cover	15%
Unit status	Natural to degraded	Grass cover	55%
Faunal spp.	Birds, insects	Rock cover	2%
Erosion			0%
Dominant spp.	<i>Vachellia erioloba</i> , <i>V. tortilis</i> and the grasses <i>Heteropogon contortus</i> and <i>Aristida meridionalis</i> .		

Conservation value	Low-medium	Ecosystem functioning	Low-medium
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Sensitivity analysis

A sensitivity analysis was done for the seven vegetation units identified. This was achieved by evaluating the different vegetation units against a certain set of habitat criteria. The results indicate that Units 1, 2 and 7 have low-medium sensitivity, Units 3, 4 and 5 have medium sensitivity (mostly due to the threatened species present) and unit 6 has a high sensitivity to disturbance

Ecological sensitivity of the different identified vegetation units



Threatened ecosystems & Protected areas

No protected area or and threatened ecosystem occurs within the proposed corridors. The proposed routes do however cross two river systems.

Red data species

Only one red data species which is also a protected species namely *Vachellia erioloba* was found to be present in the study area. This species has a conservation status of “declining” due to its removal for fire wood and other agricultural activities.

Protected species

The Department of Forestry and Fisheries developed a list of protected tree species. In terms of Section 15(1) of the National Forests Act, 1998, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Trees are protected for a variety of reasons, and some species require strict protection while others require control over harvesting and utilisation. The Department of Agriculture, Forestry and Fisheries (DAFF) will have to be approached to obtain the required permits for the removal of any protected tree species. The most recent list of protected tree species was published in GN 908 of 21 November 2014.

Two protected species have been recorded during the survey, namely *Vachellia erioloba* (Camel thorn) in Vegetation Units 1, 2 and 5 and *Boscia albitrunca* (Shepherd's tree) in Vegetation Unit 1.

The DAFF / Eskom developed a document in 2012 titled: “Basic Guidelines for the handling of EIAs and License Applications for Eskom SOC Holdings Linear Infrastructure affecting Natural Forests, Protected Trees or State Forests”. According to this document and in relation to new planned Eskom linear infrastructure, “protected trees do not need to be removed from the whole servitude, only from under the lines (this is not necessary for smaller tree species such as Shepherd’s trees) and trees in the way of towers to be erected”. The Northern Cape is a semi-arid region and unnecessary clearance of vegetation may expose soil, subjecting it to wind erosion that may take many years to recover after disturbance.

Medicinal species

Four medicinal plant species have been identified within the study area. These plants occur throughout the southern African region on various soil types and areas none are threatened species:

Plant name	Plant part used	Medicinal use	Vegetation unit
<i>Vachellia karroo</i>	Leaves, bark and gum	Diarrhoea & dysentery Gum: colds, oral thrush & haemorrhage.	3, 6
<i>Lippia javanica</i>	Leaves & twigs	Coughs, cold, stomach problems, bronchitis, headaches	1
<i>Tarchonanthus camphoratus</i>	Leaves & twigs	Stomach trouble, headache, toothache, inflammation	1, 2, 3, 4, 5
<i>Ziziphus mucronata</i>	Roots, bark or leaves	Cough & chest problems; diarrhea; pain relief	1, 2, 3, 4, 5

Alien plant species

A total of four different declared alien invasive species, the tree *Prosopis glandulosa* (units 1 & 3), *Agave americana* (unit 1), *Melia azedarach* (unit 3) and *Eucalyptus camaldulensis* (unit 6) were found within the study area.

Prosopis glandulosa and *Eucalyptus camaldulensis* are a declared Category 2 (CARA) and 1b (NEMBA) invader trees, while *Agave Americana* and *Melia azedarach* a Category 3 (CARA) and NEMBA Category 3 invaders. This means that these may not be grown or planted on one’s property unless a permit is obtained from nature conservation. It is recommended that these plants are removed from the different vegetation units and that a programme is implemented on a long-term basis to control the spread of these plants.

Indigenous invader plant species

One indigenous invader species namely *Acacia mellifera* was found to be present in the study area. This species is part of the natural ecosystem and do not pose a threat to the environment under natural conditions. Where vegetation is disturbed due to overgrazing, agricultural activities, general mismanagement etc., these species can quickly spread, forming dense stands that replace other indigenous species.

Conclusion on flora

The proposed corridors are located within vegetation types of which none are regarded as threatened.

Seven Vegetation Units were identified of which Units 1, 2 and 7 were found to have low-medium conservation values and sensitivity to disturbance. Units 3, 4 and 5 were found to have medium conservation value due to threatened plant species present as well as the ecosystem functioning of the riverine unit. Unit 6 was found to have a high conservation value and a medium sensitivity to disturbance. It is recommended that no pylons are placed within the riverine areas and associated floodplains of units 3 and 6.

Most of the land is used for agriculture and grazing by domestic stock with free roaming game.

It is important that the trees *Vachellia erioloba* and *Boscia albitrunca* (where present) are not removed unnecessarily. The impact on habitat fragmentation would be low and could be mitigated. All other impacts were found to be acceptable after mitigation.

None of the impacts assessed for the different Vegetation Units will have a high negative effect on the environment and no unit was found to be highly sensitive to development.

One red data/protected species and one protected species were found to be present in Units 1, 2 & 5. It is important that these species are not removed from the ecosystem and that the placement of the pylons should be done in such a way as to avoid damaging these species. If single individuals of these species have to be removed, a permit from the Department of Agriculture, Fisheries and Forestry (Forestry Branch) and Nature Conservation will have to be obtained for this purpose. It is recommended that once the final powerline route and pylon positions have been decided on and pegged that a walk down by a qualified plant ecologist is done to determine if any of these protected species must be removed.

4.1.5 FAUNA

A *Vegetation and Faunal Scoping Report* was undertaken by EnviroGuard Ecological Services CC and is attached in Appendix D(1). A summary of the relevant sections is provided below.

Nama-Karoo and Succulent Karoo, now almost devoid of large wild ungulates, holds some 10 million Sheep (*Ovis aries*) and Goats (*Capra hircus*). The once plentiful and diverse set of nomadic herbivores has been replaced by large encamped herds of small livestock with specialist feeding habits. Nearly 200 years of this treatment has had a devastating effect on the Karoo soils and vegetation. Prolonged heavy grazing is considered to suppress shoot/root formation and flowering in the Nama-Karoo and Succulent-Karoo flora, which leads to compositional changes and depletion and thinning out of the vegetation, particularly those components that the sheep find palatable. Changes in the structure and composition of the vegetation affect the associated fauna. Thinning of the already sparse vegetation layer has greatly accelerated rates of soil erosion. Although conditions have improved since the 1950's, vegetation changes in the Nama-Karoo and Succulent-Karoo are now difficult or even impossible to reverse. The changed herbivore community and the resultant impacts on the vegetation have led to lower productivity of karroid vegetation. This, in turn, is thought to have affected the food chain and ultimately reduced the density of tertiary predators, particularly mammals as well as large eagles. High livestock densities also pose considerable threat to wildlife, since high numbers of domesticated animals generally cause a displacement of game, as there is less suitable habitat available. Furthermore, wild predators and scavengers such as the Black-backed Jackal, Caracal, Leopard and the Cape vulture have been eradicated by livestock farmers who see these animals as a threat to their livelihoods. Poisoned carcasses are often used for this purpose; this method is indiscriminate and therefore poses considerable threat to all predators and scavengers; especially the threatened White-backed and Lappet-faced Vultures. Poaching and illegal hunting (dogs) are further reducing the remnant faunal populations.

Mammals

The majority of larger mammal species are likely to have been eradicated or have moved away from the area, as a result of previous agricultural activities, hunting and poaching as well as severe habitat alteration and degradation. The settlements surrounding the site as well as several informal settlements and associated hunting and poaching limits the suitability of the site for larger mammal species. High levels of hunting were noted on and surrounding the site with the use of dogs and wire snares as well as several empty shotgun cartridges. Several dog tracks were observed along the existing Eskom servitudes as well as hunting with dogs was observed during the site visit. The collection or harvesting of wood (stumps) and rock material as well as the frequent burning of the vegetation reduces available refuge habitat and exposes remaining smaller terrestrial mammals to increased predation levels. The use of wire snares for high intensity poaching activities will significantly affect remaining smaller mammal species such as rabbits and mongooses. Secondary access roads and vehicles (motor cars, motor cycles, quad bikes) which transverse the area and bisect the valley bottom wetlands increase access to the site as well as potential road fatalities. Major road networks (R31)

with high vehicular traffic increase the risk of road fatalities (hedgehogs, hares) of mammals. Smaller mammal species are extremely vulnerable to feral cats and dogs.

Threatened mammal species

Various mammal species are likely to occur within the study area. However, according to Friedman & Daly (2004) and Skinner & Chimimba (2006), the majority of species within the study area are common and widespread and listed as species of least concern.

Reptiles

The majority reptile species are sensitive to severe habitat alteration and fragmentation. Due to current agricultural activities in the area coupled with increased habitat degradation (overgrazing, soil erosion) and disturbances are all causal factors in the alteration of reptile species occurring in these areas. Limited low-lying quartzite and dolerite rock outcrops occur around the proposed alignments and provide favourable refuges for certain snake and lizard species (rupicolous species). The removal of rock material for commercial activities from the de-proclaimed Vaalbos Nature Reserve will have a high negative impact on remaining rupicolous reptile species.

The indiscriminate killing of all snake species as well as the illegal collecting of certain species for private and the commercial pet industry reduces reptile populations especially snake populations drastically. The frequent burning of the grassland vegetation on the site will have a high impact on remaining reptiles. Fires during the winter months will severely impact on the hibernating species, which are extremely sluggish. Fires during the early summer months destroy the emerging reptiles as well as refuge areas increasing predation risks.

Threatened Reptile Species

No threatened reptile species have been recorded from the combined locus = 2824 CD, 2824 CC, 2824 BB and 2824 BA. Four endemic reptile species namely Distant's Ground Agama (*Agama aculeate distanti*), the Marico Gecko (*Pachydactylus mariquensis*), Thin-tailed Legless Skink (*Acontias gracilicauda*) and Greater Padloper (*Homopus femoralis*) have been recorded in the adjacent grid squares. The Southern African Python (*Python natalensis*), Water Monitor (*Varanus niloticus*) and Rock or White-throated Monitors (*Varanus albigularis*) are protected species.

Amphibians

Seven frog species were recorded from the seasonal and permanent (farm dams) wetland habitats around the proposed alignments including Raucous Toad (*Amietophrynus rangeri*), Drakensberg River Frog (*Amietia quecketii*), Cape River Frog (*Amietia fuscigicula*), Bubbling Kassina (*Kassina senegalensis*), Tremelo Sand Frog (*Tomopterna cryptotis*), Natal Sand Frog (*Tomopterna natalensis*) and Common Platanna (*Xenopus laevis*). All frog species recorded are common and widespread.

The Giant Bullfrog is currently assigned as a near-threatened species (IUCN Red List category). Giant Bullfrogs have been recorded from the Kimberly area and adjacent grid squares during previous surveys as well as during the South African Frog Atlas Project (SAFAP). It is however highly unlikely that the proposed alternative power line alignments will have a significant impact on remaining bullfrog populations if the proposed tower positions are placed away from the any seasonal wetland habitats (especially seasonally inundated pans/grassland). No Giant Bullfrogs must be captured on disturbed during the construction phase of the project.

Selecting an alternative

Based on an ecological perspective Route Two Corridor (Alternative) would be the preferred route. However, the recent de-proclamation of the previous Vaalbos National Park through which a large section of Route One Corridor (Preferred) passes, has led to the decimation of large natural areas and associated habitat for various faunal species. It is therefore concluded that both of these corridors could now be considered for the erecting of the power lines from a plant and faunal ecological point of view. The powerlines should be restricted to the

transformed and disturbed areas within this area wherever possible.

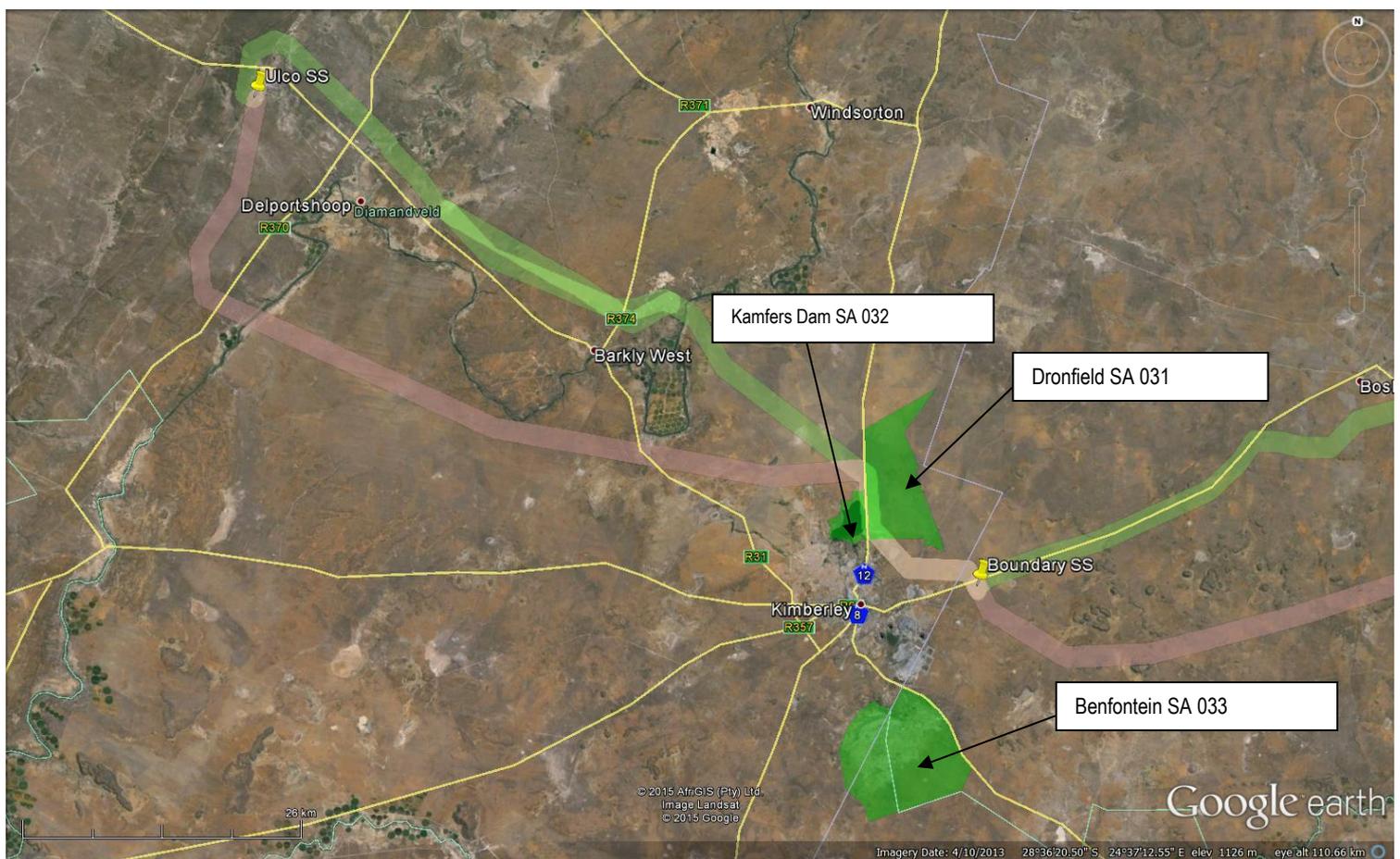
4.1.6 AVI-FAUNA

A *Bird Impact Report* was undertaken by Mr Chris van Rooyen and Mr Albert Froneman and is attached in Appendix D(2). A summary thereof is provided below.

Important Bird Areas (IBAs)

Three IBAs are located within 11km from the Boundary substation, and one of them, Dronfield Farm, is bisected by the alignments. The three IBAs are the following:

- Benfontein (SA 033);
- Dronfield Farm (SA 031); and
- Kamfers Dam (SA 032)



Dronfield Farm lies 5km north of Kimberley on the road to Warrenton. The farm holds large numbers of breeding White-backed Vulture, an average 75 breeding pairs are resident in the colony. Two pairs of Martial Eagle and one pair of Verreaux's Eagle-Owl also nest on the property. This farm was privately owned by De Beers Consolidated Mines Limited (DBCM) and used purely for cattle farming from the 1920s to 1960s. Thereafter Springbok were introduced, and later Hartebeest, Eland, Gemsbok, Blue and Black Wildebeest, Zebra, Impala and Blesbok, and the land was used for game and cattle farming until 2004. In 2005 it became a game farm. A vulture restaurant on the property provides supplementary food for the vultures. In 2012 the sale of DBCM to Anglo American was concluded.

Benfontein lies 14 km southeast of Kimberley and consists of flat, unvarying plains. During good rains, a large 300ha calcrete pan in the northwest fills with water, creating a shallow fertile wetland. The vegetation is a

semi-open thornveld savanna. The reserve holds small numbers (about 20 pairs) of breeding White-backed Vulture, and in the past a few breeding pairs of Blue Cranes. The plains hold Ludwig's Bustard, and the thornveld occasionally holds Kori Bustard. A pair of Secretarybirds and Tawny Eagles regularly breeds on the reserve. Lesser Kestrel ranges throughout the area in summer. The ephemeral pan in the northwest of the property holds large numbers of Greater and Lesser Flamingos in wet years, amongst a host of other waterbird species.

Kamfers Dam is located six km north of Kimberley and is natural in origin. It is an ephemeral (non-perennial), endorheic pan in a semi-arid environment, receiving water from three primary sources; its 160km² catchment, 30-40 megalitres of partially treated sewage effluent from Kimberley per day and half of the town's storm water runoff. Historically the pan dried up between October and December, and was inundated between February and March, with standing water for a few more months in above average rainfall years. Over the past ten years the pan has been transformed from an ephemeral pan to a permanent wetland due to a continual increase in sewage effluent inflow. The wetland provides a reliable refuge for waterbirds during periods of drought, when many of the surrounding ephemeral waterbodies dry out. Kamfers Dam occasionally supports extremely large numbers of resident, migratory and nomadic birds. It regularly holds more than 2000 water birds (excluding Greater and Lesser flamingos). A special feature is the large numbers (from a South African perspective) of Greater Flamingo and Lesser Flamingo that are found throughout the year. Kamfers Dam supports the largest permanent population of Lesser Flamingos in southern Africa, at times in excess of 80 000 individuals.

It is not expected that Benfontein and Kamfers Dam will be directly impacted by the proposed Boundary – Ulco power line. However, the proposed corridors currently run through the south-western area of Dronfield Farm, and there are a number of potential impacts, which is discussed below in more detail.

Description of bird habitat classes

Savanna

The study area is situated in savanna, and consists primarily of Kimberley Thornveld (between Kimberley and Delpoortshoop), Schmidtsdrif Thornveld (between Delpoortshoop and Ulco) with a few isolated areas of Vaalbos Rocky Shrubland, which only occurs on solitary hills and scattered ridges. Schmidtsdrif Thornveld occurs mostly between Delpoortshoop and Ulco – the vegetation is sometimes very disturbed due to overgrazing by goats and other browsers. Just west of Ulco Substation, the Ghaap Plateau starts with its distinctive Ghaap Plateau Vaalbosveld.

The power line sensitive Red Data avifauna occurring in this habitat is typically arid woodland species i.e. Lappet-faced Vulture, White-backed Vulture, Cape Vulture, Tawny Eagle, Martial Eagle, Lanner Falcon, Verreaux's Eagle (ridges and koppies), European Roller, Secretarybird and Kori Bustard.

Pans

An important feature of the arid landscape where the proposed power line is located is the presence of pans. Pans are endorheic wetlands having closed drainage systems; water usually flows in from small catchments but with no outflow from the pan basins themselves. They are characteristic of poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (<3m), and flooding characteristically ephemeral. When flooded, pans are important for a variety of power line sensitive Red Data species which occur in the study area e.g. Black Stork, Greater Flamingo, Lesser Flamingo, Abdim's Stork, Chestnut-banded Plover, Greater Painted-snipe, Maccao Duck and Yellow-billed Stork. Pans are also used by raptors and vultures for drinking and bathing. Double-banded Coursers and Burchell's Coursers occur along the pan fringes and on dry pans.

The most significant pan in the study area is Kamfers Dam outside Kimberley.

Rivers

The study area contains two major rivers, the Vaal River and its important northern tributary, the Harts River, which are important for a variety of waterbirds, including Red Data Black Stork and Yellow-billed Stork, while Abdim's Stork are attracted to adjacent floodplain areas. Rivers are also corridors for woodland, which Kori Bustard often associate with.

Vulture breeding areas

A notable feature of the study area is the large number of breeding White-backed Vultures which are distributed in loose colonies over several areas within a 50km radius around Kimberley. These colonies are situated in savanna areas where there are scattered, large Camel Thorn *Acacia erioloba* trees. The most important breeding colonies known at this stage are Dronfield, Riet River, Paardeberg, Secretarius, Rivermead and Susanna. The total number of breeding pairs is estimated at around 240 pairs with a total of 650 individual birds across all the colonies. All three proposed route corridors cross through the Dronfield colony, consisting of an average of 75 breeding pairs, and a very active vulture restaurant. The third alternative corridor also crosses through the Rivermead colony, which holds at least 24 pairs. The small Secretarius colony is not directly affected.

Agricultural lands

The study area contains extensive irrigated agricultural lands, mostly along the Vaal and Harts Rivers. Although agricultural lands completely destroy the structure of the original vegetation, some birds do benefit from this transformation. Abdim's Stork and Ludwig's Bustard (to a lesser extent) are the Red Data species most likely to utilise agricultural lands in the study area. Abdim's Stork can occur in flocks of several hundred on irrigated fields.

Cliffs and ridges

The majority of the proposed alignments are located in topographically flat plains. However, in places the proposed alignments do cross steep terrain, specifically near Ulco substation, at the edge of the Ghaap Plateau, which consists of a series of low cliffs. These cliffs are potentially suitable roosting and breeding habitat for a number of Red Data power line sensitive species, e.g. Black Stork, Lanner Falcon, and Verreaux's Eagle.

Potential Impacts

Electrocutions

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components. The electrocution risk is largely determined by the pole/tower design.

Due to the large size of the clearances on overhead lines of 400kV, electrocutions are ruled out as even the largest birds cannot physically bridge the gap between energised and/or energised and earthed components. The risk of electrocution posed to Red Data species by the new power line infrastructure is likely to be negligible.

Collisions

The most likely potential candidates for collision mortality on the proposed power line are Kori Bustard, Greater Flamingo, Lesser Flamingo, Secretarybird, Abdim's Stork, White-backed Vulture, Yellow-billed Stork, Black Stork, Verreaux's Eagle and Cape Vulture. Ludwig's Bustard will also be at risk, based on the species flight characteristics and tendency to fly long distances between foraging and roosting areas and when migrating. The highest risk for Ludwig's Bustard is likely to be on irrigated fields and dry pans. Flamingos might be at risk near water bodies, particularly large pans. Kori Bustards might be at risk anywhere in the savanna habitat, particularly when flying to roost sites in the late afternoon and early evening. Secretarybirds will be most at risk in areas of open woodland with a prominent grass layer, and when descending to pans to drink. Abdim's

Stork will be at risk at pans, where they often roost in large numbers, and in irrigated areas, where they forage in large numbers. White-backed Vultures are at risk in breeding colonies, particularly in Dronfield Farm and Rivermead colonies. Cape Vultures are at risk in areas where they roost on transmission towers. Black Stork and Yellow-billed Stork will be at risk at river crossings and pans. Black Stork, Lanner Falcon and Verreaux's Eagle might be at risk where the proposed lines cross the low cliffs at the edge of the Ghaap Plateau. Tawny Eagle, Martial Eagle and Lappet-faced Vulture might be at risk anywhere in savanna habitat, but particularly when descending to and leaving from pans when visiting to drink and bath. Burchell's Courser, Double-banded Courser, Chestnut-banded Plover, Caspian Tern and Greer Painted-snipe are also potentially at risk of collisions, but less so than the larger species as they are more agile and therefore less likely to collide with the earthwires of the proposed lines.

Displacement due to habitat destruction and disturbance

The risk of displacement of Red Data species due to habitat destruction is likely to be fairly limited, given the nature of the habitat. The one exception is the White-backed Vulture breeding colonies, where the removal of large Camel Thorn trees could result in the destruction of nests, and the resultant displacement of breeding birds. Both the route corridor alternatives are routed south of the Dronfield breeding areas and should therefore not impact directly on the breeding activity.

Construction and maintenance activities could also potentially impact on birds through disturbance, particularly at the White-backed Vulture breeding colonies. This could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. However, as mentioned earlier, the important Dronfield colony is not affected by any of the two corridors, and the potential impact on the Rivermead colony is fairly limited on a regional scale due to limited significance of the colony from a regional perspective.

Power line sensitive species occurring in the study area

A total of 22 Red Data species have been recorded by SABAP2 in the QDGCs that are bisected by the various corridors. For each species, the potential for occurring in a specific habitat class was indicated, as well as the potential impact most likely associated with this specific species. Refer to page 15 of the Bird Impact Scoping Report for this list.

Selecting a preferred alternative

Route One Corridor (Preferred) and Route Two Corridor (Alternative)

All the route alternative corridors emerged with very similar risk ratings, with only a 10% difference in ratings between the highest risk (Route One Corridor - Preferred) and the lowest risk (Route Two Corridor - Alternative). This indicates that all the various route alternative corridors are very similar as far as envisaged impacts on avifauna are concerned. The main reason for Route Two Corridor – Alternative emerging with a slightly lower risk rating than Route One Corridor - Preferred is the fact that the latter is 17% longer than the former. However, the scoring system does not account for risk factors lying beyond the boundaries of the 2km corridor. In the case of avifauna, it may on occasion be necessary to consider factors beyond the 2km corridor to better assess the collision risk that a new line poses. In this instance, a section of Route Two Corridor - Alternative is located between two areas of agriculture along the Harts River which is located largely beyond the 2km corridor boundaries, which most likely acts as a focal point for collision sensitive species such as Ludwig's Bustard and Abdim's Stork. It is highly likely that there is regular traffic of these species and other non-Red Data species of avifauna between these two agricultural areas, which would expose them to a collision risk. If this is taken into account, the scales tilt towards Route One Corridor - Preferred as the preferred option, despite it being a longer route. In addition, Route Two Corridor - Alternative cuts through the Rivermead vulture colony, which, although a minor colony, is not a desirable outcome. *Route One Corridor is therefore put forward as the recommended alternative from an avifaunal impact assessment perspective.*

Recommendations

It is not the objective to attempt to demarcate all sections of power line for all the alternative corridors that would need to be mitigated for potential collisions or disturbance of Red Data breeding species. This can only be done once the final alignments have been selected and tower positions have been finalised. At this stage, the following recommendations are put forward from a potential bird impact perspective:

- Route One Corridor is assessed to be the alternative with the lowest risk to birds. It is therefore recommended that this alternative is used.
- Once the final alignments and tower positions have been selected, the sections of the line that would need the application of Bird Flight Diverters to mitigate for potential collisions should be indicated by the avifaunal specialist by means of a “walk-through” exercise. This exercise should be informed by an analysis of satellite imagery supplemented by on site ground-truthing (physical inspection). The type of Bird Flight Diverter to be used and the marking scheme will be determined during that phase of the project.
- The Eskom standard procedure with regard to the clearing of vegetation must be strictly adhered to, to minimise the extent of habitat destruction and disturbance during the construction phase. Existing roads should be used as far as possible to prevent further habitat fragmentation through the construction of new access roads, and to limit the construction footprint.

4.2 CULTURAL/HISTORICAL ENVIRONMENT

4.2.1 PALAEOLOGY

A *Palaeontological Impact Assessment* was undertaken by Prof Marion Bamford and is attached in Appendix C(3). A summary thereof is provided below.

Since none of the rock formations or sediments in the region is potentially fossiliferous, being too old or too young, the project to erect power lines and substations between the Boundary and Ulco substations may continue as far as the palaeontology is concerned. If however, any fossils are discovered during the excavations then it is strongly recommended that the fossils are rescued and a palaeontologist is called to assess their importance and make further recommendations.

No phase 2 palaeontological impact assessment is required.

4.2.2 ARCHAEOLOGY & CULTURAL HERITAGE

A *Heritage Impact Report* was undertaken by Archætnos Culture & Cultural Resource Consultants and is attached in Appendix D(4). A summary thereof is provided below.

The fieldwork undertaken revealed one site of cultural heritage significance. The site is within the Route One Corridor. However, it would be easy to avoid the site.

From a heritage perspective it definitely seems as if the Route One Corridor has more possible heritage based issues. Apart from the site identified, many other sites are known along this route. It would therefore be preferred if this alternative could be avoided.

However, should it be decided to use this route, it would be possible to mitigate the impact on heritage resources. This option may therefore be supported on condition that mitigation measures be implemented. None of the alternatives routes are within a 10 km radius of a world heritage site.

No further action is necessary with regards to the site identified during the survey.

4.3 SOCIO-ECONOMIC, TOURISM AND LAND USE

A *Socio-Economic, Tourism and Land Use Potential Impact Report* was undertaken by AMP Property Management and Land Acquisition and is attached in Appendix D(6). A summary of the relevant sections is provided below.

4.3.1 LANDUSE

The proposed 400kV power line will not directly affect the residential areas, but will influence rural farms in the area. The power line may cross inhabited farm land, tourist and mining areas. Denser residences are, however, found near the Boundary Substation, close to the Vaal River as well as Delportshoop. The alternative routes cross over combinations of agricultural, tourist, game farms and mining properties.

Land use along the route corridors can be broadly described as follows:

Alternative 1

This is the most northern alternative, commences at the Boundary Substation and runs mostly parallel to existing power lines. It passes through multiple game farms including the De Beers Dronfield Reserve to the west of the substation, and runs parallel to the Boundary – Olien 1 & 2 275kV power lines after which it crosses over the N12 to the north of Kimberley. It then runs parallel to the Kimberley – Holsdam 132kV and Kimberley Weir 132kV power lines and passes on the southern side of Droogfontein Solar Power and over several properties owned by communal property associations, followed by crossing the Vaal River. The route passes to the north of Barkly West and over the R374. The line then follows a west and north-westerly direction, crossing over game farms including Mattanu Private Game Reserve. It then runs parallel to the Kudu - Gong-Gong 132kV power line until it passes on the northern side of Delportshoop and Ulco and heads south towards where the new Ulco Transmission Substation is proposed in the vicinity of the current Ulco Distribution Substation. The length of this alternative is approximately 94km.

Alternative 2

The proposed corridor route follows the same route as in Alternative 1 until crossing the N12. It then continues west parallel to Boundary – Olien 1 & 2 275kV power lines over communal properties and bends in a north-west direction crossing over the state-owned property that was previously the Vaalbos National Park. After crossing over the Vaal River, the route then turns north and runs parallel to the Ulco – Herbert 132kV and the Douglas – KDS – Olien Tee 275kV power lines, to the area of the proposed Ulco Substation. Most of the proposed alternative is parallel to existing power lines. The length is approximately 98km.

Alternative 3

The proposed corridor follows Alternative 2. Instead of crossing over the previous Vaalbos National Park, it crosses over Rooipoort Game Reserve and joins the same corridor after crossing the Vaal River. The length is approximately 102km.

Game Farms and Nature Reserves

Several game farms are located in the area of study. The following lists some of the possible game farms and nature reserves that may be affected:

- Dronfield: was proclaimed a nature reserve in 2004 and is owned by De Beers.
- Mattanu Private Game Reserve: Various species of exotic wildlife are being bred here since 1991.
- Rooipoort: situated 63km west of Kimberley and bordering 32km of the Vaal River. The total extent of the reserve is 40 000ha, making it one of the largest privately owned nature reserves in South Africa.
- Tarentaalrand Safari Lodge: situated North/North-East from Kimberley, it caters exclusively to foreign hunters.

Mining

- De Beers is still discovering diamonds from Kimberley's tailings dumps. This, however, falls outside the scope of this project.
- Elandslaagte mine: falls within the corridor of alternative 1. According to Mining Atlas “the mine has been on care and maintenance for some time” and its status is suspended. InfoMine states that on the 25th of January 2008 there was reported that the reason for the suspension had been that the electricity supply in the NCP was increasingly unreliable, which impede the mine progress.
- Ulco: is one of the largest cement mines and factories in the Southern Hemisphere.
- In the area of Delportshoop and Diamondveld there several diamond diggings, however this falls outside of the proposed corridors.

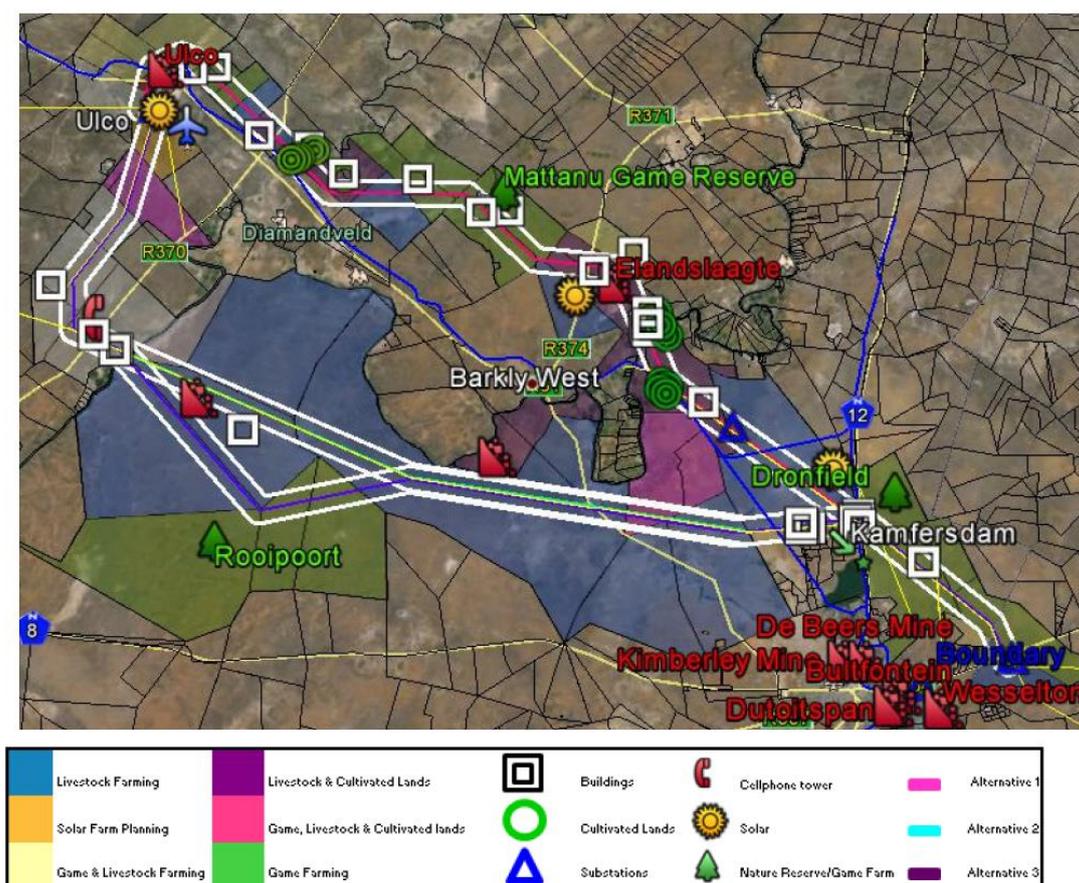
Agricultural

Agricultural activities consist mostly of cattle, sheep and game farming. There are a few areas with arable lands, most of which are irrigated with pivots systems from the Vaal River.

Solar Energy Facilities

According to Savannah Environmental (Pty) Ltd, EIA's are being conducted for Solar Energy Facilities on the following properties: Droogfontein 62, Portion 2 of Holsdam 229, Plaas 217 and Plaas 278.

Land Use Illustration



4.3.2 SOCIO-ECONOMY AND TOURISM

A *Socio-Economic, Tourism and Land Use Potential Impact Report* was undertaken by AMP Property Management and Land Acquisition and is attached in Appendix D(6). A summary of the relevant sections is provided below.

Social Change Processes

The purpose of this section is to describe the social processes that this proposed Eskom project will entail. It is important to understand that social and economic change processes can evolve to relevant impacts. The following processes are predicted in the different phases of the project:

- *Demographic Processes*

In small communities the movement of people looking for new opportunities is more visible. This may happen during the construction phase, where people of other areas will be looking for jobs. However job opportunities during the construction phase will be very limited since most contractors do not use many unskilled labourers. In the operational phase the greater electricity capacity may indirectly attract development of industries which may offer new work opportunities.

- *Economic Processes*

Macroeconomic factors as well as the way that people make a living in the area will have an effect on the economic processes. There may be a possibility for a small amount of temporary jobs for unskilled workers during the construction phase, but the operational phase will be performed by Eskom employees.

- *Geographic Processes*

These processes affect the land-use patterns of the community. Most of the land is grazing for game and livestock, but there are areas with irrigated lands and pivots. There will be a time period during construction when the farms will be encroached upon, should there be structures on the properties. During the design phase, pylon placing will be done in a matter that has minimum encroachment on the property and is most economically sustainable.

In the case of game farms the power line will not only impact the farms in terms of aesthetics but may also be a danger and inconvenience with regards to helicopters, which play a significant role in game farming in terms of game counting, capture and darting.

- *Institutional and Legal Processes*

These processes affect the efficiency of organisations, which include government and non-government agencies, as well as the commercial sector that is responsible for the supply of the services that the people depend on. The power line will not have a great effect on these processes with regards to normal livestock and agricultural farming. The negative aesthetic value associated with power lines is found to be a major concern for game farmers, since they are often involved with international investors who may be discouraged from the area.

- *Emancipatory and Empowerment Processes*

Emancipatory and empowerment processes lead to the ability of the local community to participate in the decisions that will have an effect on their lives. The proposed power line will not have a direct benefit for the local people, since it will be between two substations, the influence is therefore of an indirect nature since the substations will feed the local electricity network with a better quality supply. Therefore it will be applicable in the operational phase. As discussed above it will provide the possibility for economic growth in the area.

- *Socio-Cultural Processes*

The aspects in the culture and the way people live together are applicable in this section. During construction there may be an influx of people from other areas mainly for labour purposes.

Social Impact Assessment Categories

- *Health and Social Wellbeing*

- Future aspirations – Economic growth regarding farming, tourism and mining activities.

- Feeling in relation to project – great sense of fear and resistance was experienced initially, but with consultation and explanation it changed positive regarding many private land owners. It was established to rather work together in planning an environmentally acceptable route than to force a route on the land owners. Special consideration needs to be taken into account where crossing over game farms.
- *Quality of living environment*
 - Quality of physical environment - There will be exposure to minimum dust and noise of vehicles in the construction phase. Construction workers will be fitted with PPE and be in the possession of identification when in the construction area.
 - Aesthetic Quality- The visual impact of the structures was addressed.
 - Adequacy of physical infrastructure. The route next to the existing roads as well as sections next to existing power lines will be preferred to minimise additional impacts. Gates should be closed at all times.
 - Personal safety and risk exposure. This is a high risk to property owners. No unauthorised entrance will be acceptable. Staying on next to existing roads where possible will be more acceptable – not accessing the total farm. No fires on construction sites.
 - Crime and violence. Eskom and the contractors are not welcome due to the perception that livestock thefts can increase.
 - Fire risk prevention. Eskom Transmission implemented the AFIS system where three satellites monitor (two of which are MODIS by NASA) which together track fires. The system updates every 15 minutes and fires as small as 0.25ha can be picked up. If these fires come within 2.5km from transmission power lines, warnings are sent via text messages to relevant Eskom employees mobile phones. Where possible national control can temporarily isolate the circuit under threat. Fire suppression teams are sent out where available.
 - Eskom registers servitudes for power lines. This means that the property still belongs to the relevant land owner, and Eskom owns the right to have a power line over the property. Since the property still belongs to the land owner, it is still the responsibility of the land owner. Eskom does however do maintenance of the vegetation under the power lines to decrease the fire risk under the lines.
- *Economic impacts and material wellbeing*
 - Property values. There may be a negative effect on the property values pending on the utilisation of the land. The influence will be taken into consideration during the valuation process where a valuation is to be done and land owners is to receive market value compensation.
 - Employment. Only limited unskilled work opportunities may be available to local communities.
 - Replacement costs of environmental functions. Land owners will be able to continue farming activities.
 - Structure planning must be liaised with land owners in cultivated fields.
- *Cultural impacts*
 - Loss of natural and cultural heritage. Refer to relevant report.
- *Family and Community impacts*
 - Social networks. The proposed route is mostly over game and agricultural farm land and a good neighbouring relationship exists.
 - Community connections. Social network exist in the community where a group will support each other. This is essential in the form of farmers associations. The relevant associations in the area have been informed about the proposed project and is considered part of the I&AP's.
- *Institutional, legal, political and equity impacts*
 - Impact equity. There should be a fair distribution of the impacts across the community. This project will ensure a better supply of electricity and fewer interruptions to all.

- Other institutions that will also possibly be affected are state owned organisations like SANRAL, Transnet as well as the relevant municipalities and provinces.
- *Gender relations*
 - Gender division of labour. According to Statistics South Africa TLM have a greater than 50,3% female population. There are normally not woman employed as unskilled labour for the construction of power lines.

Conclusion

The socially preferred route will have the minimum impact on individual properties. During consultation with land owners it became apparent that it will be preferred if the proposed power line can be as close as possible to farm boundaries and existing power lines and have the smallest possible impact on nature reserves.

The Route One Corridor (Preferred) as is presented for Environmental Authorisation accommodates these preferences and conditions.

4.3.3 SOILS & AGRICULTURAL POTENTIAL

A *Soil and Agricultural Potential Baseline Study* was undertaken by TerraAfrica Consults and is attached in Appendix C(3). A summary thereof is provided below.

Land Types

The following land types were identified within the macro study area:

- *Land Type Ae15*

The land type is found in landscapes where the slope is between 0 and 2% and slope length between 50 and 5000m. The soil forms in this land type mainly consist of shallow, rocky and limestone rich red and yellow well drained soils. These soils are derived from wind transported sands overlying hard rock with dolerite outcrops.

- *Land Type Ae44*

This land type is found in four different landscape positions in areas with slight hills and slopes of between 0 and 8% and slope lengths of 50 to 2000m. The soil forms in this land type mainly have high base status and are shallow, well-drained soils of red colour. The soils in this area are derived from wind transported sands overlying hard rock.

- *Land Type Ae45*

This land type is found in four different landscape positions in areas with slight hills and slopes of between 0 and 8% and slope lengths of 50 to 2000m. The soil forms in this land type mainly have high base status and are shallow, well-drained soils of red colour. These soils are derived from wind transported sands overlying hard rock.

- *Land Type Db2*

The land type represents areas where duplex soils with non-red B horizons comprise more than half of the area covered by it and where the slopes are relatively flat. The soils are dominantly shallow to deep structure duplex with a limited occurrence of swelling soils in depressions. According to this classification, the land capability and land use is predominantly extensive grazing due to climatic and soil constraints. Due to the level terrain soil erosion is not a major factor but the duplex soils are very susceptible to such if the terrain is physically disturbed. The site also falls into an area with low potential due to relatively low and erratic rainfall.

- *Land Type Dc5*

Land type Dc5 consist of a combination of duplex soils where clay accumulation through the soil profiles have resulted in more structured soil forms such as that of the Valsrivier, Swartland and Oakleaf forms. It is found in flatter landscape positions with long slope lengths.

- *Land Type Fb1*

The land type represents a combination of red and yellow-brown apedal soils interspersed with duplex soils. The soils are dominantly shallow to deep structure duplex with a limited occurrence of swelling soils in depressions.

Soil classification

Three different main soil groups are present in the entire baseline area as well as in the areas currently indicated as the proposed alternative sites for the project. Below follows a description of each of the groups:

- *Lithic soil*

The lithic group is dominated by soils of the Mispah and Glenrosa forms and also include rocky outcrops (in this area more specifically dolerite outcrops). This soil group covers the smallest area of the three groups within the study area and is limited to the south-western part of the study site. The pans identified on site are endorheic pans that formed as a result of low infiltration rate of the soils present on site. These pans are underlain by rock and hardpan carbonate horizons where water accumulates during thunderstorms during the summer months. The water in the pans remains present until the high evaporation rate resulted in all the water evaporating. This leaves the soil surface barren and the lack vegetation on the soil surface cause sand to erode away as a result of wind erosion. The rock and/or carbonate horizon does not function as a conventional wetland and therefore the soils present in the pans are not considered sensitive. Sensitivity of these pans is more related to the ecosystems that are supported by the temporary water supply in the summer months.

- *Red-yellow apedal freely drained soil*

The red and yellow apedal horizons are per definition non-calcareous within 1500mm of the soil surface, but may contain small lime nodules as was the case on site. Textures are coarse to medium sand to sandy-loam in the topsoil and medium to fine sandy-loam in the subsoil. Structure is weak blocky (dominant) or apedal in all horizons. These red-yellow apedal soils dominate the western half of the entire study area. The clay content for this soil group is less than 15%.

- *Duplex soils (prismacutanic and pedocutanic soils)*

Duplex soils have strong B horizon structure and a marked increase in clay content down the soil profile, compared to the overlying horizon, from which it is separated by a clear or abrupt boundary. This clear change between adjacent horizons has resulted in the term “duplex soils” being given to this group. The soils have high erosion susceptibility and the B horizon is often sufficiently hard to be an impediment to both root growth and water movement. The marked enrichment with clay in the subsoil results in strong blocky structure and cutanic character (clay skins). The cutans give the peds shiny surfaces that reflect the light and are often a different colour to the interior of the peds. The orthic A horizon often has a weak structure and when it contains sufficient clay it may become hard or very hard when dry (a feature known as ‘hard-setting’).

Amounts of organic matter are low giving their (orthic) top soils a grey or brown colour. Base status varies from low to high, a range directly correlated to the amount of clay in either the overlying horizon or the B horizon itself. The soils have a low phosphate (P) fixing ability and often have moderate reserves of plant nutrients. Duplex soils dominate the eastern half of the site and the clay content ranges between 15 and 35%.

Soil Depth

The Environmental Potential Atlas indicated that soil depths in the study area are divided into two groups i.e. soils shallower than 450mm and soils between 450 and 750mm. Deeper soils are present on the eastern

portion of the study area and are associated with the pedocutanic and prisma-cutanic soil forms. The shallower soils are present on the western part of the side and are found in the areas associated with the red and yellow apedal soils as well as the lithic soil group.

Agricultural Potential

The dominant land-use in the larger study area is cattle and small livestock farming. This included the commercial farming of cattle, goats and sheep. The average carrying capacity of the veldt is 14ha per unit of large stock. Game farming is also present in the study area. This region is not suited to the production of dryland arable agricultural owing to the low rainfall. Irrigated crop production is practiced in very small areas that are limited by the availability of irrigation water and proximity to the water resource.

The western portion of the study area is dominated by land with no or very low arable agricultural potential due to the shallow nature of the topsoil present. The eastern portion is considered to have intermediate suitability as a result of the deeper soil profiles however the climate only permits successful production in the presence of irrigation systems as a result of the erratic rainfall and high evaporation rate that results in soilwater losses.

Conclusion

Based on the baseline soil and agricultural potential data gathered for this study, it is the opinion of the soil scientist, from a soil conservation and land capability point of view, that the first alternative for the proposed development be considered favourably. The reason for this is that the first alternative does not cut through a pivot irrigation area like the third alternative and is shorter than the second alternative which means it has impact on a smaller portion of land than the second alternative. Power line construction has a negative impact on centre pivot irrigation as it is not possible to continue with this practise directly underneath these power lines.

4.3.4 VISUAL COMPONENT

A *Visual Impact Assessment Scoping Report* was undertaken by Newtown Landscape Architects and is attached in Appendix D(5). A summary thereof is provided below.

Study area

For the purposes of the visual specialist report the study area is defined as 3km beyond the proposed corridors. Beyond 3km the power line would tend to become part of background and will not have a major impact on views.

Visual Resource

- *Value of the Visual Resource / Scenic Quality*

High Escarpment with Kimberly Thorn Bushveld, Dronveld Nature Reserve and Game Farms (last two types = moderate to high)	Moderate Rolling plains with savannah and grassland – mostly game and cattle grazing	Low Power infrastructure
This landscape type is considered to have a <i>high</i> value because it is: <ul style="list-style-type: none"> ○ A distinct landscape that exhibits a very positive character with valued features that combine to give the experience of unity, richness and harmony. ○ It is a landscape that may be considered to be of particular importance to conserve and which has a strong sense of place. 	This landscape type is considered to have a <i>moderate</i> value because it is: <ul style="list-style-type: none"> ○ A common landscape that exhibits some positive character but which has evidence of alteration /degradation/erosion of features resulting in areas of more mixed character. 	This landscape type is considered to have a <i>low</i> value because it is: <ul style="list-style-type: none"> ○ A minimal landscape generally negative in character with few, if any, valued

<p>Sensitivity: It is sensitive to change in general and will be detrimentally affected if change is inappropriately dealt with.</p>	<p>Sensitivity: It is potentially sensitive to change in general and change may be detrimental if inappropriately dealt with.</p>	<p>features. Sensitivity: Generally not sensitive to change</p>
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- *Sense of Place*

The study area's sense of place derives from the combination of all landscape types described above and their impact on the senses. The wide open, gently undulating grassland, in the eastern and central sections of the study area give it a relatively strong positive sense of place due to the openness and expansive panorama views that the visitor can experience. In the western areas, the openness still prevails but the addition of bushveld and the rising escarpment along the western edge create a greater visual interest and thus a more memorable landscape – hence a greater sense of place. The landscape associated with the eastern section at the Dronfiled Nature Reserve, also conjures up a strong sense of place due to the large mature acacia trees. The presence of wild animals and vultures also add to this, however, the intrusion of transmission lines compromises the effect.

Visual Receptors

- *Views*

Public views to the proposed alternative transmission line corridors area originate along the main public roads which are present throughout the study area. Private views, from residences, originate mostly from the farmsteads scattered about the site. Most of these occur along the northern alternative with the fewest along the southern alternative corridor. Due to the flat and open nature of the landscape many views from these vantage points would be exposed to one or other of the alternative alignments of the transmission line.

- *Sensitive Viewers and Sensitive Viewer Locations*

<p>High Residential, Farmsteads and Game Farms</p>	<p>Moderate Public roads N12, R31 and local roads</p>	<p>Low Far eastern section of the study area</p>
<ul style="list-style-type: none"> ○ Visitors of tourist attractions and travelling along local routes, whose intention or interest may be focused on the landscape; ○ Communities where the development results in changes in the landscape setting or valued views enjoyed by the community; ○ Occupiers of residential properties with views affected by the development. 	<ul style="list-style-type: none"> ○ People travelling through or past the affected landscape. 	<ul style="list-style-type: none"> ○ Visitors and people working within the study area and travelling along local roads whose attention may be focused on their work or activity and who therefore may be potentially less susceptible to changes in the view.

Selecting an alternative

Mitigation measures to reduce the visual impact of transmission lines are generally difficult and costly after the alignment has been determined. To this end, mitigation measures, including alternative route alignment and specific measures for the mitigation of potential conflict areas are usually proposed for corridor options. Specific mitigation measures are usually proposed for conflict areas within a corridor in order to reduce the potential visual impact of the power lines. Screening measures from sensitive viewing areas are difficult to achieve. Resultantly, there is a severe limitation to the mitigation and the management of power lines other than to avoid conflict situations wherever possible during the planning and public participation process.

To this end and in response to these issues the final alternative route corridor alignments were adjusted to avoid, where possible, conflicts with sensitive landscape and use types (game farms and nature reserves) and

residences.

The potential visual impact of the two proposed alternatives would be the following:

Route One Corridor - Preferred

The potential impact is high, but spatially concentrated i.e. affecting less visual environment and thus in the broader scale less visually intrusive. However, the potential impact of two lines of differing type traversing the landscape would be high at highly sensitive landscape areas and viewing locations resulting in an 'industrial' aesthetic. This corridor option would have 13 visual conflicts (mostly in the eastern area where all corridors are aligned in the same corridor) and 11 landscape conflicts.

Given these facts the preferred option from a visual impact perspective is the Route One Corridor.

Route Two Corridor (Alternative)

The potential impact is high, but also spatially concentrated i.e. spatially affecting less visual environment and thus in the broader scale less visually intrusive. This option is acceptable in the context of the study area as the impact is contained and has been rerouted to avoid major conflicts with sensitive land uses (game farms and tourist facilities) done in conjunction with the public who would have been affected by the original northern alignment of this option. However, the potential impact of two lines of differing type traversing the landscape would be high at highly sensitive landscape areas and viewing locations resulting in an 'industrial' aesthetic which may not be acceptable to sensitive visual receptors. Along these corridors there are 26 potential visual conflicts and 6 landscape conflicts.

The impact the Boundary and Ulco substations would be the same for each route and therefore do not factor in a comparative analysis of the alternative corridors.

4.4 SUMMARY OF ENVIRONMENTAL SENSITIVITY

Refer to the Environmental Sensitivity Maps included as Appendix A(5). These maps summarises the significant site sensitivities that guided the route selection. Specific mitigatory measures are proposed in the Environmental Management Plan to ensure that no unnecessary negative impact will occur on these environmental features as a result of the project.

CHAPTER 5: PUBLIC PARTICIPATION

5.1 OBJECTIVES OF THE PUBLIC PARTICIPATION PROGRAMME

The main aim of public participation is to ensure transparency throughout the EIA process. The objectives of public participation in this EIA are the following:

During the Scoping Phase

- To identify all potentially directly and indirectly affected stakeholders, government departments, municipalities, landowners;
- To communicate the proposed project in an objective manner with the aim to obtain informed input;
- To assist the Interested & Affected Parties (I&AP's) with the identification of issues of concern, and providing suggestions for enhanced benefits and alternatives;
- To obtain the local knowledge and experience of I&AP's;
- To verify that the concerns and issues raised by I&AP's define and guide the scope of further studies to be undertaken during the Impact Assessment.
- To ensure that all reasonable alternatives are identified for assessment in the EIA Phase.

During the Environmental Impact Assessment Phase

- To communicate the progress of the EIA study as well as the proceedings and findings of the specialist studies;
- To ensure that informed comment is possible;
- To ensure that all concerns, comment and objections raised are appropriately and satisfactorily documented and addressed;
- To obtain reasonable consensus with regards to the final route corridor proposed for the Eskom project.

5.2 PROCESS FOLLOWED

Significant measures were taken to ensure that all stakeholders and interested and affected parties were informed of the project and were allowed the opportunity to place their concerns and comment on record.

The Public Participation Process (PPP) followed is summarised as follows:

INITIAL / 1ST PHASE NOTIFICATION and ADVERTISING

- The PPP for this project kicked-off during January 2014.
- All potential directly and indirectly affected landowners, stakeholders and government departments were identified. The following I&AP lists were compiled (and is included in Appendix E(11) of this report):
 - List of Government Departments
 - List of Municipalities
 - List of General Stakeholders
 - List of Directly Affected Landowners
- A Background Information Document (BID) was compiled and distributed to all the stakeholders listed. The method of distribution included e-mail; fax and/or postal service. Both the BID and the proof of distribution of the BID are included in Appendix E(1).

- Eighteen onsite advertisements (in both English and Afrikaans) were placed along the three initially route corridor alternatives initially proposed. Proof of placement of these onsite advertisements are included in Appendix E(2).
- Seven newspaper advertisements were placed in the following publications:
 - Regional Publications:
 - Kalahari Bulletin, 13 February 2014
 - Free State Times, 14 February 2014
 - Kathu Gazette, 15 February 2014
 - Volksblad, 15 February 2014
 - Diamond Fields Advertiser, 17 February 2014
 - National Publications:
 - Sunday Times, 16 February 2014
 - Rapport, 16 February 2014
- Two Public Open Days were held on Wednesday 25 June 2014 and on Thursday 26 June 2014:
 - Formal presentation at 17h00 at the Kimberley Big Hole Protea Hotel, followed by a discussion period up to 20h00.
 - Formal presentation at 10h00 at the NG Church, Pretorius Street, Barkly West, followed by a discussion period up to 13h00.

The objectives of this Public Open Day were the following:

- To communicate the purpose and details of the proposed project;
- To present the alternative routes which are being considered and investigated;
- To present the findings of the specialist studies;
- To further enable informed comment from the public and key stakeholders;
- To provide an opportunity to address questions to a panel of specialists and/or Eskom personnel.

Comment received during the initial advertising phase as well as the public open day was addressed in the Draft Scoping Report.

Deviation requested

The following deviations from the public participation process were applied for with the Department of Environmental Affairs in terms of Regulation 54(5) of GN R. 543:

Deviation from GN R. 543 Item 54(2)(b)(ii):

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by

- (b) giving written notice to—
- (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken

Deviation from GN R. 543 Item 54(2)(b)(iii):

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by

- (b) giving written notice to—
- (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;

Reason for deviation request

Three different route alternatives were identified for this powerline proposal and a total of 274km with a 2km wide corridor will be investigated.

It is not possible, nor feasible to inform all the occupiers of the land or the adjacent land of this development proposal.

Numerous steps were taken to ensure that nobody is negatively affected by the allowance of the deviation request (refer to the public participation followed as described above).

The deviation request was granted by the Department of Environmental Affairs.

DISTRIBUTION OF SCOPING REPORT

Proof of distribution is attached as Appendix E6.

- The Distribution of the Draft Scoping Report was done as follows:
 - Notification to all the listed stakeholders of the availability of the Draft Scoping Report at a public venue (the Kimberley and Barkly-West public libraries) was done via email, fax and/or postal service. Where an e-mail address was available an internet link to the Draft Scoping Report was provided. A 40-day response period applied: 4 December 2014 to 5 February 2015 (the period 15 December to 2 January was excluded).
 - The Draft Scoping Report was linked to the SAHRIS website of the South African Heritage Resources Agency (SAHRA).
 - Hard copies of the Draft Scoping Report were hand-delivered to the following authorities;

Free State Province

- **Dept of Economic Development, Tourism & Environmental Affairs, Free State Province**
The Acting Director - Environmental Quality Management, Ms Grace Mkhosana
Bojanala Building; 34 Markgraaf Street; Bloemfontein; 9301
Tel 051 400 4812 / 051 400 4817
- **Department of Water and Sanitation, Free State Region**
Please note that the Free State Department of Water and Sanitation informed us that they will not comment on this project because it falls outside of the Upper Orange Water Management Area. The relevant office on this matter is the *Northern Cape* Department of Water and Sanitation, which is responsible for the Lower Vaal Water Management Area. Free State DWS is however a registered I&AP and will receive all correspondence electronically.
- **Tokolologo Local Municipality**
The Municipal Manager: Mr Kelihle Motlhale
Market Square, Voortrekker Street, Boshof; 8340: Tel 053 541 0014

Northern Cape Province

- **Department of Environment and Conservation, Northern Cape**
The Environmental Officer: Ms Dorien Werth
90 Lang Street, Vasco Building, Kimberley
Tel 053 807 7468
- **Department of Water and Sanitation, Northern Cape Region**
Acting Director: Water Sector Regulation and Use: Ms Nosie Mazwi
28 Central Road; Room B 24; Beaconfield; Kimberley, 8301
053 836 7600 / 082 802 7128

- **Dikgatlong Local Municipality**
The Municipal Manager: Mr Robert Harold
33 Campbell Street, Barkly West
Tel 053 531 0671 / 053 531 0624
- **Sol Plaatje Local Municipality**
The Municipal Manager: Mr G Akharwaray
Sol Plaatje Drive, Kimberley
Tel 053 830 6911 / 053 830 6700

Comment received on the Draft Scoping Report was responded to in the Final Scoping Report as well as the Draft Environmental Impact Report, which was distributed for further public comment (see paragraphs below).

DISTRIBUTION OF DRAFT ENVIRONMENTAL IMPACT REPORT

Proof of distribution is attached as Appendix E9.

- The Distribution of the Draft EIR was done as follows:
 - Notification to all the listed stakeholders of the availability of the Draft EIR at a public venue (the Kimberley and Barkly-West public libraries) was done via email, fax and/or postal service. Where an e-mail address was available an internet link to the Draft EIR was provided. A 40-day response period applied.
 - The Final Heritage Impact Assessment Report and Final Route Map were linked to the SAHRIS website of the South African Heritage Resources Agency (SAHRA). An email was also sent to the applicable case officers informing them of the submission on SAHRIS.
 - Hard copies of the Draft EIR were hand-delivered to the following authorities;

Free State Province

- **Dept of Economic Development, Tourism & Environmental Affairs, Free State Province**
The Acting Director - Environmental Quality Management, Ms Grace Mkhosana
Bojanala Building; 34 Markgraaf Street; Bloemfontein; 9301
Tel 051 400 4812 / 051 400 4817
- **Department of Water and Sanitation, Free State Region**
Please note that the Free State Department of Water and Sanitation informed us that they will not comment on this project because it falls outside of the Upper Orange Water Management Area. The relevant office on this matter is the *Northern Cape* Department of Water and Sanitation, which is responsible for the Lower Vaal Water Management Area. Free State DWS is however a registered I&AP and will receive all correspondence electronically.
- **Tokolologo Local Municipality**
The Municipal Manager: Mr Kelihle Motlhale
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Northern Cape Province

- **Department of Environment and Conservation, Northern Cape**
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The Municipal Manager: Mr G Akharwaray
Sol Plaatje Drive, Kimberley
Tel 053 830 6911 / 053 830 6700

Comment received on the Draft EIR is addressed in the Final EIR (this document). No comment that could change the outcome of the project was received and no substantial changes were made to the Draft EIR. No changes were made to the Preferred or Alternative Route as presented in the Draft EIR. The Final EIR is now submitted to the Department of Environmental Affairs for their perusal and ultimately, the issuing of the Environmental Authorisation.

5.3 ISSUES RAISED DURING THE SCOPING PHASE

5.3.1 WRITTEN COMMUNICATION WITH I&AP'S: INITIAL ADVERTISING PERIOD UP TO THE PUBLIC OPEN DAY

Correspondence between I&AP's and Landscape Dynamics are attached in Appendix E(4)

Please note

- *AMP Property Management & Land Acquisition (the route identification specialists on the project team) contacted the affected landowners directly to discuss issues as mentioned below. The proposed power line route corridors were adjusted in some cases to accommodate the landowners' concerns.*
- *Comment summarised below was either addressed by AMP via direct consultation with the applicable landowner or are responded to in Paragraph 5.2.2, "Main Issues Raised at the Public Open Day".*
- *The routes as proposed in the amended route map (attached in Appendix A3) could still be amended or could even result in a combination of routes, depending on the outcome of specialist investigations, further community consultation and input from the directly affected landowners.*
- *It is important to note that Eskom cannot construct any power lines without the written consent of the landowner, since a servitude has to be registered for the power line and substation.*

Van de Wall & Partners, Mr JJ Botma on behalf of Portion 1 of Farm 232 – Gert Venter Faber; Portion 2 of Farm 232 – Ostiproop 1155 (Edms) Bpk; and Farm 217 – Broekskeur Boerdery (Edms) Bpk

- All three above-mentioned landowners object to the route as proposed in the Background Information Document.
- A request was made that the existing power lines should be shown on the proposed route maps.

Response from Landscape Dynamics

- *The maps as presented during the Open Day, as well as the new route alternative map show the existing power lines clearly.*

Van de Wall & Partners, Mr JJ Botma on behalf of the Johan Kriek Family Trust

- The landowner strongly objects to the power line crossing his property, a popular game farm.
- The Trust insisted that the following studies should be undertaken: an EIA as well as an Economic Impact Assessment, clearly indicating the financial implication of the power line on the existing business.
- The following two websites explain the extent of the business: www.mattanu.com and www.kriekheli.com.
- It is not understood why existing servitudes can't be used.

- A power line crossing the properties will have a severe negative impact on the operations of the game farm, since, amongst other, regular helicopter flights are undertaken in the effective management of the game farm (game counts, game capture, etc.).

Dr Johan Kriek also contacted Landscape Dynamics directly and the following objections were lodged:

- It is absolutely not acceptable for the line to cross the following properties: Rosalind 224 (portion Anex), Portion 2 of the Farm Greefputs 169 (current owner Mr Willem Van Zyl).
- They are at present running an eco-tourism business, a helicopter business and breed with exotic game species.
- The line could run adjacent to other existing lines close to Barkly West.

Response from Landscape Dynamics

- AMP (the route identification specialists) contacted Mr Johan Kriek and New Route Alternative 1 (map attached in Appendix A.3) is a result of negotiations with Mr Kriek - the line will not cross his properties.

Mr PA Versluis: Landowner - Farm Rosalind Portion 2 nr 224 (Buitenzorg)

The planned route crosses his property and he is willing to enter into negotiations with Eskom.

Response from Landscape Dynamics

- Comment noted

The De Beers Group of Companies: Ecology Division: Ecology Manager - Dr Corne Anderson and Exploration Administrator - Ms Anette Basson

- The Ecology Division of De Beers Consolidated Mines (Pty) Ltd strongly objects to the construction of the proposed 400kV power line on any of its earmarked properties.
- The first of their properties directly impacted upon by the proposed power line route are Samaria 75, Picardi 72 and Kenilworth Estate 71. These properties form part of the bigger Dronfield Nature Reserve. The proposed alternative purple route (1E via 2F to 2G) also traverses De Beers's properties Waterkolk 95, Randt Plaats 96, Vogelstruis Pan 98 and Klipfontein 99. These properties fall within the bigger Rooipoort Nature Reserve system and they are vehemently opposing this option.

The following reasons for the objections are listed below:

- Both Dronfield and Rooipoort reserves have been managed as biodiversity offset areas for the mining operations in the Kimberley area for more than a hundred years, and these protected areas can be considered benchmark ecological and biodiversity reserves. Multiple Anglo Boer War sites (Dronfield) and world renowned Archaeological sites (Rooipoort) occur on these reserves.
- Dronfield is the home of more than 75 breeding pairs of African White-backed Vulture, a protected species, which is prone to power line collisions and electrocutions. As Dronfield is already crisscrossed by Eskom power lines, collisions and electrocutions are experienced. An additional line traversing the reserve will increase the risk of the above-mentioned. The vultures and other raptors also use the existing power lines for roosting purposes, which poses a risk to aviation in terms of aircraft-bird collisions. An additional line on Dronfield, which falls within the approach and take off angles for the Johannesburg/Kimberley route, will also definitely increase the risk of such collisions.
- An additional power line on especially Dronfield will seriously obstruct an already strained collision situation in terms of aerial censuses and game capture operations, where a helicopter is used to perform the tasks. Operational requirements will definitely be hindered by an additional power line on both the reserves. Hunting is forms part of their management strategy on both reserves, and Eskom personnel, who frequently arrive unannounced, not only endanger themselves, but also interrupting the hunting activities which obviously cannot continue while civilians are on the property.

- Both Dronfield and Rooipoort are popular eco-tourist destinations, and this proposed power line will definitely impact negatively on the aesthetical properties of the reserves.
- The main revenue generators are game sales, hunting and ecotourism and this power line, in terms of visual impact, will negatively impact on our conservation and business objectives.
- DRONFIELD: The lodging of a public complaint from De Beers Ecology Division (09/12/2012) to Eskom, when protected Camel Thorn trees were cut and removed on Dronfield Nature Reserve by an Eskom approved contractor, without the appropriate licence from the Department of Forestry, resulted in the Safety, Health and Environmental (SHE) report (SAP Ref NO: 37215). This issue was addressed by Eskom.

Other impacts of the power lines are:

- The Vulture habitat as more big trees will have to be removed
- The impact on Kudu, Giraffe and impala habitat
- Sensitive game species - huge poaching risk
- Increased Eskom contractors affecting hunting operations/ safety risks

Response from Landscape Dynamics

- *Their objections were forwarded to the avifaunal specialist, ecologist as well as heritage specialist for their consideration.*
- *AMP (the route identification specialists) contacted Dr Anderson and New Route Alternative 1 (map attached in Appendix A.3) is a result of negotiations with Dr Anderson - the line will not cross the above-mentioned properties.*

Mainstream Renewable Power SA: Solar Development Project Manager: Mr Jonathan Frick

- The servitude corridor between Boundary and Ulco impacts on 3 of Mainstream's projects:
 1. Most notably is the servitude route to the north designated to run through our constructed round 1 solar PV plant indicated by the red square in the image (Boundary – Ulco proposed route obstacles).
 2. Additionally the same northern route runs across the Droogfontein PV 2 (Bid in in round 2 of the REIPPP) and Droogfontein PV 3 both developed solar PV projects.
 3. Finally both routes potentially cross the 132kV grid connection planned for Droogfontein PV3 project connecting into Homestead SS.
- To the south of ULCO the servitude routes cross 3 land parcels which they have under option as well as the area where they are developing a number of solar projects. If the southern route into Ulco is taken there would overlap of the projects.

Response from Landscape Dynamics

- *AMP would have contacted Mainstream to discuss possible routes crossing their properties.*

Bird Life SA – Policy and Advocacy Manager: Mr Simon Gear

They requested to be registered as an I&AP, with particular reference to bird collisions with the proposed power lines. The following information must be pass on to the avifaunal specialist:

- Information on the nearest Important Bird and biodiversity Areas can be sourced here: <http://www.birdlife.org.za/conservation/iba/iba-directory>
- Although this project falls outside of an IBA, there are breeding areas for various collision prone birds, including vultures, in the vicinity.
- The guide for accessing avian data for EIAs.

Response from Landscape Dynamics

- *The information was forwarded to the avifauna specialist for this project.*

Department of Labour, Free State Province: The Chief Director – Ms Marsha Bronkhorst

- The correct contact person for the Free State province is Mr Nomfundo Douw-Jack
- The contact person in the Northern Cape is Ms Monica Lepheane

Response from Landscape Dynamics

- *The I&AP list was updated to reflect above-mentioned names.*

Department of Agricultural and Rural Development, Free State Province: Chairperson: Subdivision Application and Evaluation Committee: Mr Izak Venter

- The Northern Cape Department should comment on this proposal.

Response from Landscape Dynamics

- *The Boundary-Ulco project stretch across both the Free State and the Northern Cape.*
- *The Department of Agriculture, Forestry and Fisheries (Land Use and Soil Management) commented on the Beta-Boundary Project as follows (it is concluded that this comment is also applicable to the Boundary-Ulco Project): They confirmed that the transfer of a portion of land to a statutory body, in this case Eskom, is not subject to the provisions of the subdivision of Agricultural Land Act, Act 70 of 1970.*

SANRAL: Statutory Control: Ms Rene de Kock

If services need to be constructed within 60m measured from the road reserve fence or if a crossing of the national road (N12) is required, the services owner must apply for a wayleave.

Response from Landscape Dynamics

- *Comment noted*

Northern Cape Department of Water Affairs: Deputy Director: Water Sector Data Management: Ms Mahadi S. Mofokeng

- Future communication regarding this project should be communicated to Ms Mofokeng since Mrs Mazwi is on maternity leave until September and Ms Mofokeng am currently acting on her position.

Response from Landscape Dynamics

- *The I&AP list was updated to reflect this information. No further comment from the Department was however received.*

5.3.2 MAIN CONCERNS RAISED AT THE PUBLIC OPEN DAY

The PowerPoint presentation as presented at the Open Day is attached in Appendix E(5)

The project components, EIA process as well as the key findings of the specialist studies up to date were communicated at the Open Day. A Draft Environmental Sensitivity Map was presented on which additional comment was added to during discussions.

It was explained during the introduction to the meeting that the route alternatives as presented are in draft form and that the routes may change considerably – the routes as presented were identified to kick-off route negotiations, specialist studies and investigations. Concerns raised during the EIA process will determine the final route which will be presented to DEA for Environmental Authorisation.

Once the Environmental Authorisation is in place, Eskom will appoint evaluators to evaluate the land and establish the compensation price according to the current market value of the land. This would be negotiated with the landowners. Servitudes with a 55m width will be registered for the purpose of the power line. Eskom will have the right to access the servitude for construction, maintenance and inspection purposes.

Discussions took place after the presentations were given at the two respective meetings.

It was stated by Landscape Dynamics that concerns raised at the meeting must also be put in writing so that formal responses thereto can be provided in the Draft Scoping Report. Very little written concerns were however received after the meeting. The main issues and comments raised can be summarised as follows:

- The Eskom maintenance teams which maintain existing power lines very often cause damage to property and farm roads, cutting trees without permission, leaving farm gates open, etc.
Response: Eskom has official complaint procedures which should be followed in this regard. The EMP that will be compiled during the EIA phase will include the relevant contact details and complaints structure to address these enquiries and claims.
Regarding the new transmission power lines, it is important to note that the construction and maintenance teams will be bound by the stipulations as per the EMP. Each landowner will receive a copy of the EMP and they can ensure that the various contractors abide by the EMP. It was emphasised that the landowners could forward specific conditions to Landscape Dynamics for inclusion in the EMP.
- It was suggested that a trust, with the landowners and Eskom being the trustees, should be established. The idea would be that the money in this trust should be used to compensate for any damage caused by Eskom on any property. This is recommended because previous experience showed that it is very difficult, if not impossible to be compensated for damage to fences, roads and so on made by the Eskom construction and maintenance teams. It can take very easily up to 2 years before compensation is paid should the normal Eskom complaint structure be utilised.
Response: Eskom responded that they would communicate the matter with the decision-makers at Eskom but they are concerned that it would create a precedent for projects all over the country and this is problematic.
- Reasonable compensation would be required. Numerous game farms focus on eco-tourism, exotic farming and hunting and compensation negotiations should accommodate these land uses.
Response: This should be communicated with the evaluators. The landowners will have the opportunity to meet with them on site.
- A concern was raised that land is not usable for grazing for a period up to a year during the construction period. Compensation should take this loss of income into account.
Response: This should be communicated with the evaluators. The landowners will have the opportunity to meet with them on site.
- Eskom power lines are not suitable at all in areas where game farming is dependent on management via helicopters.
Response: Noted
- A question was raised on the safe distance between houses and power line servitudes.
Response: Houses can be built immediately adjacent to the 55m servitude.
- The concern was noted that from the Visual Impact Report it is taken that power lines are generally considered a visual intrusion within 3km from the line.
Response: It will be strived to accommodate this issue as far as reasonably possible with the final route corridor alignment.
- A concern was raised that some of the specialist reports were lacking important information, because not all game farms had been listed.
Response: The reports were still in draft format and would be finalised in appropriate detail for the Scoping Report.
- The need for the project was questioned. The concern was raised that eco-tourism and game farms will be impacted on to accommodate future mining that would ruin the current businesses.
Response: Eskom has to plan and augment the Transmission System in Accordance with the South African Grid Code. In the past 15 years load, has increased in the Hotazel-Kuruman-Kathu-Kimberley-Dealesville corridor by 32.5%. The forecast in this corridor anticipates a huge load growth due as a result

of high mining activities (diamond, manganese and iron ore mining), electrification and the establishment of small businesses in underdeveloped areas as well as increased housing densities and commercial development in developed areas. Growth is anticipated to quadruple in the next 25-30 years. The existing network will not be able to support the Hotazel-Kuruman-Kathu-Kimberley-Dealesville corridor load past 2021, strengthening will therefore be required to support the forecasted load and potential renewable generation.

- Numerous solar developments had been confirmed and indicated on the Draft Environmental Sensitivity Map.
Response: This will be considered in the final proposed route corridors.
- The question was raised why the new power lines could not be strung on the existing pylon structures.
Response: It was responded by Eskom that bigger conductors are required, resulting in a requirement for bigger structures and the existing pylons had not been built with that in mind. It would be required to decommission the existing lines, resulting in a break-down of power supply. Bigger servitudes would also have to be registered. It is not technically viable.
- The power line should run as close as possible to railway lines, so that existing infrastructure can be utilised for the new power line. This could also assist in reducing habitat fragmentation and edge effects.
Response: It was explained by the Eskom engineers that the Eskom power lines may cross railway lines, but it may not run adjacent to railway lines. It should be at least 1km away from existing railway lines.
- It was requested that the routes focus on road alignments to limit impact.
Response: Eskom generally strives to restrict route alignments as far as technically and environmentally viable along existing infrastructure such as roads, property boundaries and existing power lines.

The outcome of the meetings can be summarised as follows:

- Numerous objections regarding the proposed route alternatives were received.
- The fact that the power line project is a necessity was realised; therefore the general feeling of the affected landowners is that of support for the project. Further communication with regards to a practical and viable route corridor is required.

It was concluded that further stakeholder meetings and significant communication will take place between Landscape Dynamics, AMP (the route identification specialists on the project team) and the key stakeholders, specifically the directly affected landowners. The main aim of the discussions would be to establish a recommended route corridor with viable alternatives. Viable route alternative corridors which result from the Scoping Phase will be provided in the Draft Scoping Report on which all the Interested & Affected Parties would have the opportunity to comment.

Furthermore, the relevant specialist studies would be updated to accommodate new information supplied at the Public Open Day.

5.3.3 WRITTEN COMMUNICATION WITH I&AP'S DURING AND AFTER THE PUBLIC OPEN DAY

Correspondence between I&AP's and Landscape Dynamics are attached in Appendix E(6).

Transnet Freight Rail Johannesburg: Mr Vincent Matabane

Mr Matabane forwarded the invitation to attend the public open day to colleagues, requesting that they should deal with this application.

Response from Landscape Dynamics

- *No further comment from Transnet was received*

South African Heritage Resource Agency

SAHRA is unable to issue a Final Comment as more information is required. Based on the submitted information, it is likely that the proposed development will impact significant heritage resources. As such,

SAHRA requires that a field based heritage impact assessment (Phase 1 HIA) be completed that assesses the impact of the proposed development on all heritage resources including, but not limited to, archaeological heritage, rock art, any significant structures and intangible heritage. This assessment must not only assess impacts in terms of the development footprint, but must also assess broader, indirect impacts to heritage that may result from the proposed development.

This assessment must satisfy SAHRA's minimum requirements for impact assessments and must comply with the requirements in Section 38(3) of the NHRA and as such, this assessment must provide recommendations regarding the mitigation of any identified direct and indirect impacts to heritage resources. No further assessment of impacts to palaeontological heritage is required.

Response from Landscape Dynamics

- Their comment was forwarded to the heritage specialist to take into account when the final studies are conducted during the EIR phase of this project.
- The Scoping Report as well as EIR report will be submitted to SAHRA via the SAHRIS website.

Mr PA Versluis: Landowner Rosalind Gedeelte 2 nr 224 (Buitenzorg)

Route Alternative 3 will be the best because it runs on the northern side of the exiting two lines.

Response from Landscape Dynamics

- Comment noted

Mr Bennie Liebenberg, also on behalf of Mr Willem van Zyl: Farms Carolusdrif, Greeffputs & Melkveleie)

- The power line route above the railway line is preferred. Mr van Zyl indicated that a possible route across Melkveleie would be negotiable, but not across Greeffputs.

Response from Landscape Dynamics

- Comment noted

DO Potgieter & Son Farming: Ms Patsy Potgieter

She requested that previous communication be forwarded to her, since no previous correspondence from Landscape Dynamics was received.

Response from Landscape Dynamics

- The Background Information Document and applicable maps were emailed to Ms Potgieter.

Mainstream Renewable Power SA: Solar Development Project Manager: Mr Jonathan Frick

- He will not attend the open day due to late notice. They still have had no contact from the land negotiators regarding the power line crossing land parcels they have under option. Consent need to be obtained from Mainstream to cross the land parcel with the proposed gridlines.

Response from Landscape Dynamics

- AMP will contact Mr Frick as the need arises.

5.3.4 WRITTEN COMMENT ON THE DRAFT SCOPING REPORT

Correspondence between I&AP's and Landscape Dynamics are attached in Appendix E(8).

Free State Province: Department of Economic Development, Tourism & Environmental Affairs: Deputy Director General, Mr T Moremi: Enquiries Mr Mpho Gunundu

- The Department has reviewed the Draft Scoping Report and is satisfied with the identified specialist studies to be undertaken during the Impact Assessment Process.
- The Department further has no objection to this project provided that any and all further issues raised during public participation are addressed to the satisfaction of the issuing authority, DEA.

Response from Landscape Dynamics

- *Comment noted*

Free State Province: Department of Water & Sanitation: Ms Sibó Mdluli

The Free State Region: Department of Water and Sanitation will not be submitting comment on this project because the area of the project falls outside of the Upper Orange Water Management Area which ends at Daleville. The relevant office on this matter is the Northern Cape Region: Department of Water and Sanitation, which is responsible for the Lower Vaal Water Management Area that includes Boshof and Hertzogville. The Leeuw River is a tributary of the Vaal.

Response from Landscape Dynamics

- *The IA&P lists were updated with the contact details provided for the Northern Cape Region.*

The Northern Cape Province: Department of Environment & Nature Conservation: Environmental Officer, Environmental Quality Management: Ms Dorien Werth

- The Department awaits the Final Scoping Report for review.

Response from Landscape Dynamics

- *Landscape Dynamics responded to the Department as follows:*
 - *The Draft Scoping Reports were distributed for comment and the Final Scoping Reports will be submitted to DEA for approval.*
 - *Should the Department wish to make any further comment on the Draft Reports, it should be done within the next 2 weeks. If no comment from the DENC is received, it will be assumed that the DENC awaits the Draft EIR to submit further comment.*
- *No further comment from the Department was received.*

Northern Cape Province: Department of Agriculture, Forestry & Fisheries: Chief Forester: NFA Regulation: Ms Jacoline Mans

1. The Directory: Forestry Management (Other Regions) in DAFF is mainly concerned about the potential impact on protected tree species. See the National Forest Act, Act 84 of 1998 (NFA) as amended, section 12(1)(d) read with section 15(1) and section 62(2)(c). The most recent list of protected tree species was published in GN 908 of 21 November 2014. *No protected tree may be damaged, disturbed, cut or destroyed without a valid Forest Act license, irrespective of other authorisations and approvals.*

The DAFF is also responsible for the administration of the National Veld and Forest Fires Act, Act 101 of 1998 (NVFFA). Please take note of responsibilities in terms of the NVFFA.

2. Page 19 of the Draft Report refers to vegetation clearance required for the construction of the power line over a distance of approximate 95km and stated that tall trees will be cleared along the entire length of the servitude. The DAFF would like to point out that the total width of (55m or 27.5m on either side of the line) may not be cleared of protected trees. The DAFF / Eskom developed a document in 2012 titled: "*Basic Guidelines for the handling of EIAs and License Applications for Eskom SOC Holdings Linear Infrastructure affecting Natural Forests, Protected Trees or State Forests*". According to this document and in relation to new planned Eskom linear infrastructure, "protected trees do not need to be removed from the whole servitude, only from under the lines (this is not necessary for smaller tree species such as Shepherd's trees) and trees in the way of towers to be erected". The Northern Cape is a semi-arid region and unnecessary clearance of vegetation may expose soil, subjecting it to wind erosion that may take

many years to recover after disturbance.

3. Areas with higher density protected trees (national and provincial) should be avoided as far as possible. A provincially protected tree species that comes to mind is the Wild Olive (*Olea europaea* subsp. *Africana*) associated with the Ghaap Plateau.
4. A copy of the EIA Report should be submitted to the Department once available.

Response from Landscape Dynamics

- *This information was forwarded to the botanist for inclusion in the Vegetation and Faunal Report (to be submitted with the EIA Report).*
- *These stipulations will also be included in the EMP (to be submitted with the EIA Report).*

Sol Plaatje Municipality: Directorate: Services and Infrastructure: Mr LJ Stevens

1. Where the proposed power line route crosses over municipal land all applications are to be submitted to council in order to get municipal approval including the registration of the servitude by Eskom, including any agreements regarding compensation for land which is to be done via the Urban Planning division of this municipality.
2. Where the proposed route crosses private land, the municipality will not be held liable to compensate any of the parties involved; that would have to form an individual agreement between Eskom and these individual parties. Eskom would be required to submit copies of these agreements to this Sub-Directorate Electrical Service for reference purposes.
3. Scaled drawing of the proposed route is to be submitted to this Sub-Directorate Electrical Services where the route cross over the licenced area of supply of this municipality as per the licence number NER 13/10/KIM issued by NERA to the municipality.
4. Where the power line crosses any existing municipal electrical structure or any other municipal entities the specific clearance heights and safe working procedure as set out in the OHS Act is to be adhere to at all times, including the NOSA working Act regarding safe working procedure including all other municipal working ordinances with regard to road crossings or any excavation work within the municipal area.

Response from Landscape Dynamics

1. *Eskom, or their appointed negotiators, will contact the Municipality in due course to discuss compensation for the registration of the servitude, if applicable.*
2. *Agreements between private landowners and Eskom are private agreements between those parties and copies of these agreements will not be forwarded to the municipality for reference purposes.*
3. *This will be stipulated in the EMP (to be submitted with the EIA Report).*
4. *This will be stipulated in the EMP (to be submitted with the EIA Report).*

- **Samaria 75: De Beers Consolidated Mines Ltd: Dr P. C Anderson & The Manager: Ecology & DBCM Properties: Mr Piet Oosthuizen**
- **Picardi 72: De Beers Consolidated Mines Ltd: Dr P. C Anderson & The Manager: Ecology & DBCM Properties: Mr Piet Oosthuizen**
- **Kenilworth Estate 71: De Beers Consolidated Mines Ltd: Dr P. C Anderson & The Manager: Ecology & DBCM Properties: Mr Piet Oosthuizen**

De Beers had enquiries regarding the calculation of the compensation of the servitude.

Response from Landscape Dynamics

- *The Environmental Authorisation will have to be completed before the servitude acquisition phase can be done. The compensation will be calculated once the servitude areas are finalised. Eskom make use of external professional evaluators who do a market related valuation for the servitude. These values will then be negotiated.*

Mainstream Renewable Power SA: Project Development Manager; Mr Jonathan Frick

KML files of the proposed routes of all four applications were requested.

Response from Landscape Dynamics

- *The KML files were emailed to Mr Frick and no further comment was received.*

Van de Wall & Partners: On behalf of the Johan Kriek Family Trust

Van der Wall & Partners will not communicate with their client before 15 January 2015 and will forward written comment to Landscape Dynamics after that date. It may be possible that they will miss the 5 February 2015 due date.

A further letter was received, stating that they will submit written comment to Landscape Dynamics during the first week in March 2015.

Response from Landscape Dynamics

- *No comment was received, and no further extension requests of the commenting period were received.*

5.4 ISSUES RAISED DURING THE EIR PHASE

5.4.1 COMMUNICATION WITH STAKEHOLDERS DURING THE EIR PHASE

Continuous liaison is required for a project of this magnitude. However no further comment was received after the submission of the Final Scoping Report to DEA up to the distribution of the Draft EIR.

5.4.2 WRITTEN COMMENT RECEIVED ON THE DRAFT EIR

Correspondence between I&AP's and Landscape Dynamics are attached in Appendix E(10).

The Draft Environmental Impact Report was distributed to all the registered Interested and Affected Parties as well as key stakeholders, including all directly and potentially affected landowners, and the following comment was received:

Department of Agriculture, Forestry and Fisheries: Zilungile

There are protected trees within the development area and the Department therefore requested that a site visit should be undertaken before comment can be supplied.

Response

The extent of the project is as follows:

- *The total Eskom Strengthening Phase 4 Project entails the construction of an approximate 390km 400kV power line. Environmental authorisation is requested for a 2km wide corridor within which a 55m servitude will be registered.*
- *During the EIA process the ecological specialist did confirm that protected species occur within the route corridor alternatives. Note that only once environmental authorisation is obtained for a specific corridor for each of the four sections can Eskom start with the detail design of the powerline. As soon as the proposed positions of the pylons are identified within the approved corridor will a Site Walk-down with the relevant Eskom engineers; the ecologist; the bird impact specialist; the freshwater specialist and the archaeologist take place. During this Site Walk-Down the protected trees that require permits from the Department will be marked and coordinates will be identified and permits will be prepared for submission to your office.*

- *Due to the reasons supplied above, a detailed site investigation at this stage will not be time and cost effective since the approved route corridor had not been confirmed yet and the locality of protected species had also not been identified.*
- *It is therefore strongly recommended that the Site Walk-Down be attended by the Department at the time that it takes place; or else that the Department attends a site investigation to the relevant areas of concern where the permits are required once more specific detail in that regard becomes available, when the permit applications are submitted to the Department. We could include your requirement to attend the Site Walk-Down in the Environmental Management Plan as a condition, should the Department wish to do so.*
- *Written comment in terms of the way forward and the Department's requirement in terms of compliance with the Department's legislation should be submitted.*
- *Landscape Dynamics further requested that complete contact details should be submitted since it is not sure from which office Zulingile is since comment from the Northern Cape Forestry Branch was already received.*

No further comment from the Department was received.

South African Heritage Resource Agency: Case Officers: Mr Phillip Hine, Ms Jenna Lavin and Mr Andrew Salomon

An email was sent on 8 September 2015 to above-mentioned case officers, informing them that the final HIA's and Route Maps were uploaded on SAHRA for their perusal and comment.

A further email was sent on 28 October, reminding them that comment was required. The deadline for comment was extended from 19 October to 30 October and the email specifically stated the following: "If no comment is forthcoming, it will be seen that SAHRA has no further comment on these development proposals."

No further comment / reply to the email was received and it is therefore concluded that SAHRA has no further comment on this Eskom power line project.

South African Civil Aviation Authority: Obstacle Specialist: Procedure Design and Cartography: Mr Harry Roberts

SACAA has no objection to the routing as depicted on the KMZ file accompanying their email. Should the route differ from that which is depicted, this comment will become null and void, subject to a new review of the route proposed. They requested information regarding the intended height of the pylons.

Response

Technical information regarding the pylons that could be used for the Eskom Kimberley Strengthening Phase 4 project was included as Appendix B in the Environmental Impact Report and the following information was also provided in the EIR:

Different pylon structures are being considered for this project. Find attached diagrams with their dimensions attached in Appendix B. They include the following:

- *Guyed Suspension Type- Top width 23m; total base width 26 meters with pointed tower base in the centre, height average 33m*
- *Cross-Rope Suspension Type – Top width 29m; distance between base towers 21 meters, height up to 38m.*
- *Strain Tower Type – Top width 22,8m; base width 22,8; total base 55 meters; height average 33m*
- *Double Circuit (where more than one power line is carried via the same pylons) – Top width 12,6m; base width 8,05m; height average ranging between 30m and 61,22m.*

The proposed "double circuit" line is a worst case scenario. It will only be used where no other viable

alternative is possible due to huge financial implications and construction constraints.

The final pylon structure will however only be determined during the design phase. The choice of pylon structure will be guided by the site-specific characteristics, i.e. geology, soils, topography, landowners' preference, etc. At this stage it does however appear as if the 'Cross-Rope Suspension Type' pylon is favoured by the engineers for this project specifically.

The Northern Cape Department of Environment & Nature Conservation: EIA Administration: Ms L Tools-Bernardo

The Department acknowledged receipt of the hard and electronic copy of the Draft EI Report on 9 September 2015. The application has been assigned the reference number NC/MAT/FB/SOL/KIM/2014 and the responsible officer is Mr T Mthombeni.

Response from Landscape Dynamics

- *Comment noted*
- *No further comment from the Department was received.*

Free State Department of Economic, Small Business, Development, Tourism and Environmental Affairs: Acting Director: Environmental Management: Ms M Sello

The Department recommended the following:

- The proposed buffer of 50m should be taken from the edge of the wetland and not from the centre of the drainage line.
- Once the final route has been selected and it is operational, nearby pans which support flamingos must be identified and where appropriate, the power lines must be fitted with 'flight diverters'.

The Department has no other objections to the development.

Response

- *The mitigation measures proposed by the Freshwater Impact Assessment undertaken for this study, and included in the EMP, are as follows:*
 - *Where the proposed power lines are located close to freshwater features it is proposed that a buffer of 50m from the centre of the drainage lines and approximately 500m (varies depending on wetland cluster) from the edge of the pans be implemented.*
- *This was taken into account during the Bird Impact Assessment and the recommendations made were included in the EMP for execution by Eskom.*

Mainstream Renewable Power South Africa: Development Executive: Ms Enelge Gildenhuys

The proposed Eskom project will affect one of their projects, Droogfontein PV3, for which environmental authorisation and land agreements are in place. The original environmental authorisations and all amendments to date were attached to her email. Mainstream currently has land right agreements over the following properties with regards to this project:

- Portion 31 of the Farm Roode Pan no 70, Kimberley Division, Northern Cape Province
- Remaining Extent of Portion 18 of the Farm Roode Pan no 70, Kimberley Division, Northern Cape
- Remaining Extent of Portion 30 of the Farm Roode Pan no 70, Kimberley Division, Northern Cape
- Remaining Extent of Portion 1 of the Farm Droogfontein no 62, Kimberley Division, Northern Cape
- Portion 15 of the Farm De Hoop no 65, Kimberley Division, Northern Cape
- Portion 11 of the Farm De Hoop no 65, Kimberley Division, Northern Cape
- Remaining Extent of the Farm Droogfontein no 62, Kimberley Division, Northern Cape

Mainstream must be involved during the planning phase of this Eskom project to ensure that both Mainstream's and Eskom's projects can be accommodated.

Response from Landscape Dynamics

- *The route negotiators for this project responded that deviation of the 55m servitude within the 2km corridor will be considered, as far as technically possible to avoid infrastructure, during the negotiation phase.*
- *No further comment from Mainstream was received.*

Van De Wall & Partners Attorneys: On behalf of the owners of Farms Atlast & Riverside 217

1. A comprehensive maintenance register of the past 20 years of all the Eskom power lines running on above-mentioned properties must be submitted. These registers must contain detail regarding the exact work done and date on which it was done as well as replacement of equipment, gates and servitudes.
2. What is meant by a 2km zone?
3. What is the height of the existing pylons and what will be the height of the new pylons?
4. What is meant on page 52 of the EIR that the potential impact is high and what is meant with the term “spatially concentrated”?
5. What is meant by the term “this corridor option will have 13 visual conflicts”? More detail is required.
6. Since the public meeting Eskom did not respond to the request that a trust fund must be registered (page 59 of the EIR).
7. When will the Eskom evaluators contact the landowners?
8. What studies have been conducted to determine the impact of Eskom pylons on game farms where helicopters are being used?
9. What distance is required between the pylons and the area where helicopters are being used?
10. Will Eskom conduct negotiations directly with affected landowners?

Response from Landscape Dynamics

1. *The supply of such a maintenance register falls outside of the scope of this study. Landscape Dynamics was appointed to obtain Environmental Authorisation for the proposed Boundary-Ulco section of the Kimberley Strengthening Phase 4 Project. Part of the Environmental Impact Study is to address relevant concerns and/or comment regarding the proposed project. The request to supply a detail register of Eskom projects over the past 20 years over relevant properties is not reasonable. Note however that the existing Eskom Distribution and Eskom Transmission servitudes are indicated on the route maps. As can be seen from the final route map proposed, all effort was made to plan the new route as far as possible parallel to existing powerline servitudes and infrastructure such as roads and property boundaries.*
2. *The servitude width is 55m, with 27.5m on either side of the line. For the purpose of the Environmental Impact Assessment a route corridor width of 2km is being investigated for each alternative and a 2km wide route corridor will ultimately be authorised by DEA. This enables slight adjustments within the corridor during the corridor walk-down and servitude negotiations with the relevant landowners without having to enter into an additional environmental authorisation process. After all negotiations had been finalised; the 55m servitudes will be registered against the properties at the deeds office. The property remains that of the landowner, but Eskom will have the right to build and maintain a power line according to the servitude conditions as determined during the negotiation phase.*
3. *The following information regarding the height of the new pylons is supplied on page 14 & 15 of the Draft EIR as well as Appendix B:*

Different pylon structures are being considered for this project, which could include the Guyed Suspension Type (height average 33m); Cross-Rope Suspension Type (height up to 38m); Strain Tower Type (height average 33m) and Double Circuit (height average ranging between 30m and 61,22m).

The proposed “double circuit” line is a worst case scenario. It will only be used where no other viable alternative is possible due to huge financial implications and construction constraints.

The final pylon structure will however only be determined during the design phase. The choice of pylon structure will be guided by the site-specific characteristics, i.e. geology, soils, topography, landowners’ preference, etc. At this stage it does however appear as if the ‘Cross-Rope Suspension Type’ pylon is favoured by the engineers for this project specifically.

Regarding the existing power lines, the height of a 132kV power line normally varies between 17.4m-24m depending on the topography.

4. *Visual Impact: The significance of the impacts was rated as follows:*

Significance of impact	Explanation of Significance
None	There is no impact at all
Low	Impact is negligible or is of a low order and is likely to have little real effect
Moderate	Impact is real but not substantial
High	Impact is substantial
Very high	Impact is very high and can therefore influence the viability of the project

A high impact could therefore not influence the viability of the project.

“Spatially concentrated” means that objects is closely situated to each other within the space they occupy. In the case of this project, it means that two lines that run alongside each other are “spatially concentrated”.

5. *“Visual conflict” is defined as “a sensitive viewing point or receiving landscape occurring within a 3.0km radius of a proposed corridor. Within this range the viewer would experience a moderate to high visual exposure to the power line, which could result in a high visual impact.” (page 26 of the Visual Impact Assessment specialist study).*

Refer to page 70 of the Visual Impact Assessment where the conflicting areas are mapped.

The alternative route corridor has 26 potential visual conflicts and the Preferred Route has 13 visual conflicts, thereby resulting in the Preferred Rout Alternative Corridor being considered the preferred option from a visual perspective.

6. *Eskom responded that they had consensus that it would create a costly precedent for projects all over the country which Eskom cannot afford.*
7. *The independent professional evaluators will only be appointed by Eskom after the Environmental Authorisation has been received. The landowners will be contacted thereafter to commence with the negotiation phase and to establish the market values of the servitude areas.*
8. *No studies in this regard could be found, but Eskom strives to construct new power lines parallel to existing infrastructure. On the properties in question, the line is to the greater extent parallel to existing power lines. This means that there is not a new impact; the existing servitude area is only increased.*
9. *See above*
10. *The Eskom or Eskom appointed consultants will contact the affected landowners after the Environmental Authorisation has been received. A meeting will be arranged during which the position of the proposed*

power line will be discussed as well as the market value compensation valuation, conducted by a professional evaluator. The landowner and negotiator can then discuss specific issues pertaining to their involved property.

Please note

The above reply was sent via email to Van De Wall & Partners Attorneys. It was requested in this email that they should please provide Landscape Dynamics with comment before Friday, 24 November. If no reply to this email is forthcoming, it will be seen that Van De Wall & Partners Attorneys is in agreement with the response.

No further comment was received.

5.5 CONCLUSION OF PUBLIC PARTICIPATION

The main issues raised during the advertising period are related to the following:-

- Impact on future planning , i.e. solar energy farms
- Impact on existing land use – eco-tourism, hunting, agriculture
- Impact on natural environment – vegetation, wildlife and avi-fauna
- Visual Impact
- Cumulative impact of additional power lines on properties with impact on property values
- Eskom access during the operational phase is problematic in terms of security, poaching and veld fires

These issues are addressed in this chapter in what is believed to be a fair and satisfactory manner. Relevant mitigatory measures and specifications are prescribed in the Environmental Management Plan in Appendix F.

The main objective of the Public Participation Programme undertaken for this project was to identify viable route corridors that are not only acceptable from an ecological point of view, but also from a landowner perspective. It should be noted that it is very difficult to meet this goal with a project of this magnitude; however the EAP is confident that reasonable consensus was reached regarding the preferred and alternative route corridors presented in this document.

CHAPTER 6: IMPACT ASSESSMENT AND PROPOSED MITIGATION MEASURES

6.1 METHODS USED TO IDENTIFY IMPACT

Environmental issues and impacts have been identified through the following means:

- Correspondence with Interested and Affected Parties, including directly affected landowners, general stakeholders and relevant authorities;
- Consultation with the EIA Project Team, supported by the Eskom Project Team;
- Evaluation and consideration of relevant existing environmental data and information;
- The general knowledge and extensive experience of the Environmental Consultants in the field of Environmental Impact Assessments for linear development planning.

6.2 ASSESSMENT OF IMPACTS ASSOCIATED WITH THE DEVELOPMENT

The impacts below are assessed according to the following criteria:

Extent of impact	Explanation of extent
Site	Impacts limited to construction site and direct surrounding area
Local	Impacts affecting environmental elements within the local area / district
Regional	Impacts affecting environmental elements within the province
National	Impacts affecting environmental elements on a national level
Global	Impacts affecting environmental elements on a global level

Duration of impact	Explanation of duration
Short term	0 - 5 years. The impact is reversible in less than 5 years.
Medium term	5 - 15 years. The impact is reversible in less than 15 years.
Long term	>15 years, but where the impacts will cease if the project is decommissioned
Permanent	The impact will continue indefinitely and is irreversible.

Probability of impact	Explanation of Probability
Unlikely	The chance of the impact occurring is extremely low
Possible	The impact may occur
Probable	The impact will very likely occur
Definite	Impact will certainly occur

Magnitude/Intensity of impact	Explanation of Magnitude/Intensity
Low	Where the impact affects the environment in such a way that natural, social and cultural functions and processes are not affected
Moderate	Where the affected environment is altered, but natural, social and cultural functions and processes continue albeit in a modified way
Severe	Where natural, social and cultural functions or processes are altered to the extent that it will temporarily or permanently cease

Significance of impact	Explanation of Significance
None	There is no impact at all
Low	Impact is negligible or is of a low order and is likely to have little real effect
Moderate	Impact is real but not substantial
High	Impact is substantial
Very high	Impact is very high and can therefore influence the viability of the project

6.2.1 EXPECTED NEGATIVE IMPACTS

Please note that mitigation measures as supplied below are also included in the Environmental Management Plan.

IMPACT EVALUATION: ROUTE ONE CORRIDOR (PREFERRED)

VEGETATION

Loss of flora, fauna and habitat

The construction of pylons will lead to the destruction and loss of vegetation, which can result in degradation of the environment, loss of vegetation cover and resultant erosion and loss of topsoil, increase in water runoff and less water infiltration, loss of habitat for sensitive or secondary species, reduction of species richness and system diversity and eventual loss of ecosystem functioning and species composition.

Habitat fragmentation (loss of landscape connectivity)

Habitat fragmentation refers to destruction of the habitat leading to a discontinuity in a species/populations' the environment. The remaining habitat therefore becomes smaller.

Loss of vulnerable species

Not only will the loss of vulnerable species cause further degradation of the environment and the conservation status of the ecosystem, but it will alter also the functioning of adjacent ecosystems and their species compositions.

Invasion of invader plants and declared weeds

Weeds, alien invasive and indigenous invasive plants are normally aggressive growers that can out-compete other natural species growing in the environment.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Loss of flora, fauna and habitat	Low	Site	Short / Medium	Probable	Low / Moderate	Low
Habitat fragmentation (loss of landscape connectivity)	Moderate / Low	Site	Short	Possible	Low	Low
Loss of vulnerable species	Low	Site / Local	Medium	Possible	Low / Moderate	Low
Invasion of invader plants and declared weeds	Moderate	Site	Medium	Possible	Moderate	Low

Mitigation

Protected trees

- It is important to take into consideration during the planning phase of the project the fact that the total width of the servitude may not be cleared of protected trees. The Department of Agriculture, Forestry & Fisheries, together with Eskom developed a document in 2012 titled: "*Basic Guidelines for the handling of EIAs and License Applications for Eskom SOC Holdings Linear Infrastructure affecting Natural Forests, Protected Trees or State Forests*". According to this document and in relation to new planned Eskom linear infrastructure, "protected trees do not need to be removed from the whole servitude, only from under the lines (this is not necessary for smaller tree species such as Shepherd's trees) and trees in the way of towers to be erected". The Northern Cape is a semi-arid region and unnecessary clearance of vegetation may expose soil, subjecting it to wind erosion that may take many years to recover after disturbance.
- Areas with higher density protected trees should be avoided as far as possible.

- Two protected species have been recorded within the study area (more species may be found during the walk-down exercise):
 - *Vachellia erioloba* (Camel thorn) in Vegetation Units 1, 2 and 5
 - *Boscia albitrunca* (Shepherd's tree) in Vegetation Unit 1
- The Directory: Forestry Management in the Department of Agriculture, Forestry and Fisheries (DAFF) is mainly concerned about the potential impact on protected tree species. The most recent list of protected tree species was published in GN 908 of 21 November 2014. *No protected tree may be damaged, disturbed, cut or destroyed without a valid Forest Act license, irrespective of other authorisations and approvals.*

Preparation of servitude / vegetation clearance

- The procedures for vegetation clearance and maintenance within overhead power line servitudes and on Eskom owned land, updated September 2009 or latest approved revision thereafter, must be implemented (EPC 32-247).
- Vegetation clearance is often one of the very first activities of construction. The Project Coordinator shall inform the ECO before the vegetation clearance contract is issued. Vegetation clearance is considered commencement of construction. Eskom needs to notify the DEA of its intention to commence with construction before vegetation clearance can commence.
- Indigenous vegetation which does not interfere with the safe operation of the power line should be left undisturbed.
- Clearing for pylon positions must be done to the minimum required for that specific pylon.
- Vegetation clearing during construction must be restricted to the footprint of the substation infrastructure only and the power line servitude.
- Existing access roads must be used as far as possible and the creation of new access tracks for power line construction should be minimised.
- Unnecessary impacts (such as driving off road) on surrounding natural vegetation must be avoided.

Control of alien vegetation

- Alien vegetation in servitudes shall be managed in terms of the Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. In terms of these regulations, Eskom shall "control" i.e. to combat Category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas or land owned by Eskom.
- The use of herbicides shall be in compliance with the terms and conditions of The Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947).
- *Prosopis glandulosa* and *Eucalyptus camaldulensis* are a declared category 2 (CARA) and 1b (NEMBA) invader trees, while *Agave Americana* and *Melia azedarach* a category 3 (CARA) and NEMBA category 3 invaders. This means that these may not be grown or planted on one's property unless a permit is obtained from nature conservation. It is recommended that these plants are removed from the different vegetation units and that a programme is implemented on a long-term basis to control the spread of these plants.
- All alien vegetation should be eradicated along the servitude. Invasive species (*Prosopis glandulosa*; *Nicotiana* spp.) should be given the highest priority.
- No dumping of any materials in undeveloped open areas and neighbouring properties.
- Activities in the surrounding open undeveloped areas (especially the rocky hills and koppies must be strictly regulated and managed.
- It is imperative that the construction activities as well as vegetation clearance are restricted to the powerline servitude. The limitation of the disturbance of vegetation cover within the servitude will ameliorate this impact.

Protection of flora

- No animals or birds may be fed, disturbed, hunted or trapped. Severe contractual fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harm remaining faunal species.
- No plant material may be removed if not part of identified vegetation clearance.
- Workers must be limited to areas under construction within the corridor and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated (“no-go” areas during construction activities).
- Provision of adequate toilet facilities must be implemented to prevent the possible contamination of ground (borehole) water in the area.
- All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction. All alien invasive plant should be removed from the site to prevent further invasion.
- Contract employees must be educated about the value of wild animals and the importance of their conservation.
- All vegetation not interfering with the operation of the line shall be left undisturbed. This is especially pertinent to the protected Shepherds Tree (*Boscia albitrunca*) as well as Camel Thorn (*Acacia erioloba*). None of these species may be removed without permission from the DAFF & Nature Conservation.
- Collection of firewood and traditional medicinal plants is strictly prohibited.
- All alien vegetation should be eradicated along the corridor.
- Remaining indigenous bulbous geophytes should be retained or replanted wherever possible. Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited.

Rehabilitation

A suitably qualified rehabilitation specialist should be appointed for the commencement of rehabilitation activities. The specialist should identify areas requiring rehabilitation as well as appropriate seed mixes which are required. Photographic records of the servitude and access roads prior to construction activities and after the construction phase will be taken to assess the level of rehabilitation and re-vegetation.

FAUNA (MAMMALS, REPTILES AND AMPHIBIANS)

Disturbance to and/or destruction of habitat and illegal placement of snares could impact on the Fauna within the study area.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Disturbance / destruction of habitat	Moderate / Low	Local	Short	Possible	Moderate	Low

Mitigation

Mammal management recommendations

- All large indigenous tree species should be conserved wherever possible as they form important habitat for arboreal mammal species.
- Activities should be restricted away from any rocky hills and outcrops as well as riparian habitats along the non-perennial drainage lines.
- The conservation and correct management of the Vaal and Harts Rivers riparian habitats along the proposed servitudes should ensure the conservation of all remaining suitable habitat for wetland/riverine associated mammals on the site (Cape Clawless Otter).
- No hunting or poaching activities must be allowed along the servitudes during all phase of the project.

Reptile management recommendations

- No rock removal should occur adjacent to the proposed towers. No termite mounds should be intentionally destroyed. If any moribund termite mounds have to be destroyed due to tower position it should be carefully excavated by hand and pick.
- Any animals rescued or recovered will be relocated in suitable habitat away from the transmission tower and line.
- Trees including stumps; bark and holes in trees are vital habitats for numerous arboreal reptiles (chameleons, snakes, agamas, geckos and monitors).
- The removal of indigenous tree species (*Vachelia erioloba*) as well as clearance of the riparian vegetation along the Vaal and Harts Rivers must be kept to the minimum wherever possible.
- Exotic cleared vegetation should form wood piles and logs and stumps. Dead or decaying wood piles should be created as these will provide valuable refuge areas especially due to the clearance of vegetation cover. Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians, arachnids and scorpions. With time they will eventually be reduced to valuable compost by several animal species. Dead trees and stumps will also be used for nesting purposes by barbets, hoopoes, owls, hornbills as well as perching or hunting platforms for birds like the kingfisher.
- Any lizards, gecko's, agamids, monitors or snakes encountered should be allowed to escape to suitable habitat away from the disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project.
- Several venomous snake species occur along the proposed lines including Cape Cobra (*Naja nivea*) and Puff Adder (*Bitis arietans*).
- General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area.
- Appropriate foot wear (sturdy leather boots) should be worn in the field.

Amphibian management recommendations

- Construction activities should be restricted to daylight hours reducing the potential impact on the nocturnal breeding activities of the majority of amphibian species.
- Ideally the installation of the new towers should be undertaken during the dry winter months (May-September) when the majority of amphibian species are dormant.
- The towers should ideally not be placed in any seasonal wetland habitats and should be positioned outside the temporary wet areas.
- No Giant Bullfrogs must be collected for food or illegal pet trade.
- As a precautionary mitigation measure it is recommended that the developer and construction contractor as well as an independent environmental control officer (ECO) should be made aware of the possible presence of certain threatened amphibian species (Giant Bullfrog) prior to the commencement of construction.

AVIFAUNA

Displacement due to habitat disturbance

Apart from direct habitat destruction, the above mentioned construction and maintenance activities could also potentially impact on birds through disturbance, particularly at the aforementioned White-backed Vulture breeding colonies. This could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. However, the important Dronfield colony is not affected by the proposed route alignment.

Displacement due to habitat destruction

During the construction phase and maintenance of power lines and substations, some habitat destruction and transformation inevitably takes place. This happens with the construction of access roads, the clearing of servitudes and the levelling of substation yards. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimise the risk of fire under the line, which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through transformation of habitat, which could result in temporary or permanent displacement. In the present instance, the risk of displacement of Red Data species due to habitat destruction is likely to be fairly limited, given the nature of the habitat. The one exception to the last statement is the White-backed Vulture breeding colonies, where the removal of large Camel Thorn trees could result in the destruction of nests, and the resultant displacement of breeding birds.

Collisions

A significant impact that is foreseen for the proposed Boundary - Ulco transmission line is collisions with the earth wire of the proposed line. Collisions are probably the biggest single threat posed by transmission lines to birds in southern Africa. Most heavily impacted upon are bustards, storks, cranes and various species of water birds. The technical aspects of power line design and siting also play a big part in collision risk. Grouping similar power lines on a common servitude, or locating them along other features such as tree lines, are both approaches thought to reduce risk.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Displacement through disturbance	Moderate	Site	Short	Possible	Low	Low
Displacement through habitat destruction	Moderate	Site	Short	Possible	Low	Low
Collisions	Moderate	Regional	Short	Probable	Moderate	Low

Mitigation

Disturbance to and destruction of habitat

- Disturbance to and killing of birds must be prevented.
- Unnecessary habitat destruction must be avoided.
- The removal of large trees should be avoided if at all possible.
- All dismantling, construction and maintenance activities must be carried out according to best environmental practice principles so as to minimise habitat destruction (see in this respect the Eskom Environmental Procedure, EPC 32-96). The unnecessary removal of large trees IS not allowed (see also in this respect the Procedure for Vegetation Clearance and Maintenance within Eskom owned land, EPC 32-247).

Collisions

Once the final alignments and tower positions have been selected, the sections of the line that would need the application of Bird Flight Diverters to mitigate for potential collisions should be indicated by the avifaunal specialist by means of a “walk-through” exercise. This exercise should be informed by an analysis of satellite imagery supplemented by on site ground-truthing (physical inspection). The type of Bird Flight Diverter to be used and the marking scheme will be determined during that phase of the project.

FRESHWATER FEATURES

Impact of the powerline

- Disturbance / loss of aquatic habitat

Construction Phase

The installation of new foundation and pole structures could be expected to result in some disturbance of freshwater ecosystem habitat and loss of associated vegetation. Flow & water quality modification as a result of increased erosion and invasive plant growth within disturbed areas could also impact on the effective functioning of the *freshwater aquatic systems*.

Operation Phase

Some disturbance of the freshwater features in the area of the constructed power line could be expected that would be associated with the maintenance activities for the project.

Impact of the access roads

- Disturbance / loss of aquatic habit
- Flow and water quality modification

Construction Phase

The major impacts associated with any access roads, should they need to be established, relate to the potential loss of habitat within wetland areas and the streams and drainage channels, invasive alien plant growth, flow and water quality impacts and erosion of river/stream banks and drainage channels.

Operation Phase

The major impacts associated with the access roads during the operation phase relate to disturbance to the instream and riparian habitat of the freshwater ecosystems along the designated routes.

Construction of new Ulco Substation

Tributaries of the Vaal and Harts rivers occur more than 3km to the north and south-west of the existing substation. The construction of the new substation could possibly impact on these water features.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
<i>Impact of the <u>powerline</u></i> Disturbance / loss of aquatic habitat Construction Phase Operational Phase	Moderate / Low Moderate / Low	Site / Local Site	Short Long	Probable Possible	Low Low	Low Low / None
<i>Impact of the <u>access roads</u></i> Disturbance / loss of aquatic habit Flow and water quality modification Construction Phase Operational Phase	Moderate / Low Moderate / Low	Site / Local Site	Short Long	Probable Possible	Moderate / Low Moderate	Low Low / None
Impact of substation on water features	Moderate / Low	Local	Short	Possible	Moderate	Low

Mitigation

Power lines and its structures

- Construction activities should as far as possible be limited to the sites outside the proposed buffer zones.

- Clearing of debris, sediment and hard rubble associated with the construction activities should be undertaken post construction to ensure that flow within the drainage channels are not impeded or diverted.
- Rehabilitate disturbed stream bed and banks and re-vegetate with suitable indigenous vegetation.
- It is important that any of the cleared areas that are not hardened surfaces are rehabilitated after construction is completed by re-vegetating the areas disturbed by the construction activities with suitable indigenous plants. Invasive alien plants that currently exist within the immediate area of the construction activities should also be removed and any regrowth prevented and managed.
- Erosion should be controlled at all times.
- Conditions as specified in the Water Use License or else the General Authorisation issued by the Department of Water and Sanitation must be met.

Access roads

- The existing road infrastructure should be utilised as far as possible rather than creating new ones in order to minimise the overall disturbance created by the proposed project.
- Where access routes need to be constructed through ephemeral streams, disturbance of the channel should be limited and multiple crossings should not be created.
- Riparian areas should be avoided and any road adjacent to the riparian zone should also remain outside of the applicable buffer zones.
- All crossings over drainage channels or stream beds should be such that the flow within the drainage channel is not impeded.
- Road infrastructure and cable alignments should coincide as much as possible to minimise the impact.
- Any disturbed areas should be rehabilitated to ensure that these areas do not become subject to erosion or invasive alien plant growth. To reduce the risk of erosion, run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring within the freshwater features and drainage lines.

Contaminated runoff from the construction sites should be prevented from entering the rivers/streams. All materials on the construction sites should be properly stored and contained and disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 50m away from the river/stream systems and regularly serviced.

The establishment of alien vegetation in the riparian zones should specifically be prevented, and controlled if it does occur.

Substation

The new Ulco substation should therefore preferably be located to the east of the existing substation.

VISUAL IMPACT

Visual resource impacts would result from the construction, operation, and maintenance of the proposed 400kV transmission power lines. Impacts would result from the power lines being seen from sensitive viewpoints and from effects to the scenic values of the landscape

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Visual impact	Moderate	Local	Permanent	Definite	Moderate	Moderate

Mitigation

Mitigation measures to reduce the visual impact of transmission lines are generally difficult and costly after the alignment has been determined. To this end, mitigation measures, including alternative route alignment and specific measures for the mitigation of potential conflict areas are usually proposed for corridor options.

Screening measures from sensitive viewing areas are difficult to achieve. Resultantly, there is a severe limitation to the mitigation and the management of power lines other than to avoid conflict situations wherever possible during the planning and public participation process.

To this end and in response to these issues the final alternative route corridor alignments were adjusted to avoid, where possible, conflicts with sensitive landscape and use types (game farms and nature reserves) and residences. The preferred route alignment as proposed in this report is the preferred option from a visual impact perspective.

CULTURAL / HERITAGE

The fieldwork undertaken revealed one site of cultural heritage significance. The site is within the Route One Corridor. However, it would be easy to avoid the site.

From a heritage perspective it definitely seems as if the Route One Corridor has more possible heritage based issues. Apart from the site identified, many other sites are known along this route. It would therefore be preferred if this alternative could be avoided.

However, should it be decided to use this route, it would be possible to mitigate the impact on heritage resources. This option may therefore be supported on condition that mitigation measures be implemented.

No further action is necessary with regards to the site identified during the survey.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Placement of pylons on historical mining site	Very high	Local	Permanent	Unlikely	Severe	None
Over-spanning historical mining site	Moderate	Local	Long term	Possible	Moderate	None

Mitigation

By not placing the pylon positions on any sites of cultural significance (such as the historical mining site), no further action will be necessary as these sites may be over-spanned. The only exception is graves which may not be over-spanned and for which a 20m buffer zone is recommended. A final walk-down, to inspect pylon positions, is therefore recommended.

It should be noted that due to the nature of the subterranean presence of archaeological and/or historical sites, features or artifacts, the possibility to find these during the course of construction work are always real. Care should therefore be taken, when development work commences, that if any of these are accidentally discovered, a qualified archaeologist be called in to investigate. The results of such an investigation should be submitted to SAHRA.

PALAEONTOLOGY

Since none of the rock formations or sediments in the region is potentially fossiliferous, being too old or too young, the proposed Boundary-Ulco project may continue as far as the palaeontology is concerned.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Palaeontology	Low	Local	Medium	Unlikely	Low	None / Low

Mitigation

If any fossils are discovered during the excavations then it is strongly recommended that the fossils are rescued and a palaeontologist is called to assess their importance and make further recommendations.

AGRICULTURAL POTENTIAL / AGRICULTURAL ACTIVITIES

Insensitive placement of power lines will have a severe negative impact on current agricultural activities, such as game farming where helicopters are used extensively and agricultural land which is under irrigation.

Incorrect placement could cut through agricultural fields where centre pivot irrigation is being used and will have a severe negative impact since it is not possible to continue with this practise directly underneath power lines.

During the construction period, interference with livestock could also have a negative impact on farming activities.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Impact on agricultural activities	Very High	Local	Permanent	Probable	Moderate / Severe	Low

Mitigation

Extensive communication with affected landowners took place and the proposed route alignment takes due cognisance of areas where pivot irrigation is being used as well as helicopter flying patterns in the area.

During consultation with land owners it also became apparent that it will be preferred if the proposed power line can be as close as possible to farm boundaries, existing power lines and existing infrastructure such as roads.

Considering the issue of security, access will be easier to control during construction and maintenance phases next to the existing infrastructure, rather than having the line over the middle of properties.

Domestic Livestock

- Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species.
- The Contractor's workforce will have to be very careful not to disturb the animals as this may lead to fatalities which will give rise to claims from the Landowners.
- Interference with any wildlife without the applicable permits shall not be allowed.
- The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities.
- Should the Contractors workforce obtain any livestock for eating purposes, they must be in possession of a written note from the Landowner.
- Speed limits must be restricted especially on dirt roads preventing unnecessary road fatalities of surrounding livestock.

SOILS / EROSION

Concrete foundations will be made for each pylon and substation and new access roads will be constructed. Vegetation will therefore be cleared and there may be an increase in surface water runoff which could lead to soil erosion.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Erosion	Moderate	Local	Medium	Possible	Moderate	Low

Mitigation

- To cause the loss of soil by erosion is an offence under the Soil Conservation Act, Act No 76 of 1969. Access roads and site surfaces must be monitored for deterioration and possible erosion. Pro-active measures must be implemented to curb erosion and to rehabilitate eroded areas. All areas susceptible to erosion must be installed with temporary and permanent diversion channels and berms to prevent concentration of surface water and scouring of slopes and banks, thereby countering soil erosion.
- All cleared areas must be ripped and rehabilitated after construction. The top 200mm layer of topsoil must be removed and stockpiled in heaps not higher than 2m and replaced on the construction areas once the activities have been completed. The affected areas should be replanted with a grass mixture indigenous to the area.
- All vehicle movement must be along existing roads or tracks as far as possible.
- All stormwater runoff must be managed efficiently so as to avoid stormwater damage and erosion to adjacent properties.
- The viability of undertaking construction during the dry months of the year should be investigated in order to overcome possible problems caused by excessive moisture.
- Should any new temporary access roads be required, the following should apply in areas which are prone to erosion:
 - Where a cutting is made, subsoil drains should be installed wherever a perched water table occurs within 900m of the formation in all cuttings and below fills in the alluvial zones.
 - It is further critical to manage surface water. Drains should be provided along the top and bottom of all deep cuttings. This is to minimise the flow of surface water and erosion to the exposed cut faces and erosion along the toe of the cuttings.
 - Steep sections of the service road must be supplied of sufficient drainage areas to reduce flow velocity of run-off water.
 - Any eroded sections must be rehabilitated and part of the management plan must include regular inspections of the water run-off areas.
- If any erosion occurs, rehabilitation must immediately be done.
- All embankments (if any) must be adequately compacted and planted with grass to stop any excessive erosion and scouring of the landscape.
- After construction, all temporary access roads should be rehabilitated.
- The site must be rehabilitated and replanted with suitable, indigenous grass to prevent erosion.
- Should any signs of erosion be evident along the access and maintenance roads during the operational phase of the project, remedial action should take place as soon as possible.

GROUNDWATER

Potential for *groundwater* pollution exists as a result of oil spills, etc. during the construction period

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Groundwater pollution	Moderate	Local	Long / Permanent	Possible	Moderate	Low

Mitigation

- In all cases, abstraction of water from watercourses for construction purposes will not be allowed. Arrangements must be made prior to construction with the landowners or municipal water must be carted in.
- Under no circumstances must surface or groundwater be polluted.

- Adequate oil containment precautions must be taken.
- If a spill from a construction vehicle occurs it must be reported to ECO with immediate effect. A bio-remediation contractor must be appointed to rehabilitate large oil spills. Small oil spills must be cleaned immediately with an oil spill kit.
- Minimise on-site storage of petroleum products.
- Ensure proper maintenance procedures are in place for vehicles and equipment.
- Servicing of vehicles to be done in designated areas with appropriate spill management procedures in place.
- Ensure that measures to contain spills are readily available on site (spill kits).
- All hazardous substance spills must be reported, recorded and investigated.
- All stormwater runoff must be managed efficiently so as to avoid stormwater damage and erosion to adjacent properties.
- During and after construction, stormwater control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. to avoid the export of soil into any watercourse.
- Stormwater should not be discharged into the working areas and it should be ensured that stormwater leaving the footprint of the proposed development areas is not contaminated by any substance, whether that substance is solid, liquid, vapor or any combination thereof.
- Stockpiling of construction material and soils should be such that pollution of water resources is prevented and that the materials will be retained in a storm event.
- Drinking water and water for ablution facilities must be provided to all construction workers on the construction site.
- Waste Management
 - General Waste*
 - Expected constructed waste (unused steel, conductor cables, cement or concrete) and general waste around the construction site (plastic, tins and paper) may degrade the environment if not disposed in the correct manner.
 - Littering or illegal dumping of any waste material is prohibited.
 - No waste disposal holes may be made on site.
 - Under no circumstances should waste be burnt on site.
 - Waste separation should be encouraged for recycling purposes.
 - Provision must be made for the collection of all general waste materials. Rubbish bags and bins with lids must be provided at various points within the construction corridor and must be emptied on a regular basis.
 - Deposit solid domestic waste in containers and dispose at registered municipal waste disposal sites regularly.
 - For all waste that is disposed of, Eskom shall obtain waste manifests and disposal certificates, which shall be recorded and reported to the ECO on a monthly basis.
 - Liquid waste (grey water) must be disposed with sewerage.

Construction Waste

- Ensure compliance with stringent daily clean up requirements of site camp inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc) and dispose at municipal waste disposal sites.
- Construction waste must be collected and sold for recycling purposes as far as possible.

Sewage

- Portable ablution facilities must be placed within the construction servitude and must be serviced by registered companies only and on a regular basis. There should be one toilet for every fifteen workers.
- No effluent to be dumped in the veld or any watercourse.
- The use of the open veld for ablution is prohibited.

Hazardous Waste

- Oil contaminated waste (soil, cloths used to clean small spills, spill kits, content of drip trays, etc.) must be disposed of at a facility that is registered as a hazardous landfill facility.
- All hazardous substances at the site must be adequately stored and accurately identified, recorded and labelled. All these hazardous substances should be disposed of at a H:H registered waste disposal facility.
- Hydrocarbon (oil, diesel, petrol) waste as well as hydrocarbon containing material must be regarded as hazardous waste and separated from general waste.
- Persons who remove hazardous waste must be appropriately qualified and authorised.

AIR QUALITY

Dust created by construction vehicles could impact on air quality during the construction period.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Air quality	Low	Local	Short	Possible	Low	Very Low

Mitigation

- Sweeping of construction sites, clearing of building rubble and debris and watering of construction sites (storage areas, roads, etc.) must take place on a regular basis.

NOISE

Labourers and machinery could result in noise pollution during the construction period.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Noise	Low	Local	Short	Possible	Low	Very Low

Mitigation

- Should an onsite construction camp be necessary noise made by the workers (i.e. radios) must be limited to early evenings.
- Plan campsites an appropriate distance from any facility where it can cause a nuisance.
- Construction vehicles must be serviced on a regular basis to ensure unnecessary noise is not emitted due to poor vehicle performance.
- Eskom shall provide all necessary equipment with standard silencers and maintain silencer units on vehicles where required. Equipment must always be in good working order to minimise unnecessary noise levels.

COMMUNITY

An influx of workers could result in an increased risk for crime and safety.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Community	Low	Local	Short	Possible	Low	Very Low

Mitigation

- Construction workers must be extremely careful not to damage any property along the proposed route. Should any damage occur it should be reported to the ECO and repaired and to a state prior to the damage to the written satisfaction of the landowner and ECO.
- Removal of agricultural products is prohibited.

- No firewood may be collected.
- No open fires are to be made on private property.
- In order to prevent and/or minimise crime, it is required that all construction workers be supplied with controlled serviced accommodation or be supplied with daily transport to and from the site.
- No wandering on adjacent properties is allowed, unless written consent has been obtained from the relevant landowners.
- All adjacent landowners have to be informed of the blasting programme (if applicable) prior to any blasting taking place. Contractors must liaise personally with adjacent landowners. All communication in this regard must be documented. Blasting may only be undertaken by specialists in the field and should be limited to small localised areas. All relevant legislation must be adhered to.
- All contractors and construction workers will be issued with temporary permits to enter the property.
- All construction workers will be allowed only for specified day light hours. Transport should be made available by the contractor to remove labourers from the site after working hours.
- Secure accommodation facilities must be provided for guarding personnel.
- Supervision of labourers must at all times take place.
- Construction hours will be restricted to specific periods that exclude Sundays and public holidays.
- Sweeping of construction sites, clearing of building rubble and debris and watering of construction sites (storage areas, roads, etc.) must take place on a regular basis.
- All excavated areas must be clearly marked and barrier tape must be placed around them to prevent humans and animals from falling into them.

IMPACT EVALUATION: ROUTE TWO CORRIDOR (ALTERNATIVE)

Impacts as described above also apply to Route Two Corridor (Alternative), with additional impacts as described below.

AGRICULTURAL POTENTIAL

Insensitive placement of power lines will have a severe negative impact on current agricultural activities, such as game farming where helicopters are used extensively and agricultural land which is under irrigation.

Incorrect placement could cut through agricultural fields where centre pivot irrigation is being used and will have a severe negative impact since it is not possible to continue with this practise directly underneath power lines.

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Impact on agricultural activities	Very High	Local	Permanent	Probable	Moderate / Severe	Low

Mitigation

Route One Corridor, the preferred route alignment, will have a far less impact on agricultural activities than Route Two Corridor.

VISUAL IMPACT

Visual resource impacts would result from the construction, operation, and maintenance of the proposed 400kV transmission power lines. Impacts would result from the power lines being seen from sensitive viewpoints and from effects to the scenic values of the landscape

Impact Description	Significance Without Mitigation	Extent	Duration	Probability	Magnitude / Intensity	Significance After Mitigation
Visual impact	High	Local	Permanent	Definite	Moderate	Moderate

Mitigation

Route One Corridor, the preferred route alignment, will have a far less impact on visual resources than Route Two Corridor.

6.2.2 EXPECTED POSITIVE IMPACTS

The positive impacts of the proposed project on the environment are as follows:

- The project will result in a reliable supply of electricity to the Eskom grid – less power outages and failures are likely to occur;
- With the implementation of the project it is possible to accommodate new development and associated applications for electricity supply in the macro area;
- The proposed Eskom Strengthening Phase 4 Project is being planned in a legal, pro-active and structured manner taking all development components, potential and restrictions into account;
- The project will provide employment and training opportunities, mostly during the construction phase of the project development.

6.3 ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) was compiled and is included as Appendix F in this EIR. The implementation of the EMP will form part of the conditions of the Environmental Authorisation should the project be approved. It is therefore important that the mitigatory measures and site-specific requirements as identified during the entire Environmental Impact Assessment process are correctly reflected in the document.

The main objectives of the EMP are to ensure that

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

Specifications are supplied for the following phases of project development:

- Design & Pre-construction Phase
- Construction Phase
- Operational Phase

CHAPTER 7: CONCLUSION

7.1 LEGAL REVIEW

The objectives of the Legal Review for an Environmental Impact Assessment are the following:

- To review the processes followed with relevant to applicable legislation including the National Environmental Management Act, 1998 (Act No 107 of 1998) (NEMA); the National Environmental Management : Protected Areas Act, 2003 (Act No 57 of 2003) and the National Environmental Management : Biodiversity, 2004 (Act No 10 of 2004)
- To consider any legal issues and/or technicalities raised by the Interested & Affected Parties and provide legal opinion in respect thereof.
- To provide a legal opinion on the process followed and any legal issues emanating from that.

All the associated actions, proceedings, specialist input and relevant information as well as the Draft Scoping Report have been supplied to the Legal Review Specialist for the project. The assessment letter for the Scoping Report is included in Appendix G of the EIR.

The Draft EIR was also presented for legal review and the assessment letter is included in Appendix G. The review concluded as follows: "...we are respectfully of the view that the draft EIA adheres to the requirements of Section 31 of the Regulations".

7.2 RECOMMENDATIONS BY THE EAP

It is the professional and objective opinion of the independent EAP that the following is relevant:

- All reasonable actions were taken to identify any relevant environmental components in the study area.
- The specialist input obtained is comprehensive and effective in providing an assessment of the status quo of the study area and potentially sensitive areas and issues of concern and impact that require re-consideration of route alternatives.
- Significant and reasonable actions were taken to identify and notify all Interested & Affected Parties that include government departments, relevant authorities, general stakeholders and potentially affected landowners of the project. Extensive, continuous and significant communication with the I&AP's took place.
- The Environmental Impact Report includes all proceedings, findings and recommendations from both the Scoping Phase and EIR Phase.
- All relevant legal requirement in terms of the EIR Phase as per the Environmental Impact Assessment Regulations published on 18 June 2010 as per the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended were complied with.

The EAP can without reservation recommend this Environmental Impact Report for Environmental Authorisation by the Department of Environmental Affairs (DEA).

It is recommended that the following are included in the Environmental Authorisation:

- The implementation of the Environmental Management Plan is a condition of authorisation.
- A route corridor width of 2km is approved for the Route One Corridor (Preferred Route). The 55m servitude required by Eskom should be determined in cooperation with the directly affected landowners to accommodate site-specific requirement.
- A Route Walk-down with the Eskom Engineers, the Bird Impact Specialist, the Ecologist, the Freshwater Specialist and the Archaeologist must be undertaken once the draft positions of the pylons had been identified.
