Draft Scoping Report for the proposed relocation of three Eskom 400KV power lines that traverse Khwezela Colliery in Mpumalanga

Report Prepared for

Eskom

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Report Prepared by

srk consulting

March 2017

Draft Scoping Report for the proposed relocation of three Eskom 400KV power lines that traverse Khwezela Colliery in Mpumalanga

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SRK Project Number 512575

March 2017

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Executive Summary

Introduction and Background

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by Anglo Operations (Pty) Ltd (AOL) on behalf of Eskom Holdings SOC Ltd (Eskom) to undertake the Environmental Authorisation (EA) process required in terms of the NEMA and the EIA Regulations, 2014. Eskom proposes to relocate a section of the three 400 kV power lines that traverse Anglo Operations Limited Khwezela Colliery (formerly known as Landau Colliery Mining Right area). The project is located immediately west of the N12 freeway near eMalahleni in the Mpumalanga Province, within the Nkangala District Municipality and eMalahleni Local Municipality.

SRK has been appointed as independent assessors to carry out the specialist work needed for the Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) and to conduct the public participation process required in terms of the National Environmental Management Act (NEMA, Act No. 107 of 1998) and the regulations of December 2014.

Parallel to this environmental application Anglo is undertaking a Section 102 application and associated environmental authorisation for the reclamation of the Material Residue Deposit (MRD) with the Department of Mineral Resources. The proposed new power line route intersects with the Landau MRD 3, which is located off the N12 on the farm Klipfontein 322 JS, portion 27 and 28.

Scope of this report

This report describes the proposed activity and its context, details the stakeholder engagement process, presents the results of the Scoping Phase and sets out the Plan of Study for the Impact Assessment Phase. The Scoping Report has been prepared in accordance with Section 21 of the EIA Regulations, 2014. The report consists of the following sections:

- Introduction
- Governance Framework and Environmental Process
- Outlines the approach to the environmental process.
- Project Description
- Description of the biophysical and social environment
- Stakeholder Engagement
- Potential Environmental and Social Impacts
- Plan of Study for the EIA
- Conclusions and Recommendations

Governance Framework

There are a number of regulatory requirements at local, provincial and national level with which the proposed project must conform. Some of the key environmental legal requirements include the following:

- Constitution of the Republic of South Africa, (Act No. 108 of 1996)
- National Environmental Management Act 107 of 1998, as amended (NEMA)
- EIA Regulations 2014, promulgated in terms of NEMA
- National Water Act 36 of 1998 (NWA)

- National Heritage Resources Act 25 of 1999 (NHRA)
- National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA)

The National Environmental Management: Waste Act 59 of 2008 (NEM:WA) aims to (amongst other things) regulate waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. This project does not trigger any waste activities.

Project Description and Motivation

The current power line route is at risk as it extends across historic shallow underground mining operations contributing to the formation of sinkholes. In the event of tower structures collapsing due to the instability caused by the sinkholes this could result in disruption in continued power supply to the National Grid. In addition, Eskom cannot gain access to these areas to maintain the power lines, necessitating rerouting of the power line. Eskom and AOL have partnered and jointly employed resources to address this concern.

The towers that are currently at risk are the following:

- Duvha – Apollo 400kV line: tower 295 to tower 304
- Duvha – Kusile 400kV line: tower 42 to 51
- Duvha – Vulcan No 2: tower 42 to 51

In order to prevent power disruption Eskom proposed to reroute the three 400kV power lines.

Project Alternatives

AOL together with Eskom explored four options aiming to avoid areas with high potential for sinkhole development as well as prevent the sterilization of resources. After the analysis was undertaken Option 1 was the preferred option.

Project Phases

The entire life cycle for a new transmission line includes the following primary phases:

Feasibility phase - This includes the following:

- Selecting a suitable corridor for the route of the proposed transmission line and execution of an EIA process. Servitude negotiations are also initiated during this phase; and
- Eskom and environmental specialists (e.g. ecologist, heritage) conduct a walk-down survey to determine the exact locations of the towers, based on sensitive environmental features and technical criteria.

This project is currently in the Feasibility phase.

Planning and design phase - This phase, which is only undertaken should environmental authorisation be obtained, includes the following:

- Aerial survey of the route;
- Selection of the most appropriate structures; and
- Preparation of relevant planning documentation, including technical and design documentation.

Construction phase – During the implementation of the project, the construction activities related to the installation of the necessary infrastructure and equipment is undertaken.

Operational phase - This includes operational activities associated with the maintenance and control of the power lines.

Decommissioning - This phase will include measures for complying with regulatory requirements, rehabilitation and managing environmental impacts of the decommissioning of the existing power lines.

Biophysical and Socio- economic Environment

This section of the report describes the biophysical trends of the project environment, prior to commencement of the proposed relocation of the power lines.

Topography

The natural topography of the area has generally been disturbed by mining activities in the region.

Geology

The eMalahleni area is underlain by the Karoo supergroup. The Karoo Supergroup comprises mainly a sedimentary succession of sandstone, siltstone, shale, mudstone, coal, diamictite and tillite. The Karoo Supergroup is lithostratigraphically subdivided into the Dwyka, Ecca and Beaufort groups, succeeded by the Molteno, Elliot and Clarens formations and the Drakensburg Formation.

Climate

The area lies in the summer rainfall region (Eastern Highveld) of Southern Africa, with cold and dry winters, and warm and wet summers. Temperatures range from 9°C to 32°C in summer and from 6°C to 22°C in winter.

Soils and land use

From previous studies in the area nine dominant soil units were identified within the pre-mining land use area. These included: Hu1, Hu2, Cv1, Cv2, Av1, Gc1, Lo1, Lo2, and Ka. The area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation.

Surface water

The study area is located within the Olifants River Catchment (Primary Catchment B). The main tributary is the Naauwpoortspruit (Noupoort), which discharges directly into the upper reaches of the Witbank Dam.

Groundwater

A hydrocensus of boreholes on and surrounding area was conducted in 2013, during which all private groundwater users were surveyed within a 1 km radius. During the hydrocensus, all available details of boreholes and borehole-owners were collected (AquiSceince, 2014). This information was used to identify the Interested and Affected Parties which may be impacted upon by the mining activities, specifically relating to impacts on water quantity and quality.

Air Quality

Key sources of particulate pollution are likely to be mining and industrial operations. Sources north-west of the project area are dominant contributors of pollution in the study area, based on available meteorological data. Although apportionment of dust deposition to mining and transport sources close to the site was without reasonable doubt, the sources of suspended particulate matter may have extended further than the immediate industrial and mining operations, up to a distance of 10 km.

Biodiversity

The area falls within the Grassland Biome and more specifically the Mesic Grassland. Approximately 43 species of the 164 mammal species recorded for Mpumalanga, could occur within the study area.

Wetlands

The wetland systems in the area can be split into six wetland complexes/groups namely:

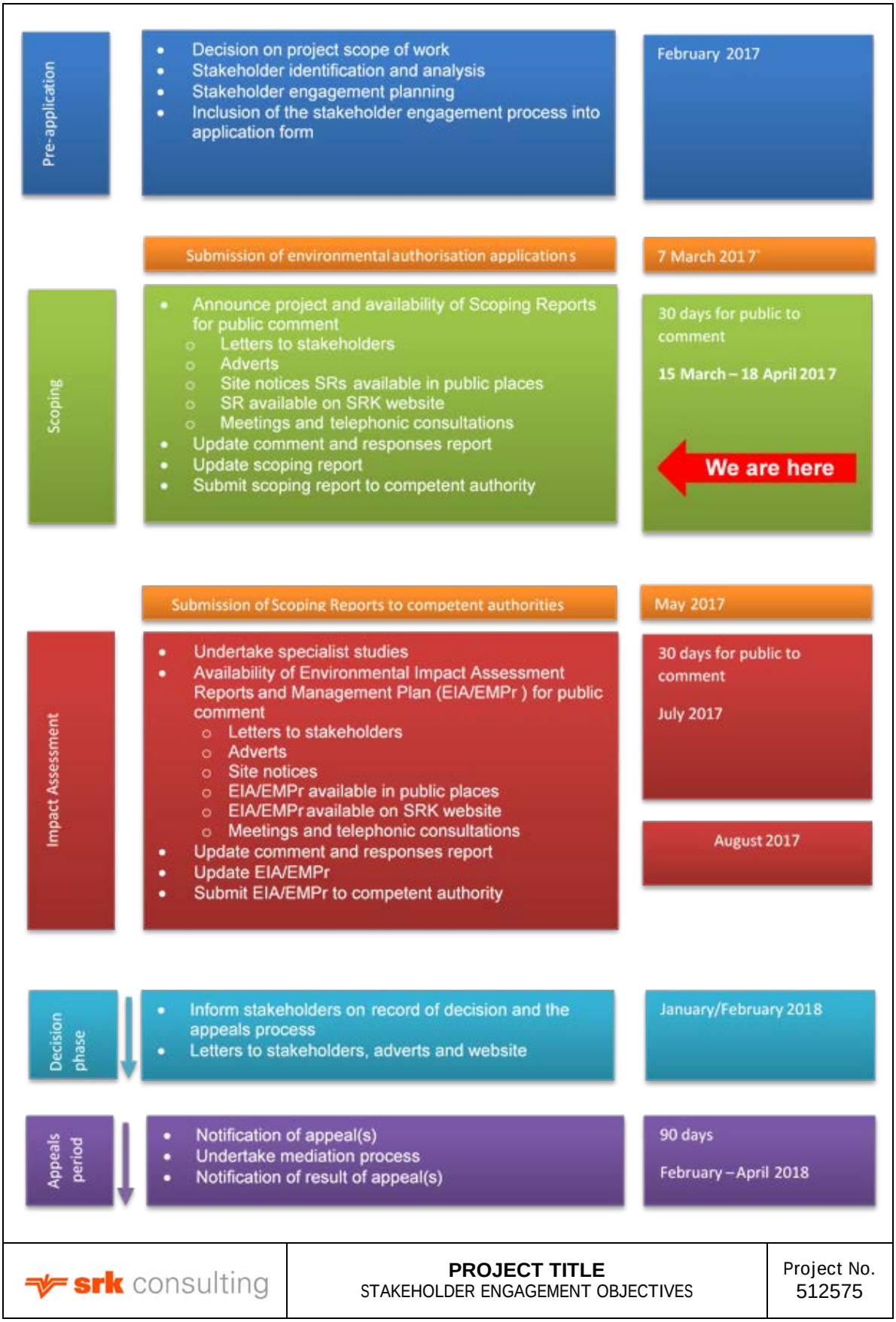
- Naauwpoortspruit wetland system
- Vleishaft Dam wetland system
- Tweefonteinspruit wetland system
- Olifants River wetlands
- Clydesdale pan wetland system
- Remaining pan wetlands

Socio-economic

The project is located within the Emalahleni Local Municipality (ELM). The ELM had the largest population size of 435,217 persons in 2007. The municipality is also the most populated in the district with a population density of 162.54 persons per square meter. The provision of educational services to a population, in the ELM is higher compared to most municipalities in Mpumalanga province. Employment opportunities are favourable in the ELM, roughly 61% for males and 38% for females, were employed in 2007. The majority of households have access to safe water either through pipes to within the dwelling, or access it from a point outside the dwelling. In 2001, over two thirds (75%) of households in the municipality either had a flushed toilet or pit latrine without ventilation. Electricity was the leading source of energy for all uses; however, it declined somewhat between 2001 and 2007 in the ELM.

Stakeholder Engagement

The objectives of stakeholder engagement are outlined below:


Pre-application
Decision on project scope of work
Stakeholder identification and analysis
Stakeholder engagement planning
Inclusion of the stakeholder engagement process into application form
February 2017
Submission of environmental authorisation applications
7 March 2017
Scoping
Announce project and availability of Scoping Reports for public comment
Letters to stakeholders
Adverts
Site notices SRs available in public places
SR available on SRK website
Meetings and telephonic consultations
Update comment and responses report
Update scoping report
Submit scoping report to competent authority
30 days for public to comment
15 March – 18 April 2017
We are here
Submission of Scoping Reports to competent authorities
May 2017
Impact Assessment
Undertake specialist studies
Availability of Environmental Impact Assessment Reports and Management Plan (EIA/EMPr) for public comment
Letters to stakeholders
Adverts
Site notices
EIA/EMPr available in public places
EIA/EMPr available on SRK website
Meetings and telephonic consultations
Update comment and responses report
Update EIA/EMPr
Submit EIA/EMPr to competent authority
30 days for public to comment
July 2017
August 2017
Decision phase
Inform stakeholders on record of decision and the appeals process
Letters to stakeholders, adverts and website
January/February 2018
Appeals period
Notification of appeal(s)
Undertake mediation process
Notification of result of appeal(s)
90 days
February – April 2018
srk consulting
PROJECT TITLE
STAKEHOLDER ENGAGEMENT OBJECTIVES
Project No.
512575

Potential Environmental and Social Impacts

The impacts of a project are mostly linked to the sensitivity of the receiving environment and proximity of receptors, the extent or footprint and nature of the development, potential risks in an emergency situation and stakeholders' perceptions. Below is a table outlying the potential impacts for the project.

Aspect	Impact
Topography	• Visual impact on ridges • Erosion of affected areas on steep slopes
Surface Water	• Impacts where access roads and the transmission lines cross watercourses • Inadequate stormwater management on access roads • Damage to towers from major flood events
Geology and Soil	• Erosion on steep slopes
Flora	• Removal of vegetation for stringing, building of new access roads, tower construction and construction camp(s) establishment • Encroachment by exotic species through inadequate eradication programme. • Clearing of vegetation along maintenance road.
Fauna	• Risk to birds from collision with infrastructure and from electrocution • Impacts to livestock
Socio-economic	• Loss of land with extension of existing servitude • Relocation of structures situated within servitude
Agricultural Potential	• Loss of agricultural land • Impacts to livestock
Archaeological and Cultural Features	• Damage to heritage resources
Transportation	• Damage to roads by heavy construction vehicles • Use of maintenance roads

Plan of Study for EIA

Description of the Proposed EIA Process

The Impact Assessment Phase can be divided into key steps, namely:

- Consultation with relevant authorities;
- Specialist studies;
- Compilation of an EIA Report and an Environmental Management Programme (EMPr);
- Stakeholder engagement; and
- Submission of the Final EIA Report and EMPr to the competent authority, in this case DEA.

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Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd (SRK) by Eskom Holdings SOC Ltd (Eskom). The opinions in this Report are provided in response to a specific request from Eskom to do so. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

1 Introduction

1.1 Background of the project

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed by Anglo Operations (Pty) Ltd (AOL) on behalf of Eskom Holdings SOC Ltd (Eskom) to undertake the Environmental Authorisation (EA) process required in terms of the NEMA and the EIA Regulations, 2014. Eskom proposes to relocate three 400 kV power linesthat traverse AOL Khwezela Colliery (formerly known as Landau Colliery Mining Right area). The project is located immediately west of the N12 freeway near eMalahleni in the Mpumalanga Province, within the Nkangala District Municipality and eMalahleni Local Municipality. The current powerline route is at risk as it extends across historic shallow underground mining operations contributing to the formation of sinkholes. In the event of tower structures collapsing due to the instability caused by the sinkholes this could result in disruption in continued power supply to the National Grid. In addition, Eskom cannot gain access to these areas to maintain the power lines, necessitating rerouting of the powerline (Figure 1-1). Eskom and AOL have partnered and jointly employed resources to address this concern.

The towers that are currently at risk are the following:

- Duvha – Apollo 400kV line: tower 295 to tower 304;
- Duvha – Kusile 400kV line: tower 42 to 51; and
- Duvha – Vulcan No 2: tower 42 to 51.

In order to prevent power disruption Eskom proposed to reroute the three 400kV power lines.

An Environmental Impact Assessment (EIA) authorisation application is required in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (promulgated in terms of NEMA) for the Eskom 400kV relocation project, which is submitted to the Department of Environment Affairs (DEA) for review and approval. A Scoping and Environmental Impact Reporting (S&EIR, also referred to as an EIA) process is required to support an application for EA.

Parallel to this environmental application Anglo is undertaking a Section 102 application and associated environmental authorisation for the reclamation of the Material Residue Deposit (MRD) with the Department of Mineral Resources. The proposed new powerline route intersects with the Landau MRD 3, which is located off the N12 on the farm Klipfontein 322 JS, portion 27 and 28.

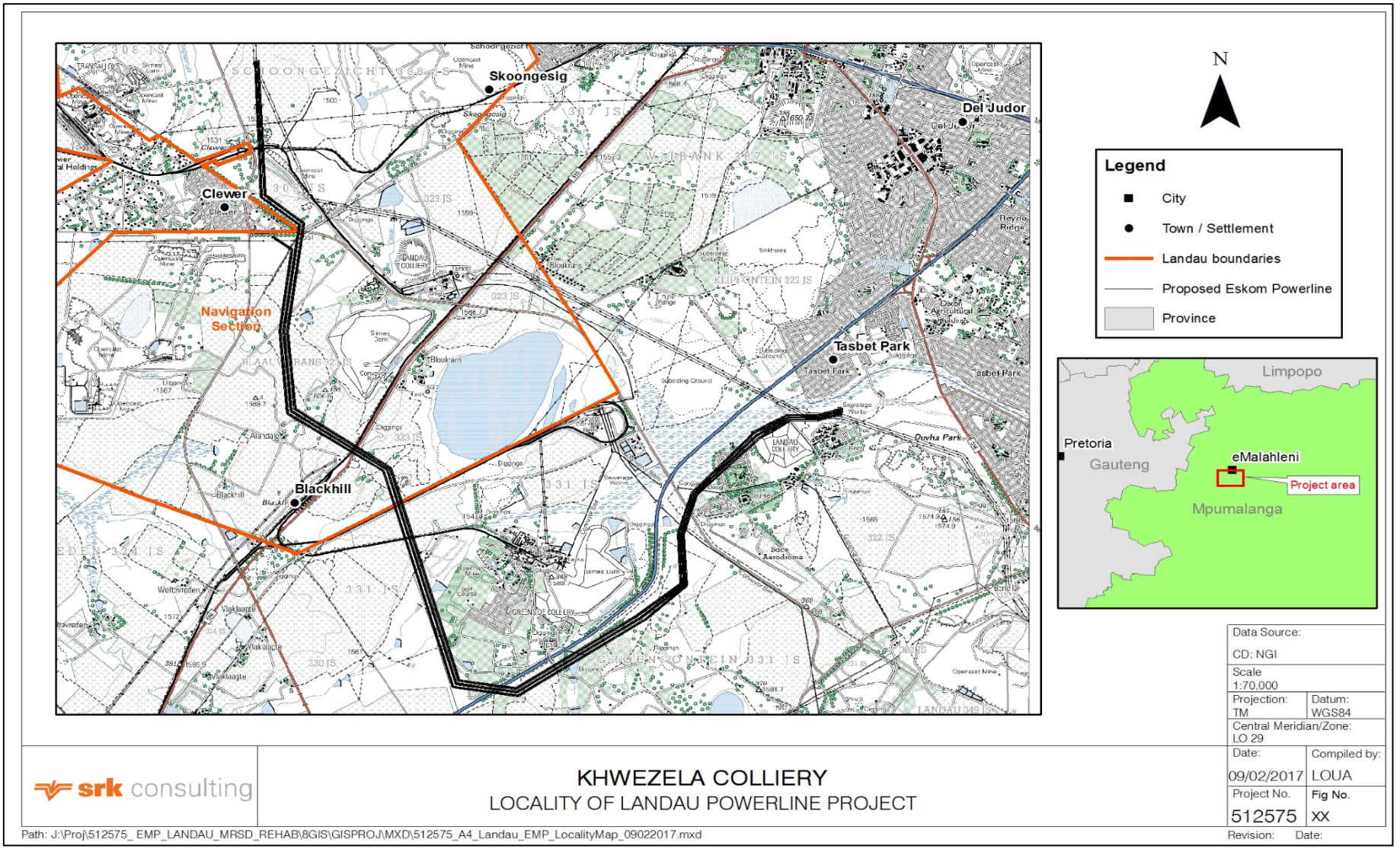


Figure 1-1: Power line locality map

1.2 Landowner and Farm Boundaries

AOL is the landowner where the power line transverses through. The power lines cuts through the following farms Table 1-1.

Table 1-1: Farm names and portion numbers

Farm names and portion numbers	Klipfontein 322 JS portion 28 Klipfontein 322 JS portion 27 Klipfontein 322 JS portion 209 Groenfontein 331 JS portion RE Groenfontein 331 JS portion 3 Groenfontein 331 JS portion 11 Groenfontein 331 JS portion 2 Blaauwkrans 323 JS portion 29 Blaauwkrans 323 JS portion 1 Blaauwkrans 323 JS portion 2 Blaauwkrans 323 JS portion 3 Blaauwkrans 323 JS portion 23 Schoongezicht 308 JS portion RE Schoongezicht 308 JS portion 65 Elandsfontein 309 JS portion 2

1.3 Purpose of the Report

This document is intended to guide the EIA process, stakeholder engagement process and specialist studies by:

- Providing an overview of the legal requirements, including the NEMA, amendments with regard to the proposed project, the proposed project description and anticipated environmental and social issues and impacts that will be further investigated in the EIA;
- Setting out the proposed stakeholder engagement process; and
- Setting out the scope of the EIA process and the Terms of Reference (ToR) for specialist studies and outlining the approach and methodologies to be used in the EIA process, e.g. the proposed impact rating methodology.

This report will be submitted to the National DEA for review and consideration.

1.4 Structure of the Report

This report describes the proposed activity and its context, details the stakeholder engagement process, presents the results of the Scoping Phase and sets out the Plan of Study for the Impact Assessment Phase. The Scoping Report has been prepared in accordance with Section 21 of the EIA Regulations, 2014. The report consists of the following sections:

Section 1: Introduction

Provides an introduction and background to the proposed project and outlines the purpose of this document and the assumptions and limitations applicable to the study.

Section 2: Governance Framework and Environmental Process

Provides a brief summary and interpretation of the relevant legislation as well as pertinent strategic planning documents.

Section 3: Outlines the approach to the environmental process.

Section 4: Project Description

Describes the location and current status of the site and provides a brief summary of the surrounding land uses as well as background to and a motivation for the project.

Section 5: Description of the biophysical and social environment

Briefly describes the biophysical and socio-economic characteristics of the affected environment that will be considered in the assessment of potential project impacts.

Section 6: Stakeholder Engagement

Details the stakeholder engagement activities conducted during the Scoping Phase.

Section 7: Potential Environmental and Social Impacts

Identifies the potential impacts associated with the project that will require investigation during the Impact Assessment Phase.

Section 8: Plan of Study for the EIA

Presents the proposed approach to the Impact Assessment Phase, outlines the methodology that will be adopted in assessing the potential impacts during the Impact Assessment Phase, identifies the specialist studies that are required and proposes the preliminary scope of work for these studies.

Section 9: Conclusions and Recommendations

Summarises the key findings of the Scoping Phase and outlines the way forward in the Impact Assessment Phase.

1.5 Assumptions and Limitations

As is standard practice, this Scoping Report is based on a number of assumptions and is subject to certain limitations. These are as follows:

- It is assumed that information provided by Eskom, Anglo and the existing specialist studies are accurate;
- A more detailed project description will be presented in the EIA Report;
- Detailed assessment of the potential positive and negative environmental impacts of the proposed development will only be undertaken during the Impact Assessment Phase;
- The EIA does not constitute a risk assessment addressing e.g. risk of rupture, explosion and/or fire; and
- The existing pylons will be decommissioned in accordance with the Eskom Decommissioning Plan. More detail will be provided in the EIA phase

Notwithstanding the above, SRK is confident that these assumptions and limitations do not compromise the overall findings of this report.

1.6 Company Profile and Independence

SRK Global is the overarching company of the SRK Group companies and is the global investment vehicle for employee shareholders.

SRK Group Consulting Practices (CPs) now employ approximately 1500 staff operating from more than 50 established offices on six continents.

SRK Consulting employs leading specialists in the fields in which it offer services. It's seamless integration of services and global base has raised its reputation in technical advice, feasibility studies, due diligence and confidential internal reviews.

Among SRK's 1500 clients are many of the world's major and medium sized mining companies, exploration companies, banks, construction companies and government bodies.

Established in 1974, SRK has over the years grown into a large consulting practice with a broad client base worldwide. Whilst the Group operated initially as specialist consultants in the geotechnical field, the growth of the Group has led to diversification into related engineering fields of mining, civil, mechanical and electrical mineral processing, hydrology and environmental.

The Group's independence is ensured by the fact that it is strictly a consultancy organisation, not holding equity in any project and with ownership primarily by staff. This permits its consultants to provide clients with conflict-free and objective support on crucial issues.

SRK has a demonstrated record of accomplishment of undertaking independent assessments of resources and reserves, project evaluations and audits, listing reports and independent feasibility studies to bankable standards on behalf of exploration companies, mining companies and financial institutions worldwide.

1.7 Expertise of the Project Team

SRK believe that an experienced and multi-disciplined team is required to fulfil the requirements of the scope of work up to and including the finalised report, the following personnel will be made available to this project:

Darryll Kilian (MA HDE (UCT), CEAPSA) – Partner: Darryll Kilian is an experienced and professionally certified environmental assessment practitioner with over 24 years of experience. Darryll Kilian has a Masters in Environmental and Geographical Science from the University of Cape Town in South Africa. Darryll is a Principal Environmental Consultant and Partner of SRK Consulting (South Africa), and presently heads the Environmental Department in SRK Johannesburg. He has worked on a wide range of environmental and social projects throughout Africa. He regularly participates in due diligence audits and reviews for companies and lenders projects. He serves as project partner on large environmental and social impact assessments including in the mining sector.

Beth Candy (MSc, Pr.Sci.Nat.) - Project Manager: Beth is an environmental scientist with more than 12 years' experience in environmental impact assessments and environmental management. With a strong background in Geology (BSc Hons Geology) her core experience and expertise is in the mining industry sector, focusing on Risk Assessments, Environment Impact Assessments (EIA), Environmental Management Programmes (EMP), Water Use Licence Applications (WULA), due diligence and integrated regulatory processes. Her involvement in such projects varies from project management and co-ordination, to the complication and review of technical and environmental documents and reports. In the mining sector she has been involved in the authorisation of EIAs, EMPs and WULAs for both underground and opencast mining operations, as well as the associated activities such as ash facilities, waste disposal facilities, conveyors routes, access roads, dragline walkways, pollution control and other dams, stream diversions, undermining of wetlands, pipelines and oil and fuel storage facilities amongst others. Other experience includes industrial sector projects and construction projects.

Natasha Anamuthoo (BSoc Sc. Honours, CEAPSA) – Project Manager / Reporting: Natasha is a Senior Environmental Scientist at SRK Consulting (Johannesburg) with over 9 years of experience in environmental management field. Natasha holds a degree in Environmental Management from the University of Kwa-Zulu Natal. Natasha is a Certified Environmental Assessment Practitioner of South Africa. Natasha has been involved in numerous petroleum and industrial environmental impact

assessments and basic assessments within South Africa. Currently she is involved in large-scale mining related projects for various clients such as Anglo American Platinum, ENRC and PPC Cement. Natasha has also been involved in a number of stakeholder engagement implementation processes for various petroleum, industrial and mining projects. She has also been involved in some environmental control officer and auditing work within the industrial and linear related projects. Natasha is also a member of the Golden Key Society, the International Association of Impact Assessments and the Society for Human Geographers of South Africa.

Avril Owens (BSc Hons Botany and Zoology) – WULA Specialist: Avril has been involved in the Environmental & Water quality management field for the past 12 years. Her expertise includes surface water quality monitoring, assessment, training and capacity building, water use licensing, pollution source identification and control, characterisation of wastewater and surface waters and integrated water resource management.

Lysette Rothmann-Guest (BL) - Stakeholder Engagement Specialist: Lysette is a senior stakeholder engagement consultant with 25 years' experience in stakeholder engagement and environmental management. Her expertise includes design and implementation of stakeholder engagement processes and engagement facilitation for Environmental and Social Impact Assessments (ESIAs) in Africa and South Africa, in compliance with international good practice and in country regulatory requirements. Lysette also worked closely with international consortium teams to develop innovative stakeholder engagement processes for implementing new technologies in the South African Context.

2 Governance Framework

2.1 South African Legislation

There are a number of regulatory requirements at local, provincial and national level with which the proposed project must conform. Some of the key environmental legal requirements include the following:

- Constitution of the Republic of South Africa, (Act No. 108 of 1996);
- National Environmental Management Act 107 of 1998, as amended (NEMA);
- EIA Regulations 2014, promulgated in terms of NEMA;
- National Water Act 36 of 1998 (NWA);
- National Heritage Resources Act 25 of 1999 (NHRA);
- National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA);

The National Environmental Management: Waste Act 59 of 2008 (NEM:WA) aims to (amongst other things) regulate waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation. This project does not trigger any waste activities.

A brief summary of SRK's understanding of the relevant Acts and Regulations that are applicable to this study is provided below. Note that other legislative requirements may also pertain to the project. As such, the summary provided below is not intended to be definitive or exhaustive, and serves only to highlight key environmental legislation and obligations.

2.1.1 Constitution of the Republic of South Africa, Act 108 of 1996

Section 24 of the Constitution enshrines the right to the environment. Everyone has the right to:

- *To an environment that is not harmful to their health or well-being; and*
- *To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that —*
- *Prevent pollution and ecological degradation;*
- *Promote conservation; and*
- *Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.*

Legal requirements for this project:

Eskom (the proponent) has a responsibility to ensure that the proposed activities and the S&EIR process conform to the principles of the Constitution. The proponent is obliged to take actions to prevent pollution or degradation of the environment in terms of Section 24 of the Constitution, and to ensure that the environmental impacts associated with the project are considered, and mitigated where possible.

2.1.2 National Environmental Management Act 107 of 1998, as Amended

NEMA establishes a set of principles which all authorities have to consider when exercising their powers. These include the following:

- Development must be sustainable;

- Pollution must be avoided or minimised and remedied;
- Waste must be avoided or minimised, reused or recycled;
- Negative impacts must be minimised; and
- Responsibility for the environmental consequences of a policy, project, product or service applies throughout its life cycle.

Section 28(1) states that *"every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring"*. If such degradation/pollution cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution.

These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution; and
- Remedying the effects of the pollution.

Legal requirements for this project:

Eskom (the proponent) has a responsibility to ensure that the proposed activities and the S&EIR process conform to the principles of NEMA. The proponent is obliged to take actions to prevent pollution or degradation of the environment in terms of Section 28 of NEMA, and to ensure that the environmental impacts associated with the project are considered, and mitigated where possible.

2.1.3 EIA Regulations, 2014

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities which may not commence without an EA issued by the competent authority (DEA). In this context, the EIA Regulations, 2014 (GN R982, which came into effect on 8 December 2014), promulgated in terms of NEMA, govern the process, methodologies and requirements for the undertaking of EIAs in support of EA applications. Listing Notices 1-3 in terms of NEMA list activities that require EA ("NEMA listed activities").

GN R982 of the EIA Regulations lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment (BA) process or a S&EIR process is required to obtain EA. Listing Notice 1[1] lists activities that require a BA process, while Listing Notice 2[2] lists activities that require S&EIR. Listing Notice 3[3] lists activities in certain sensitive geographic areas that require a BA process.

The regulations for both processes – BA and S&EIR - stipulate that:

- Public participation must be undertaken as part of the assessment process;
- The assessment must be conducted by an independent EAP;

[1] GN R983 of 2014
[2] GN R984 of 2014
[3] GN R985 of 2014

The relevant authorities must respond to applications and submissions within stipulated time frames;

- Decisions taken by the authorities can be appealed by the proponent or any other Interested and Affected Party (I&AP); and
- A draft Environmental Management Programme (EMPr) must be compiled and released for public comment.

GN R982 sets out the procedures to be followed and content of reports compiled during the BA and S&EIR processes.

The NEMA National Appeal Regulations4 make provision for appeal against any decision issued by the relevant authorities. In terms of the Regulations, an appeal must be lodged with the relevant authority in writing within 20 days of the date on which notification of the decision (EA) was sent to the applicant or I&AP (as applicable). The applicant, the decision-maker, interested and affected parties and organ of state must submit their responding statement, if any, to the appeal authority and the appellant within 20 days from the date of receipt of the appeal submission.

The project includes activities that are listed in terms of the EIA Regulations, 2014 and thus need EA (see Table 2-1).

Table 2-1: NEMA listed activities applicable to the project

Listed activity as described in GN R. 983, GN R. 984 and GN R.985	Description of project activity that may trigger the listed activity
GN R.983 Item 12 (iii and xii): The development of: (i) Bridges exceeding 100m^2 in size (ii)infrastructure of structures with a physical footprint of 100m2 or more where such development occurs- (a)within watercourse	Construction of foundations
GN R.983 Item 14: The development of: The development of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80m^3 but not exceeding 500m^3;	Storage of diesel and oil during the construction phase of the project for machinery and construction vehicles.
GN R.983 Item 19: The infilling or depositing of any material of more than 5m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5m^3 from (i) a watercourse;	Construction of foundations of pylons
GN R.983 Item 24: The development of (i) a road for which an environmental authorization was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010 or. (ii) a road with a reserve wider than 13.5 meters or where no reserve exists where the road is wider than 8 meters, But excluding- roads which are identified and included in activity 27 in Listing Notice 2 of 2014; or roads where the entire road falls within an urban area	Access roads for construction

[4] GN R993 of 2014, as amended by GN R205 of 2015.

Listed activity as described in GN R. 983, GN R. 984 and GN R.985	Description of project activity that may trigger the listed activity
GN R.983 Item 28 (ii): Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agricultural or afforestation on or after 01 April 1998 and where such development: (ii)will occur outside an urban area, where the total land to be developed is bigger than 1ha	Construction of the power lines
GN R.983 Item 31: The decommissioning of existing facilities, structures or infrastructure, for- (i)any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 2 of 2014	Decommissioning of the existing power lines
GN R.983 Item 56:The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometer- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 meters- excluding widening or lengthening occurring inside urban areas.	Access roads for construction
GN R.984 Item 9: The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex	Development of three 400kV power lines
GN R.985 Item 4: The development of a road wider than 4 meters with a reserve of less than 13.5m	Access roads for construction
GN R.985 Item 10: The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30m^2 but not exceeding 80m^3	Storage of diesel and oil during the construction phase of the project for machinery and construction vehicles.

Legal requirements for this project:

As such, the proponent is obliged to apply for EA for these listed activities and to undertake an S&EIR process in support of the application, in accordance with the procedure stipulated in GN R982, GN R983, GN R984 and GN R985 under NEMA.

2.1.4 National Water Act 36 of 1998

Water use in South Africa is controlled by the NWA. The executive authority is the Department of Water and Sanitation (DWS). The NWA recognises that water is a scarce and unevenly distributed national resource in South Africa. Its provisions are aimed at achieving sustainable and equitable use of water to the benefit of all users and to ensure protection of the aquatic ecosystems associated with South Africa's water resources. The provisions of the Act are aimed at discouraging pollution and wastage of water resources.

In terms of the Act, a land user, occupier or owner of land where an activity that causes or has the potential to cause pollution of a water resource has a duty to take measures to prevent pollution from occurring. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects, and to recover all reasonable costs from the responsible party.

Section 21 of the NWA specifies a number of water uses, including:

(a) taking water from a water resource; and

(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

These water uses require authorisation in terms of Section 22 (1) of the Act, unless they are listed in Schedule 1 of the NWA, are an existing lawful use, fall under a General Authorisation issued under section 39 or if the responsible authority waives the need for a licence.

Legal requirements for this project:

The proposed project activities may trigger water use activities in terms of Section 21 (c) of the NWA for Impeding or diverting the flow of water in a watercourse for the pylons as well as Section 21 (i) for altering the bed, banks, course or characteristics of a watercourse. No Water Use Licence (WUL) is required for the project, however a General Authorisation (GA) is required to be undertaken and the competent authority, in this case DWS.

From correspondence with DWS, it was confirmed that the proposed project activities do not trigger a full water use in terms of Section 21 of the NWA, and therefore only a GA will be submitted to the DWS. required

2.1.5 National Heritage Resources Act 25 of 1999

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (NRHA). The enforcing authority for this act is the South African National Heritage Resources Agency (SAHRA). The National Heritage Resources Act aims to promote good management of cultural heritage resources and encourages the nurturing and conservation of cultural legacy so that it may be bestowed to future generations.

The Act requires all developers (including mines) to undertake cultural heritage studies for any development exceeding 0.5 ha. It also provides guidelines for impact assessment studies to be undertaken where cultural resources may be disturbed by development activities.

SAHRA will need to approve the heritage assessment undertaken as part of the impact assessment process.

Legal requirements for this project:

As part of the impact assessment process, a heritage assessment of the project area will be undertaken. This assessment will be uploaded on the SAHRA site along with the EIA/EMP and will require approval should any sites of cultural heritage significance be identified within the project footprint.

2.1.6 National Environmental Management: Biodiversity Act 10 of 2004

The purpose of the NEM:BA is to provide for the management and conservation of South Africa's biodiversity and the protection of species and ecosystems that warrant national protection. The NEM:BA makes provision for the publication of bioregional plans and the listing of ecosystems and species that are threatened or in need of protection. Threatened or Protected Species Regulations (2007), Guidelines for the determination of bioregions and the preparation and publication of bioregional plans (2009) and a National List of Ecosystems that are Threatened and in Need of Protection (2011) have been promulgated in terms of NEM:BA.

A published bioregional plan is a spatial plan indicating terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. These areas are referred to as Critical Biodiversity Areas (CBAs) in terms of NEM:BA. Bioregional plans provide guidelines for avoiding the loss or degradation of natural habitat in CBAs with the aim of informing EIAs and land-use planning (including Environmental Management Frameworks [EMFs], Spatial Development Frameworks [SDFs], and Integrated Development Plans [IDPs]).

Permits to carry out a restricted activity involving listed threatened or protected species or alien species may only be issued after an assessment of risks and potential impacts on biodiversity has been undertaken.

Legal requirements for this project:

Although no CBAs or Ecological Support Areas (ESAs) are located in the project area the impacts of the project on the biodiversity of the area will need to be assessed.

2.1.7 Other Relevant Energy Sector Strategic Documents

The EIA further considered Energy Sector Strategic Documents, including the following:

- White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- Eskom's Transmission Development Plan;
- Integrated Energy Plan;
- Integrated Strategic Electricity Planning (ISEP);
- Electricity Regulation Act (Act 4 of 2006) as amended;
- National Electricity Response Plan (NERP) (2008);
- National Guidelines on Environmental Impact Assessment for facilities to be included in the Electricity;
- Response Plan (2008); and
- Environmental Impact Assessment Guidelines for transmission lines within the Southern African Power Pool Region (1999).

3 Environmental Assessment Process

The general approach to this study is guided by the principles contained in Section 2 of NEMA and those of Integrated Environmental Management (IEM).

NEMA lists a number of principles that apply to the actions of organs of state and that also serve as reference for the interpretation of environmental legislation and administration of environmental processes. The principles most relevant to environmental assessment processes and projects for which authorisation is required are summarised below.

Principles relevant to the EIA process:

- *Adopt a risk-averse and cautious approach;*
- *Anticipate and prevent or minimise negative impacts;*
- *Pursue integrated environmental management;*
- *Involve stakeholders in the process; and*
- *Consider the social, economic and environmental impacts of activities.*

Principles relevant to the project:

- *Place people and their needs at the forefront of concern and serve their needs equitably;*
- *Ensure development is sustainable, minimises disturbance of ecosystems and landscapes, pollution and waste, achieves responsible use of non-renewable resources and sustainable exploitation of renewable resources;*
- *Assume responsibility for project impacts throughout its life cycle; and*
- *Polluter bears remediation costs.*

This S&EIR process complies with these principles through its adherence to the EIA Regulations, 2014, and associated guidelines, which set out clear requirements for, *inter alia,* impact assessment and stakeholder involvement (see below), and through the assessment of impacts and identification of mitigation measures during the Impact Assessment Phase.

In accordance with the IEM Information Series (DEAT, 2004), an open, transparent approach, which encourages accountable decision-making, has been adopted.

The underpinning principles of IEM require:

- *Informed decision making;*
- *Accountability for information on which decisions are made;*
- *A broad interpretation of the term "environment";*
- *An open participatory approach in the planning of proposals;*
- *Consultation with interested and affected parties;*
- *Due consideration of alternatives;*
- *An attempt to mitigate negative impacts and enhance positive impacts of proposals;*
- *An attempt to ensure that the social costs of development proposals are outweighed by the social benefits;*
- *Democratic regard for individual rights and obligations;*
- *Compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and*
- *The opportunity for public and specialist input in the decision-making process.*

The study will also be guided by the requirements of the EIA Regulations, 2014, which are more specific in their focus and define the detailed approach to the S&EIR process, as well as relevant guidelines published by the DEA and in the absence of national guidelines, the Department of Environmental Affairs and Development Planning (DEA&DP), including:

- DEA's Draft Companion to Environmental Impact Assessment Regulations of 2010 (DEA, 2010);
- DEA&DP's EIA Guideline and Information Document Series (DEA&DP, 2013), which includes guidelines on Generic ToR for EAPs and Project Schedules, Public Participation, Alternatives, Need and Desirability, Exemption Applications and Appeals, an information; and
- DEA&DP's "One Environmental Management System" and the 2014 EIA Regulations Circular (DEA&DP, 2014).

The competent authority for this project will be the National DEA.

3.1 Scoping and Environmental Impact Assessment Process

The Environmental Authorisation process consists of three phases, namely the Scoping Phase *(the current phase)* and an Impact Assessment Phase (Figure 3-1 below).

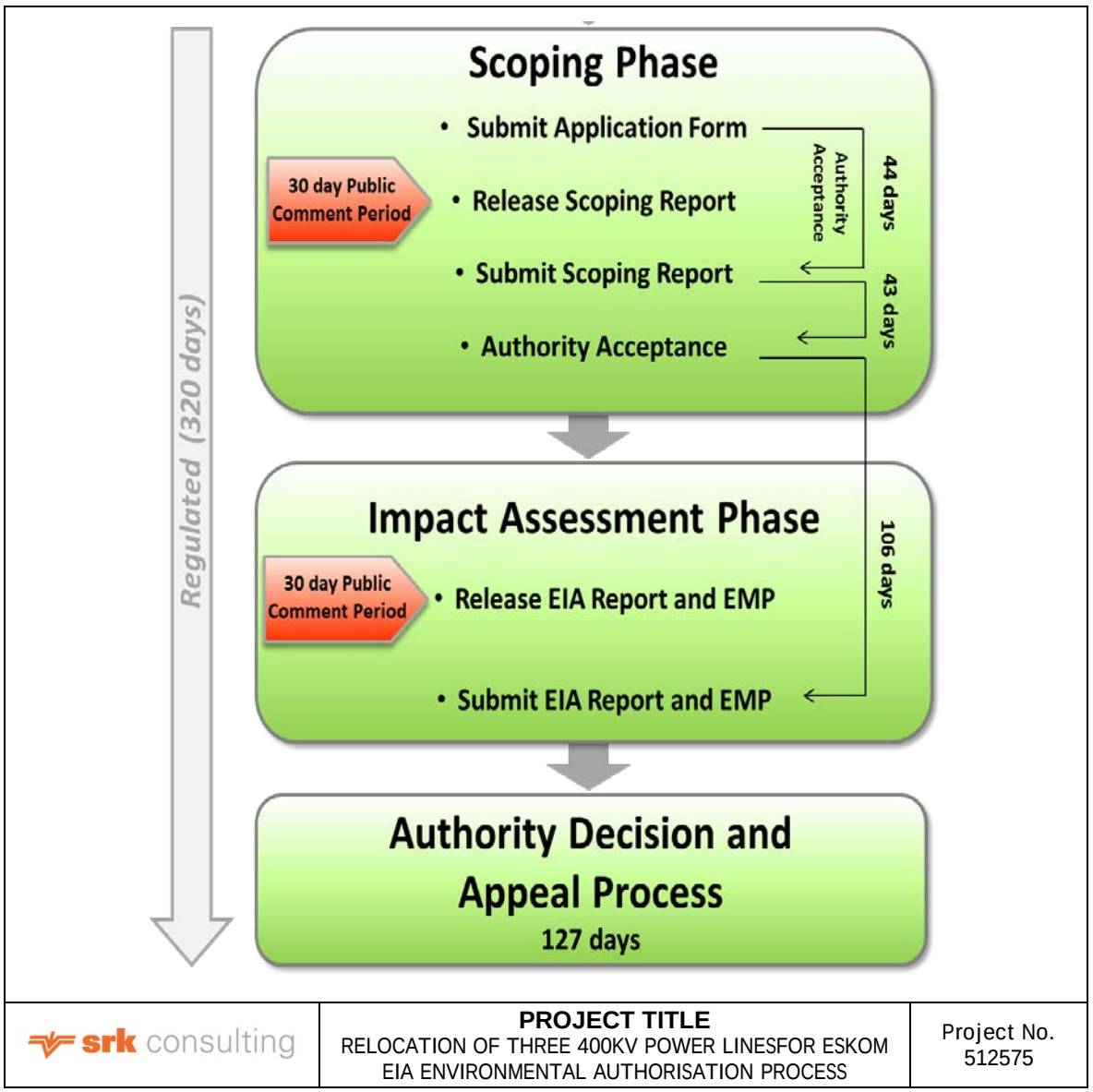


Figure 3-1: Scoping and Environmental Impact Assessment process

The objectives of the Pre-Application Phase are to:

- Identify stakeholders, including neighbouring landowners/ residents and authorities;
- Compile a Scoping Report describing the affected environment and present an analysis of the potential environmental issues and benefits arising from the proposed project that may require further investigation in the Impact Assessment Phase; and
- Develop ToR for specialist studies to be undertaken in the Impact Assessment Phase.

The objectives of the Scoping Phase are to:

- Inform stakeholders of the proposed activity, feasible alternatives and the S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify any issues and concerns associated with the proposed activity, review specialist study ToR and the Plan of Study for EIA; and
- Submit the Scoping Report to the relevant authorities.

The aims of the Impact Assessment Phase are to:

- Inform and obtain contributions from stakeholders, including relevant authorities, the public and local communities and address their relevant issues and concerns;
- Build capacity amongst stakeholders during the scoping and environmental impact assessment phase process, so that they may actively and meaningfully participate;
- Document and contextualise the biophysical baseline conditions of the study area and the socio-economic conditions of affected communities;
- Assess in detail the potential environmental and socio-economic impacts of the project;
- Identify environmental and social mitigation measures to avoid and/or address the impacts assessed; and
- Develop and/or amend environmental and social management plans based on the mitigation measures developed in the EIA Report and EMPr.

4 Project Description

4.1 Introduction

Power is generated at a power station (which could be coal fired, nuclear, solar, wind, hydro or other). From the power station a Transmission powerline, which could be 765kV, 400kV or 275kV transports the electricity to the area where it is needed. If this is a very long distance, then Transmission substations may be required along the route. Once the electricity is in the area that it is required, it is transformed to 132 kV, 88kV, 66kV, 44kV or 33kV for distribution to the end user. At distribution substations, the electricity is stepped down to 22 kV or 11kV and ultimately to 400 or 240 V before connecting to the end user.

The project assessed in this EIA consists of a proposed relocation of three 400 kV transmission power lines. A diagram of the Eskom Supply Chain is provided in Figure 4-1 below.

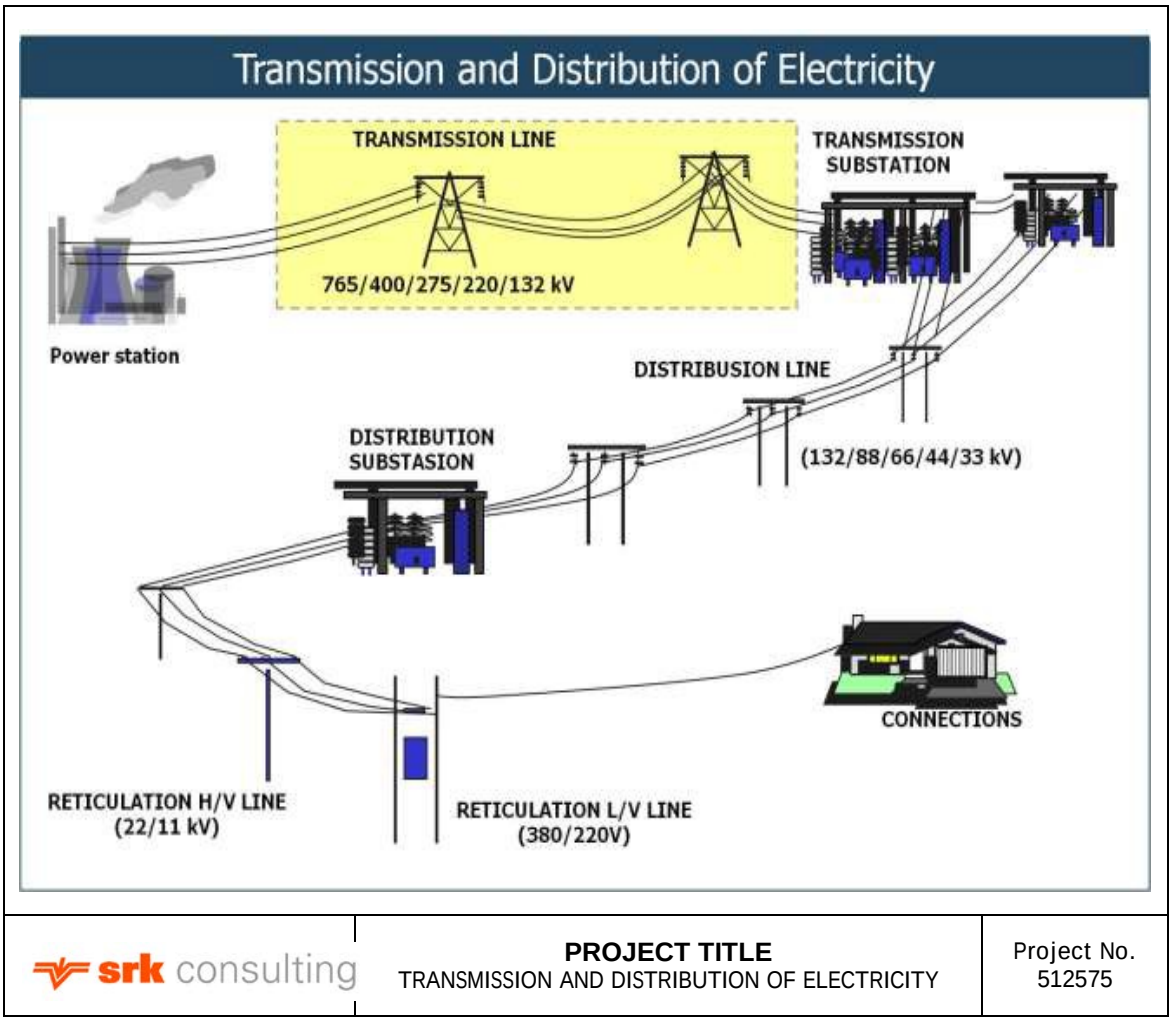


Figure 4-1: Illustration of the transmission and distribution of electricity (Eskom EIA, 2013)

4.2 Project Motivation

Eskom proposes to relocating a section of three 400 kV power linesthat traverse Anglo Operations (Pty) Ltd (AOL) Khwezela Colliery (formerly known as Landau Colliery Mining Right area). The current 400 kV powerline route extends across previously mined underground bord and pillar workings of the numbers 2, 4 and 5 seams. Burning sinkholes have developed at Landau I and II due to historical shallow underground mining operations. Due to the formation of sinkholes and subsequent spontaneous combustion the re-routing of the three 400kV power linesis being proposed.

The following towers are at risk due to instability of the mined ground surface at the Landau I and II areas:

PS 2.2.1 Duvha - Apollo 400kV line: tower 295 to tower 304.

PS 2.2.2 Duvha - Kusile 400kV line: tower 42 to tower 51.

PS 2.2.3 Duvha – Vulcan No 2 400kV line: tower 42 to tower 51.

The proposed route will pass the old rehabilitated AOL Landau 3 Mineral Residue Deposit (MRD) and as a result, the discard material from the MRD will be reclaimed. It is proposed to transport the reclaimed material from the MRD to AOL existing Khwezela Bokgoni (previously known as Kleinkopje) and Khwezela Navigation (previously known as Landau Navigation) plants. Eskom cannot gain access to the areas where the sinkholes are present, hence they cannot undertaken maintenance on these power lines, necessitating rerouting of the powerline.

4.3 Project Alternatives

Section 2 (h) (i) of the EIA Regulations, 2014, require that all S&EIR processes must identify and describe ‘alternatives to the proposed activity that are feasible and reasonable’. Different types or categories of alternatives can be identified, e.g. location alternatives, type of activity, design or layout alternatives, technology alternatives and operational alternatives. The ‘No Go’ or ’No Project’ alternative must also be considered.

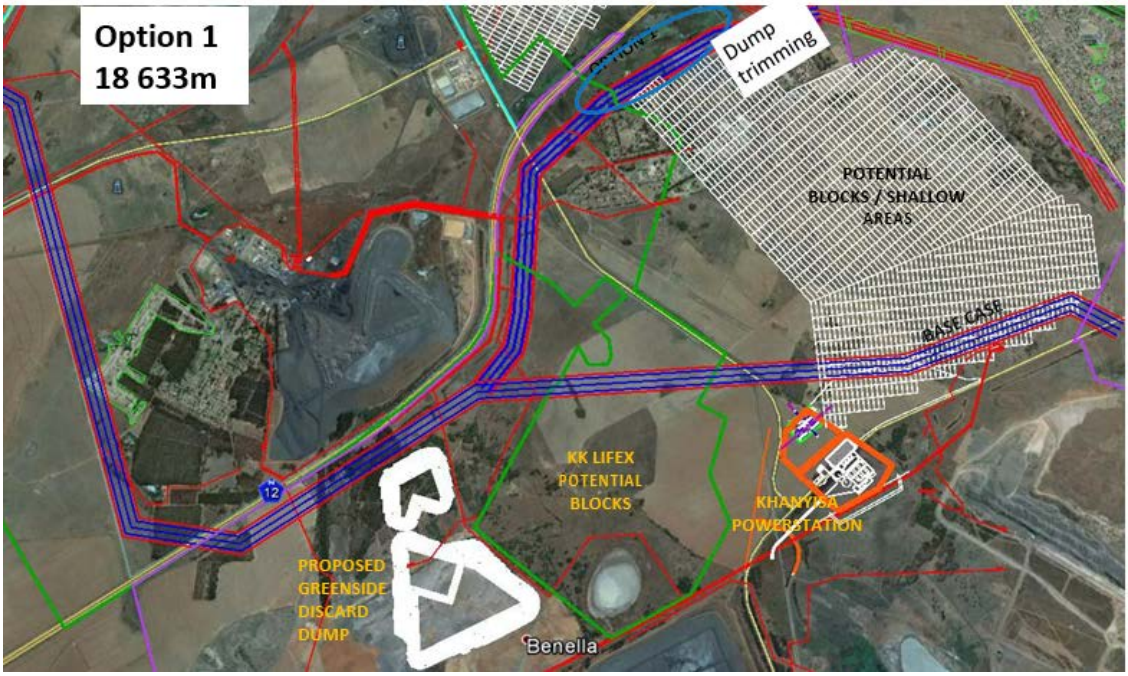
Not all categories of alternatives are applicable to all projects. However, the consideration of alternatives is inherent in the detailed design and the identification of mitigation measures, and therefore, although not specifically assessed, alternatives have been and will be taken into account in the design and S&EIR processes.

4.3.1 Location Alternatives

AOL together with Eskom explored four options aiming to avoid areas with high potential for sinkhole development as well as prevent the sterilization of resources. After the analysis was undertaken Option 1 was the preferred option.

Option 1 (Preferred option)

This option entails starting the relocation of the power linesbefore the N12 highway crossing. The actual positioning is proposed to be outside the Naauwpoortspruit wetlands located to the South of the highway. To undertake this option, the western end of Landau 3 MRD would have to be trimmed to create space for the powerline corridor of 165m.

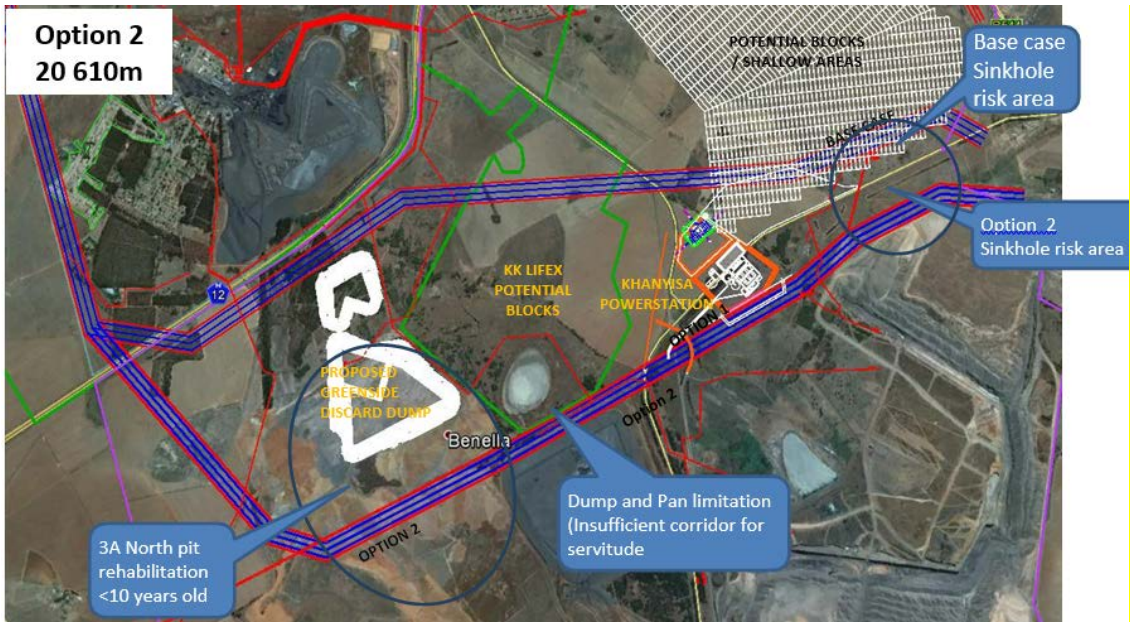


srk consulting	**PROJECT TITLE** OPTION 1	Project No. 512575

Figure 4-2: Option 1

Option 2

The 165m wide servitude required for the relocation would encroach on a pan at the Kleinkopje MRD. The portion behind the 3A North pit has been rehabilitated less than 10 years ago and does therefore not immediately qualify for inclusion in the new route. This option also traverses the sinkhole risk area along Tweefontein road.



srk consulting	**PROJECT TITLE** OPTION 2	Project No. 512575

Figure 4-3: Option 2

Option 3

The intention with this option is to avoid the portion of 3A North pit, which was rehabilitated in the last 3 years. The Tweefontein road sinkhole hazard and MRD corridor constraints as in Option 2 still remain and therefore this option is no longer considered

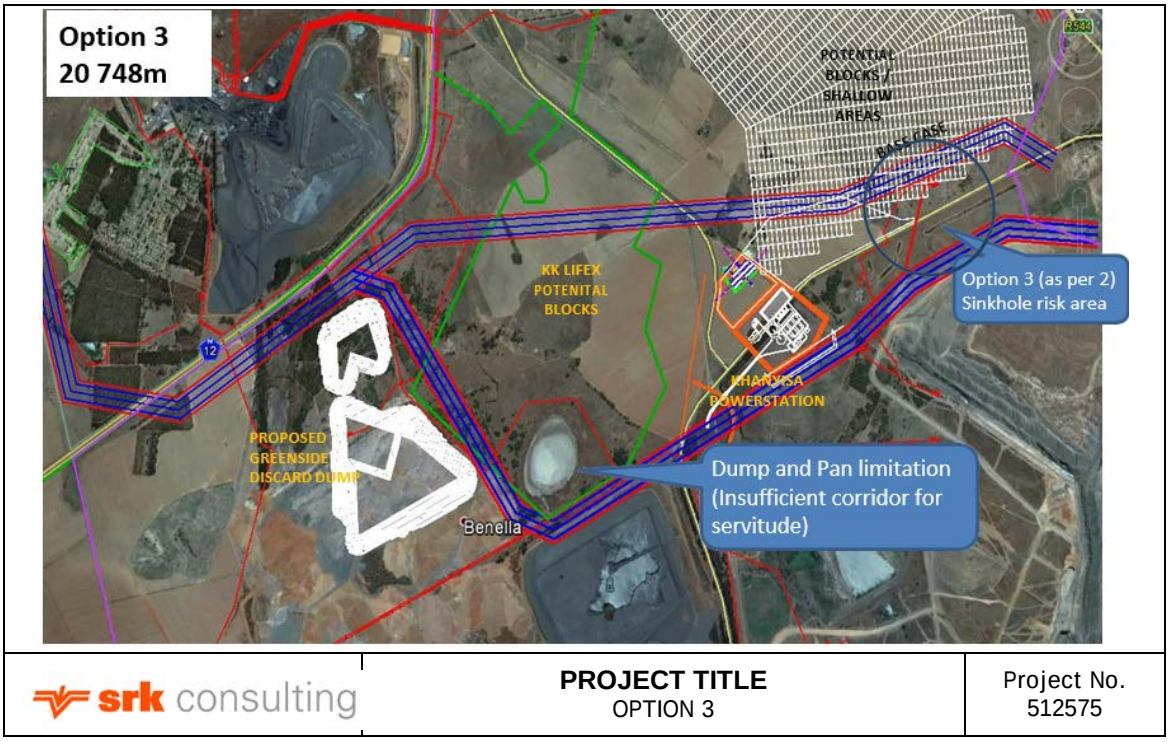


Figure 4-4: Option 3

Option 4

The total high yielding ROM tonnes that would be sterilized by this route is estimated at well over 11Mt, along Kleinkopje/Landau road.

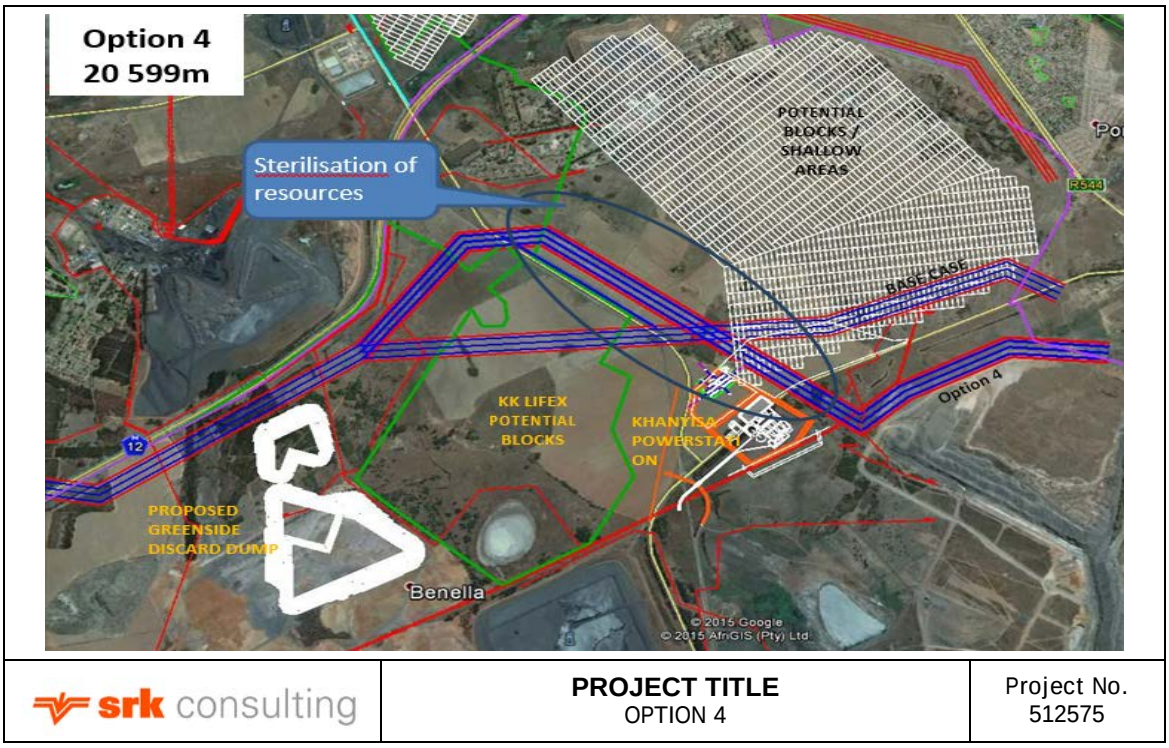


Figure 4-5: Option 4

4.3.2 Design Considerations

Certain standard design considerations for a 400kV transmission line include:

- Standard servitude width is 55m (i.e. 27.5m on either side of centre line);
- Minimum spacing between pylons is ± 300m and the maximum spacing is ± 500m (depending on the topography of the area);
- Line may be no closer than 95m from the centre line of a national road, unless a relaxation on this is granted by the roads department;
- Minimum clearance between the midspan point of the line and the ground is 8.1m,
- Minimum distance between any part of a tree or shrub and any bare phase conductor must be 5.6m; and
- Minimum safe distance required from the centre of the power line to the beginning of a domestic house is 27.5m.

4.3.3 The No Go Alternative

The current powerline route is at risk as it extends across historically shallow underground mining operations. Sinkholes have developed at Khwezela Colliery due to the shallow historical workings. In the event of tower structures collapsing due to the instability caused by the sinkholes this could result in disruption in continued power supply to the National Grid.

As a result, no No Go alternatives have been considered for this project.

4.4 Powerline Servitude, Tower and Substation Infrastructure

4.4.1 Power Line Servitude

A 55 m servitude (27.5 m on either side of the centre line) is required to accommodate the towers on which the overhead line will be strung. The servitude is required to ensure safe construction, maintenance and operation of the line and Eskom will be entitled to unrestricted access. Where 400kV power lines are constructed in parallel, a minimum separation distance of 55m between centre points is required. Minimum vertical clearance distance between the ground and power line conductors is 8.1m.

The minimum vertical clearance to any fixed structure that does not form part of the powerline is 5.6m. The minimum distance from a powerline running parallel to a proclaimed public road is 90 m from the centreline of the road servitude. The minimum safe distance required to the edge of a domestic house is 40m from the centre of the power line (i.e. 27.m plus 12.5 m). The maximum crop height within the servitude is 4.3m. The maximum operation height under the conductors is 2 m.

4.4.2 Tower Structures

The selection of a tower types depends on several factors, including terrain, expense etc. Below are examples of towers that where considered for a 400 kV transmission line.

1. Self-supporting Tower

This structure is typical of most single circuit structures in use by Eskom for their 400kv lines. It carries twin dinosaur conductors, a relatively light configuration. The use of a V--string assembly allows for compaction of phase spacing, which in turn results in both structural and electrical efficiency (Figure 4-6).

srk consulting	**PROJECT TITLE** SELF SUPPORTING TOWER	Project No. 512575

Figure 4-6: Self supported tower

2. Guyed Suspension Tower

This structure is typical for optimal use with the zebra configuration. The guyed--vee towers has one large foundation and four guys therefore four smaller foundations. Guyed--vee towers provide the best protection from lightning impulses due to the ground wire and cross arm configuration. Tower cross bar helps with the live line maintenance.

srk consulting	**PROJECT TITLE** GUYED SUSPENDED TOWER	Project No. 512575

Figure 4-7: Guyed suspension tower

Most farming activities, except for sugar cane and commercial forestry, can be practiced under the conductors, provided that there is adherence to safe working clearances, crop height restrictions and building restrictions.

3. Cross Rope Tower

This structure is typical for optimal for guided mast design, making it lighter and more efficient. Cross rope towers are cost effective and high performance towers. Their midspan clearance to ground is 1.8m or high.

srk consulting	**PROJECT TITLE** CROSS ROPE TOWER	Project No. 123456

Figure 4-8: Cross rope tower

4.5 Project Phases

The entire life cycle for a new transmission line includes the following primary phases:

Feasibility phase - This includes the following:

- Selecting a suitable corridor for the route of the proposed transmission line and execution of an EIA process. Servitude negotiations are also initiated during this phase; and
- Eskom and environmental specialists (e.g. ecologist, heritage) conduct a walk-down survey to determine the exact locations of the towers, based on sensitive environmental features and technical criteria.

This project is currently in the Feasibility phase.

Planning and design phase - This phase, which is only undertaken should environmental authorisation be obtained, includes the following:

- Aerial survey of the route;
- Selection of the most appropriate structures; and

- Preparation of relevant planning documentation, including technical and design documentation.

Construction phase – During the implementation of the project, the construction activities related to the installation of the necessary infrastructure and equipment is undertaken.

Operational phase - This includes operational activities associated with the maintenance and control of the power lines.

Decommissioning - This phase will include measures for complying with regulatory requirements, rehabilitation and managing environmental impacts of the decommissioning of the existing power lines.

The sub-sections to follow provide an overview of key activities during selected phases of the project life-cycle.

The EIA will cover of the project phases mentioned above.

4.5.1 Construction Phase

The construction of the three 400kV power lines involves the following activities:

Perimeter Fence and Security

A secure perimeter fence of approximately 2.3 m in height will be erected along the proposed powerline route with controlled security access. The perimeter fence will be a clear view fence with concrete plinths for supporting poles.

Vegetation Clearance

An 8 m-wide strip is generally required to be cleared of all trees and shrubs down the centre of a transmission power line servitude for stringing purposes only. Any tree or shrub in other areas that will interfere with the operation and/or reliability of the transmission powerline must be trimmed or completely cleared. The clearing of vegetation will take place in accordance with Eskom's minimum standards for the construction of new Transmission power lines, as listed below in Table 4 1:

Table 4-1: Minimum standards for vegetation clearing for new Transmission power line

Item	Standard	Follow up
Centre line of the proposed Transmission power line	Clear to a maximum (depending on tower type and voltage) of a 4-8 m wide strip of all vegetation along the centre line. Vegetation to be cut flush with the ground. Treat stumps with herbicide.	Re-growth shall be cut within 100 mm of the ground and treated with herbicide, as necessary.
Inaccessible valleys (trace	Clear a 1 m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing – vegetation to be allowed to regrow.
Access/service roads	Clear a maximum (depending on tower type) 6 m wide strip for vehicle access within the maximum 8m width, including destumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support/stay wire position	Clear all vegetation within proposed tower position in an area of 20 x 20m (self-supporting, guyed suspension towers or cross rope towers) and 40 x 40m around the position, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil. Allow controlled agricultural practices,	Re-growth to be cut at ground level and treated with herbicide as necessary.

Indigenous vegetation within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8m strip and within the servitude area, selective trimming or cutting down of those identified plants posing a threat to the integrity of the proposed power	Selective trimming
Alien species within servitude area (outside of maximum 8m strip)	Area outside of the maximum 8m strip and within the servitude area, remove all vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

Tower pegging

Following the necessary access negotiations and arrangements with the affected landowners, a surveyor will peg the centre of the line and later sets out the tower positions, leg extensions and guy positions for the development of the transmission line and towers. Through continual vehicular use, the surveying team will make the first basic track (access route) during their site work. If any flaws with a site are encountered (e.g. gully erosion) the site may need to be relocated.

Construction camp establishment

The locations of the construction camp will be determined during the EIA phase. The consideration of the proposed camp sites will be undertaken in accordance with Eskom Transmission's *'Generic Environmental Management Plan – Line Construction'*. In addition, the EIA will propose suitable mitigation measures to safeguard the environment from impacts associated with the construction camps.

The construction camp size will be determined in the EIA phase. The following areas / activities may occur within a construction camp:

- Fuel storage and re-fuelling areas;
- Laydown areas;
- Portable ablution facilities and / or wash areas;
- Designated eating areas;
- Accommodation facilities for contractors;
- Security guardhouse / checkpoint;
- Vehicle, plant, equipment and material storage areas;
- Cement mixing areas; and
- Any other infrastructure required for the construction of the substation.

Excavation for foundations

Excavations will be made for the foundations and anchors of the towers by a team of 10 to 15 people with equipment (i.e. drilling rig, generator). Foundation sizes are dependent on inter alia the tower type and soil conditions. For example, the minimum working area required for the erection of a self-supporting strain tower is 40m by 40m, guyed suspension is 30m x 30m and for a cross-rope suspension tower is 50m by 50 m. Contractors are required to barricade the excavations, which may include erecting a temporary wire fence around the excavations to protect the safety of people and animals.

Concrete works

Concrete is sourced via a 'Ready-mix' truck which accesses the site. If the access roads do not permit use by such a heavy vehicle, concrete will be mixed on site where required for the foundation

design. Once the excavations have been filled, the concrete requires approximately 28 days for curing.

Erection of steel structures

Tower steelwork is usually delivered to the site via trucks. The tower will then be assembled on site by a team of approximately 30 people. A new team will then be responsible for the erection of the towers, with the use of a mobile 70-ton crane.

Stringing of transmission cables

Cable drums which carry approximately 2.5 km of cable, will then be delivered to the site. Conductors are used singularly, in pairs, or in bundles of three, four or six. The choice is determined by factors such as audible noise, corona, and electromagnetic field (EMF) mitigation. Many sizes of conductor are available, the choice being based on the initial and life-cycle costs of different combinations of size and bundles, as well as the required load to be transmitted. Two cable drums, with a winch in the middle, are placed approximately 5 km apart along the route. A pilot cable, which is laid with a pilot tractor that drives along the route, is pulled up on to the pylons with the use of pulleys. The line is generally strung in sections (from bend to bend). Infrastructure Requirements during the Construction Phase

Water

During the construction stage, the Contractor(s) will require water for potable use by construction workers and water will also be used in the construction of the foundations for the towers. The necessary negotiations will be undertaken with the landowners / local authorities that are traversed by the transmission line to obtain water from approved sources.

Sanitation

Sanitation services will be required for construction workers in the form of chemical toilets, which will be serviced at regular intervals by the supplier.

Access roads

Existing access roads will be utilised as far as possible. For the use of private roads, the requisite negotiations will be conducted with the affected landowners. These roads will be constructed according to Eskom and Anglo standards.

Waste

Solid waste generated during the construction phase will be temporarily stored at suitable locations (e.g. at construction camp) and will be removed at regular intervals and disposed of at approved waste disposal sites within the local municipality that are affected by the project. All the waste disposed of will be recorded. Wastewater, which refers to any water adversely affected in quality through construction-related activities and human influence, will include the following:

- Sewage;
- Water used for washing purposes (e.g. equipment, staff); and
- Drainage over contaminated areas (e.g. cement batching / mixing areas, workshop, equipment storage areas).

Suitable measures will be implemented to manage all wastewater generated during the construction period.

Electricity

Electricity will be obtained from diesel generators or temporary electricity connections during the construction phase.

Traffic

The construction haul routes will use the existing road network. Construction traffic will include large vehicles / trucks for material delivery. The access of passenger vehicles (for construction workers) will be in accordance with the Anglo security procedures. The number of construction vehicle trips per day is unknown at this stage. The equipment expected during the construction phase will be outlined in the EIA phase.

Construction Workers

The number of construction workers expected during the construction phase will be outlined in the EIA phase.

Construction Schedule

Construction of the powerline will commence once approval has been provided by the Department of Environmental Affairs . Construction activities are expected to occur during normal working hours of 07h30 to 16h35 and will largely be limited to Mondays to Fridays. Construction activities will only be allowed outside these times where unavoidable, subject to the contractor successfully motivating for an extension.

4.5.2 Operation and Maintenance

During operations, Eskom needs to reach the servitude via access roads to perform maintenance of the transmission line. Line inspections are undertaken on an average of 1– 2 times per year, depending on the area. The servitude will need to be cleared occasionally to ensure that vegetation does not interfere with the operation of the line. This will be conducted in terms of Eskom's Transmission Vegetation Management Guideline, which will be included in the final EIA.

SHEQ Policy

Eskom has a SHEQ Policy in place, which is implemented and enforced on all Eskom sites. This policy ensures that SHEQ is an integral part of the operation and that no operating condition, or urgency of service, justifies exposing anyone to negative risks, causing an incident or damage to the environment.

Environmental Awareness

Eskom has an effective environmental awareness communication programme (Public Safety Information Forum), which ensures that the surrounding community is well informed of existing operations and future development projects in the area.

4.5.3 Decommissioning of Existing power lines

The existing power lineswill be decommissioned using Eskom's decommissioning plan, including provision for the dismantling of the towers and the disposal or recycling of the material. This plan will also require a site-specific rehabilitation plan for the footprint of the project. All regulatory requirements will need to be complied with for the decommissioning phase.

In areas where the sinkholes occur, appropriate decommissioning measures will be developed in conjunction with the appointed contractor to dismantle the towers and dispose of material.

5 Description of biophysical and social environment

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed power linesare located. The purposes of this section is to:

- Understand the general sensitivity of and pressures on the receiving environment;
- Inform the identification of potential impacts associated with the proposed project, which will be assessed during the Impact Assessment Phase;
- Identify gaps in available information to inform specialist study requirements; and
- Start conceptualising practical mitigation measures.

The proposed power linestransverses through three of AOL's mining right areas namely: Greenside, Khwezela Bokgoni Colliery (previously known as Kleinkopje) and Khwezela Colliery - previously known as Landau Colliery. The description of the receiving environment is baseline on previous specialist studies undertaken for these mining areas.

5.1 Biophysical Environment

This section of the report describes the biophysical trends of the project environment, prior to commencement of the proposed relocation of the power lines.

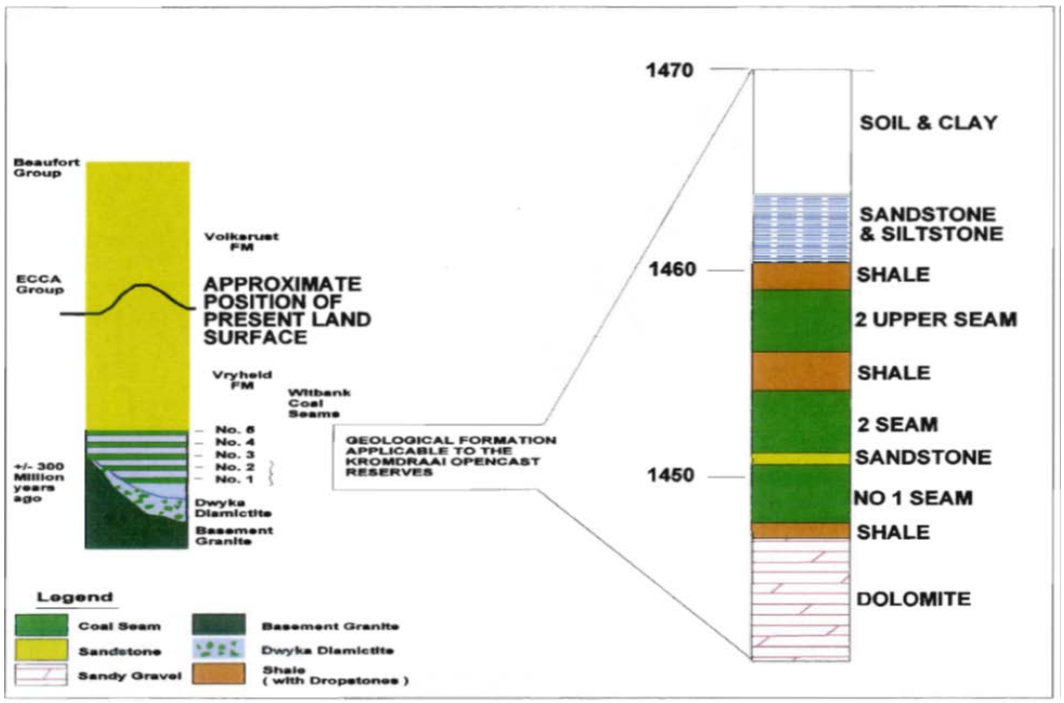
5.1.1 Topography

The natural topography of the area has generally been disturbed by mining activities in the region. These mining activities have been conducted over the past several decades with the main contributors to the topography disturbance being that of opencast mining and rehabilitation activities. The surface is gently undulating with elevations of between 1 350 and 1 400 mamsl. The area is typical of the Eastern Highveld with gently rolling hills and shallow valleys where watercourses often display "ox bow" configurations or form marshes with undefined channels. A number of small rock outcrops are found on the northern side of the mentioned unnamed tributary of the Grootspruit. Surface runoff flows into marshy pans or tributaries, which in turn flow into either the Tweefonteinspruit or the Olifants River.

5.1.2 Geology

The eMalahleni area is underlain by the Karoo supergroup. The Karoo Supergroup comprises mainly a sedimentary succession of sandstone, siltstone, shale, mudstone, coal, diamictite and tillite. The Karoo Supergroup is lithostratigraphically subdivided into the Dwyka, Ecca and Beaufort groups, succeeded by the Molteno, Elliot and Clarens formations and the Drakensburg Formation. The Ecca Group comprises successions of formations, which consists of sandstone, shale and coal and were developed within the Karoo basin locally.

Figure 5-1 indicates a general geological profile. The positions of the dykes have been interpreted from geophysical surveys, but have mostly been delineated through mapping when intersected in the underground workings (Scoping Report for AOL Kleinkopije, 2016).



srk consulting	**PROJECT TITLE** GENERAL GEOLOGICAL PROFILE OF THE WITBANK REGION DEPICTING THE 5 COAL SEAMS	Project No. 512575

Figure 5-1: General geological profile of the Witbank region depicting the five (5) coal seams

The thickest portions of the Ecca Group were deposited in the southern Karoo basin in contrast to the relatively thin sequence which is now preserved in the East Rand. This succession of sedimentary rocks generally overly the well-consolidated conglomerates/diamictites of the Dwyka Formation, but in places the Ecca Group rocks rest directly on the felsites and granites of the pre-Karoo Basement rocks. Igneous intrusions of late Karoo Supergroup age in the form of dolerite dykes and sills also occur through the sedimentary succession. The sills usually precede the dykes, with the latter being emplaced during a later period of tensional forces within the earth's crust. Tectonically, the Karoo sediments are practically undisturbed. Faults are rare. However, fractures are common in competent rocks such as sandstone and coal.

The sediments of the Vryheid Formation overlie an uneven Dwyka floor, which is controlled by the topography of the pre-Karoo platform upon which the Karoo sediments were deposited. The Vryheid Formation is present throughout the Witbank Area. At their thickest these sediments attain some 120 – 140m and can contain a number of coal seams of which four are considered to have economic potential. This area is known as the Witbank Coal fields (Shangoni, EIA, 2016)

5.1.3 Climate

The area lies in the summer rainfall region (Eastern Highveld) of Southern Africa, with cold and dry winters, and warm and wet summers. Temperatures range from 9°C to 32°C in summer and from 6°C to 22°C in winter. Frost occurs frequently between May and September. During summer months prevailing winds are northerly or easterly and during the winter months prevailing winds are north westerly to south westerly.

Temperature information from the Witbank Weather Station is presented in Figure 5-2 below (South African Weather Service, 2006). The highest average maximum daily temperatures occur from November to March ranging from 25.2ºC to 27.5ºC. June, July and August are the coldest months of the year with the average minimum temperatures ranging from 5ºC to 6ºC.

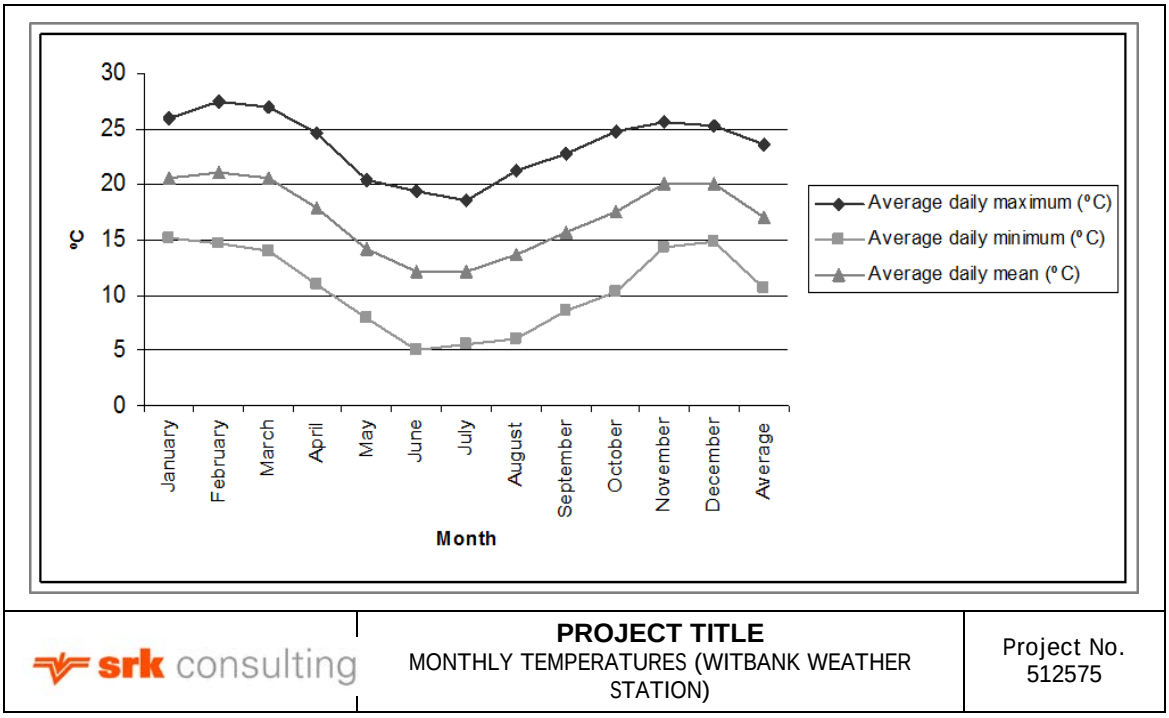


Figure 5-2: Average monthly maximum and minimum temperatures (Witbank weather station)

Precipitation in the area is highly seasonal with a mean annual rainfall of 702.7 mm according to the rainfall data from the DWA hydrological datasets. Most of the rainfall occurs during the summer months with the majority of rain events between October and April. The region receives the highest rainfall in January and the lowest in July. Wind in the area blows predominantly in a northerly direction during winter and spring, and predominantly in a south easterly direction during summer and autumn. The average monthly wind speed for the period 1993 - 2003 was 10.26 m/s. The maximum wind speed of 13.6 m/s was measured in October 1995 and the minimum wind speed of 8 m/s was experienced in June and July 2000 (Shangoni, EIA, 2016)

5.1.4 Soils and land use

From previous studies in the area nine dominant soil units were identified within the pre-mining land use area. These included: Hu1, Hu2, Cv1, Cv2, Av1, Gc1, Lo1, Lo2, and Ka.

The Hu1 soil unit consists of deep, well-drained, red soils which are not subject to depth restrictions, have no mechanical limitations, and are well drained, have favourable structure and texture, have low erosion susceptibility and occur on flat to gentle slopes. This soil unit was classified as highly arable land. Hu2 has similar soil properties as unit Hu1 but has shallower effective soil depth. Soil unit Hu2, however qualifies as arable land.

Soil units Cv1 and Cv2 consist of deep, well-drained, yellow soils which are not subject to depth restrictions, have no mechanical limitations, and are well drained, have favourable structure and texture, have low erosion susceptibility and occur on flat to gently slopes. These soil units were classified as highly arable land. Soil unit Cv2 has similar soil properties as unit Cv1 but has somewhat shallower effective soil depth.

Soil units Av1 and Gc1 consist of moderately deep, moderately-drained, yellow soils which are somewhat subject to depth restrictions, have no mechanical limitations, and are moderately drained, have favourable structure and texture, have low erosion susceptibility and occur on flat to gentle slopes. These soil units were classified as arable land. Soil unit Av1 and Gc1 have similar soil properties, but differs mainly in terms of underlying material.

Soil unit Lo1 consists of grey leached imperfectly drained soils occurring in pans, seepage zones and drainage lines. This unit shows clear evidence of seasonal wetness, lateral movement of water in the soil profile and fluctuating water tables and was classified as having a wetland land capability. Soil unit Lo2 occurs in seepage zones showing less prominent signs of seasonal wetness and lateral movement of water in the soil profile and was classified as grazing potential.

Soil unit Ka1 consists of shallow, poorly drained soils occurring in the pan in the northern part. Soil unit Ka was classified as wetland.

The area has been heavily impacted by existing mining activities on site, extensive agricultural activities (especially the cultivation of maize) as well as impacts associated with infrastructure (e.g. roads and railways) and urbanisation. All of these activities have resulted in the extensive transformation of the natural habitats within the study area, as portrayed in the Mpumalanga Biodiversity Conservation Plan's terrestrial biodiversity assessment (Ferrar et al. 2007) which classifies most of the area as having no natural habitat remaining.

5.1.5 Surface water

The study area is located within the Olifants River Catchment (Primary Catchment B). The main tributary is the Naauwpoortspruit (Noupoort), which discharges directly into the upper reaches of the Witbank Dam. The catchment has been extensively modified due to historic and current mining activities and also has a large pan that greatly reduces the catchment area. Although the construction site does not cross the river, the catchment area was identified as a point opposite the dump and was delineated on 1:50 000 topographical maps. A number of smaller farm dams were observed in the catchment but it is not expected that these will have a significant influence on the hydrology.

5.1.6 Groundwater

The information contained in this section of the document is contained in the report titled: Landau Colliery: Navigation Section Umlalazi South Block Extension, Geohydrological Investigation as input to the EMPR" dated June 2014 and compiled by Shangoni AquiScience (AquiScience, 2014).

A hydrocensus of boreholes on and surrounding area was conducted in 2013, during which all private groundwater users were surveyed within a 1 km radius. During the hydrocensus, all available details of boreholes and borehole-owners were collected (AquiSceince, 2014). This information was used to identify the Interested and Affected Parties which may be impacted upon by the mining activities, specifically relating to impacts on water quantity and quality. The hydrocensus boreholes were subjected to water level measurements including chemical analysis to evaluate the chemical characteristics of the groundwater and to establish baseline data prior to commencement with mining activities. Monitoring borehole information was also supplied by Landau Colliery: Navigation Section. The major groundwater impacts expected to occur arising from the proposed mining activities at the South Block Extension area are related to quality and quantity (aquifer depletion). Prior to any commencement of mining activity, water quality and quantity measurements are recorded that should be used as baselines to monitor any changes over the mining period. The majority of the surface area has already been disturbed by either opencast or underground coal mining activities, contributes to this relatively poor distribution. The majority of boreholes are not in use, while the rest are mainly used for domestic purposes and irrigation/livestock watering.

The National Aquifer Classification System developed by Parson (1995) is used to classify South African Aquifers (refer to Appendix E3). The South African Aquifer System Management Classification is presented by five (5) major classes, and include:

- Sole Source Aquifer System.

- Major Aquifer System.
- Minor Aquifer System.
- Non-Aquifer System.
- Special Aquifer System.

According to the regional aquifer classification map of South Africa, the surrounding Karoo aquifer has been identified as a minor aquifer. Drill logs indicate that the study area is underlain by three types of aquifers. Based on the underlying geohydrology of the project area the aquifers can classified according to Parsons and system as follows:

- Shallow weathered/perched unconfined aquifer
- Non-aquifer
- Fractured confined or semi-confined aquifer in the Vryheid Formation
- Minor aquifer
- Pre-Karoo aquifer
- Non-aquifer

The baseline groundwater levels ranged between 1.18 mbgl and 2.85 mbgl with an average 2.29 mbgl. The quality can be described as neutral, non-saline and soft to moderately hard with low to medium levels of nutrients (NO3 and NH4) within acceptable drinking water standards as proposed by the SANS (SANS 241: 2011) and the DWS (DWAF, 1998).

5.1.7 Air Quality

Key sources of particulate pollution are likely to be mining and industrial operations. Sources north-west of the project area are dominant contributors of pollution in the study area, based on available meteorological data. Although apportionment of dust deposition to mining and transport sources close to the site was without reasonable doubt, the sources of suspended particulate matter may have extended further than the immediate industrial and mining operations, up to a distance of 10 km.

5.1.8 Biodiversity

Vegetation

The area falls within the Grassland Biome and more specifically the Mesic Grassland. This bioregion is comprised of two ecological, namely:

1. Rand Highveld Grassland.
2. Eastern Highveld Grassland.

Historically, the Rand Highveld Grassland occurred on the study area but has since been transformed by agricultural activities, namely, crop production in the form of maize. Rand Highveld Grassland is typical of sloping plains and rocky ridges extending from the Pretoria area to the eMalahleni area. The rand Highveld grassland is rich in plant taxa (especially when in pristine conditions) and constitutes a sour grassland dominated by *Themeda*, *Hetropogan*, *Erogratis* and *Elionurus*. The forb composition is equally diverse and well represented by members of the Asteraceae family, while woody communities formed a typical, albeit sparse, component of the ridges. Approximately 20 % of the study area consists of Eastern Highveld Grassland (Mucina & Rutherford, 2006). This grassland is restricted to moderately undulating plains and includes a

number of low hills and pan depressions. The vegetation is short and dominated by graminoid species of the genera Themeda, Aristida, Agrostis and Eragrostis.

Table 5-1: Plant species characteristic of the Rand Highveld Grassland and the Eastern Highveld Grassland (Taken from Pachnoda, 2014)

Rand Highveld Grassland		
Grassy Layer	**Forb Layer**	**Woody Layer & Shrubs**
Aristida congesta, Brachiaria nigropedata, Cynodon dactylon, Digitaria monodactyla, D. tricholaenoides, Elionurus muticus, Eragrostis chloromelas, E. curvula, E. plana, E. racemosa, E. capensis, Heteropogon contortus, Loudetia simplex, Microchloa caffra, Monocymbium ceresiiforme, Setaria sphacelata, Themeda triandra, Trachypogon spicatus, Andropogon schirensis, Diheteropogon amplectens, Eragrostis gummiflua, Panicum natalense, Schizachyrium sanguineum, Hyparrhenia hirta, Melinis nerviglumis, M. repens, Trichoneura grandiglumis	***Non-succulents:*** *Justicia anagalloides, Pollichia campestris, Acalypha angustata, Helichrysum nudifolium, Chamaecrista mimosoides, Dicoma anomala, Helichrysum aureonitens, H. caespititium, H. rugulosum, Ipomoea crassipes, Nidorella hottentotica, Oldenlandia herbacea, Selago densiflora, Vernonia oligocephala* ***Geophytes:*** *Boophone disticha, Hypoxis rigidula, Ledebouria ovatifolia* ***Succulent herb****: Aloe greatheadii*	***Low shrubs:*** *Acanthospermum hispidulum, Felicia muricata, Indigofera comosa* ***Succulent shrub****: Lopholaena coriifolia* ***Geoxylic suffrutex****: Elephantorrhiza elephantina*
Eastern Highveld Grassland		
Grassy Layer	**Forb Layer**	**Woody Layer & Shrubs**
Aristida congesta, Brachiaria serrata, Cynodon dactylon, Digitaria monodactyla, D. tricholaenoides, Elionurus muticus, Eragrostis chloromelas, E. curvula, E. plana, E. racemosa, Heteropogon contortus, Loudetia simplex, Microchloa caffra, Monocymbium ceresiiforme, Setaria sphacelata, Sporobolus africanus, Themeda triandra, Trachypogon spicatus, Tristachya leucothrix, T. rehmannii, Andropogon schirensis, Diheteropogon amplectens, Eragrostis gummiflua, Panicum natalense, Rendlia altera, Schizachyrium sanguineum, Urelytrum agropyroides	***Non-succulents:*** *Justicia anagalloides, Acalypha angustata, Chamaecrista mimosoides, Dicoma anomala, Helichrysum aureonitens, H. caespititium, H. rugulosum, Ipomoea crassipes, Pentanisia prunelloides, Selago densiflora, Senecio coronatus, Vernonia oligocephala, Wahlenbergia undulata* ***Geophytes:*** *Gladiolus crassifolius, Hypoxis rigidula, Ledebouria ovatifolia* ***Succulent Herbs:*** *Aloe ecklonis*	***Low shrubs:*** *Acanthospermum rigidum, Seriphium plumosum*

No nationally protected species were recorded in terms of the National Environmental Biodiversity Act, 2004 (Act No. 10 of 2004). Provincially protected species in terms of the Mpumalanga Nature Conservation Act, 1998 (Act No. 10 of 1998) were however recorded, namely:

- Eucomis autumnalis.
- Eulophia species.
- Gladiolus crassifolius.
- Habenaria filicornis.
- Satyrium species.

It should be noted that all the species in the genera Eucomis and Gladiolus, and all of the species in the family Orchidaceae are protected and therefore a permit is required for the picking, sale and transport of these species

Mammals

Approximately 43 species of the 164 mammal species recorded for Mpumalanga, could occur within the study area. Of these 43 potentially occurring species, 16 species were recorded during the survey and include:

- Two (2) antelope species.
- Five (5) rodents.
- Two (2) canines (Jackals).
- Two (2) herpestids (mongoose).
- One (1) viverrid (genet).
- One (1) mustelid.
- One (1) suid (pigs).
- One (1) felid (cat).
- One (1) leporid (hares) (Shangoni, EIA, 2016)

Birds

260 bird species were recorded with the quarter degree 2529CC, according to the South African Bird Atlas Project 1 (SABAP1) (refer to Appendix E4). However, according to the SABAP2, the area is more likely to sustain 93 species. During the field survey, 80 species were recorded which equates to 86% of the SABAP2 total. The study area has a species richness value of moderate richness. The study area is dominated by species members of the Ploceidae (weaver) family.

African Grass Owl

The African Grass Owl is classified as regionally vulnerable with a South African population of less than 5 000 indiciduals. The African Grass Owl is a nocturnal species which is seldom seen in the daytime. The African Grass Owl is entirely dependent on the availability of rank, moist grasslands and show a high preference for dense tall patches of grasslands. The presence of the tall, dense and intertwined grasslands along the prominent drainage line on the study site, provides optimal breeding, roosting and foraging habitats for the African Grass Owl to occur on site.

Blue Korhaan

The Blue Korhaan is endemic to South Africa and frequents short grasslands. Due to the loss of grassland habitats and the intensification of agricultural activities, the Blue Korhaan has suffered a steady population decline and is therefore on the ‘near-threatened’ list. The Blue Korhaan is likely to occur on the extensive grassland areas adjacent to the study area.

Secretary Bird

The Secretary Bird has recently been upgraded from ‘Least concern’ to ‘Vulnerable’. Evidence suggests that its recent decrease in population is as a result of habitat loss, anthropogenic disturbances and intensive grazing. The Secretary Bird is likely to occur on the nearby natural grassland units as a foraging visitor.

Reptiles

154 reptiles species have been recorded for within the Mpumalanga Province and 26 species have been recorded in the region. However of the 26 species known to occur within this region, only three (3) species were confirmed during the field survey and include:

- Yellow-throated Plated Lizard.
- Cape Skink.
- Speckled Rock Skink (Shangoni, EIA, 2016)

Amphibians

51 amphibian species have been recorded within the Mpumalanga Province, of which 11 species could be present on site. During the field survey, four (4) species were confirmed within the study area and include the following wide spread taxa:

- Guttural Toad (Amietophrynus gutturalis).
- Common Caco (Cacosternum boettgeri).
- Common River Frog (Amietia quecketti).
- Striped Stream Frog (Strongylopus fasciatus) (Shangoni, EIA, 2016)

5.1.9 Wetlands

The wetland systems in the area can be split into six wetland complexes/groups namely:

- Naauwpoortspruit wetland system
- Vleishaft Dam wetland system
- Tweefonteinspruit wetland system
- Olifants River wetlands
- Clydesdale pan wetland system
- Remaining pan wetlands

The Naauwpoortspruit wetland system consists of a large unchannelled valley bottom wetland as well as associated hillslope seepage wetlands. The northern hillslope seepage wetlands have been heavily impacted by mining activities, with collapsing underground mine workings resulting in extensive surface subsidence within the hillslope seepage wetland (subsidence is continuing due to spontaneous combustion of pillars in the underground workings). The pH of water within the Naauwpoortspruit, based on long-term monitoring by the mine, also tends to fall within this area of the system, suggesting inputs of acidic water to the wetland. The southern hillslope seepage wetlands have been less impacted by surface subsidence, though some sinkholes were also observed. These wetlands have however also been significantly impacted with built up areas Anglo offices, a golf course, a landing strip, a mine dump and historical cultivation all located within these seepage wetlands. The Naauwpoortspruit valley bottom wetland itself consists of a large, permanently inundated reed bed dominated by Phragmites australis on site, though lower reaches of the system within the urban areas that receive significant nutrient inputs are dominated by Typha capensis. Included within this wetland complex is a small tributary of the Naauwpoortspruit located to the south of the existing Greenside Colliery dump. This valley bottom wetland is characterised by a series of dams along its length and dense stands of alien Eucalyptus trees along the footslope seepage wetlands lining the valley bottom. The upper reaches of this system, as well as its upper

catchment, have been entirely opencast (still active mining), while the lower reaches have been diverted around the Greenside Colliery dump.

The Vleishaft Dam wetland complex consists of two remnant patches of wetland that have been isolated from downstream water resources through opencast mining activities. The large Vleishaft Dam, which is understood to be operated as a dirty water dam (as per the approved Water Use License for Klienkopje), is surrounded by a large hillslope seepage wetland feeding into the dam. The western section of this seepage wetland appears to receive significant seepage inputs from the large discard dump to the west, with discharges from the water treatment plant on the western shores of the dam also entering Vleishaft Dam. Extensive areas of alien trees occur within the eastern section of the hillslope seepage wetland. Downstream of the dam, a short section of valley bottom wetland remains, though the link to the Tweefonteinspruit has been entirely mined through via opencast mining methods and no connection exists. A second small section of isolated valley bottom wetland occurs adjacent to the mine offices. This wetland also originally would have drained towards the Tweefonteinspruit, but has been isolated through opencast mining activities across its downstream reaches.

The Tweefonteinspruit enters the Kleinkopje mining area from the upstream Tweefontein Colliery mining area as a system already heavily impacted by mining. On site, and immediately upstream, the system is characterised by a series of dams, while two large haul road crossings also occur on site. The Tweefonteinspruit discharges into the Olifants River along the eastern boundary of the Kleinkopje mining area. The wetland is characterised by extensive areas of open water fringed with reeds, generally Phragmites australis. Large hillslope seepage wetlands associated with shallow, rocky soils and rocky outcrops drain into the valley bottom wetland along its northern banks, though most of these seepage wetlands fall outside the Kleinkopje mining area. Only narrow footslope seepage wetlands remain along the southern bank, where extensive opencast mining (already rehabilitated) has taken place in close proximity to the valley bottom.

The Olifants River forms the southern and south eastern boundary of the Kleinkopje mining area. For most of this stretch the river forms a narrow corridor through an area of opencast mining that takes place on both banks. The river is generally slow flowing in this area with extensive open water areas. Two large stands of alien *Populus* trees were observed. Along the northern bank a large hillslope seepage wetland drains into the Olifants. The seep is associated with a rocky outcrop and is associated with generally shallow soils. The shallow soils and wetness have prevented the area from being cultivated in the past and the remaining grassland is one of only few remaining uncultivated and unmined areas on site.

Clydesdale Pan is located just outside the Kleinkopje mining area. This large pan of over 200 ha in size has also been used as an evaporation facility for excess, dirty mine water from Kleinkopje, which has considerably altered the pan in terms of water quality and hydrology, though discharges ceased in 2007. A large hillslope seepage wetland surrounds the pan (Wetland Delineation and Assessment for Klienkopje Colliery, 2013)

5.1.10 Heritage

This brief overview contextualises the Eastern Highveld area and is necessary to understand the meaning and significance of heritages resources which may exist within the study area.

The following prehistoric and historic influences are located within the Mpumalanga Province:

Stone Age and rock art site

- There are approximately 400 rock art sites distributed throughout the Mpumalanga. Rock art found within the Mpumalanga province can be divided into San rock art and Khoi Khoi herders. There are four (4) sites within eMalahleni and the rest are distributed in areas such as

Lydenburg, white river, Kruger National Park, Nelspruit, the Nsikazi District and Ermelo. No Stone Age or rock art sites were identified during the HIA field survey at the Navigation West South Block Extension project study area.

Iron Age

- Early Iron Age remains are distributed throughout the Mpumalanga Province and reflect indications of the first farming communities in the province. However, no sites of Early Iron Age remains are located on or within the vicinity of the study area.
- Late Iron Age remains are well represented within the Mpumalanga Province and include influences from early arrivals (Bakona Clans), Swazi expansions, Bakgatla Chiefdoms in the *Steelpoort Valley, Ndzundza_Ndebele settlements, corbelled stone huts and stone walled settlements. However, no site of Late Iron Age remains are located on or within the vicinity of the study area.*

Historical period and coal mining history

- eMalahleni (Witbank) came into being as the railway line between Pretoria and Mozambique passed close to where eMalahleni is located today. The first European settlers to settle in this area noticed the abundance of coal which was evident on or near the surface. A stage post for the wagons was located near an outcrop of white stones, which gave the town its name of Witbank. Witbank (now known as eMalahleni) was established on the Farm Swartbos in 1903. Coal has since been mined in the eMalahleni region for over a century.

Vernacular stone archaeological heritage.

- A unique stone architectural heritage was established in the Eastern Highveld from the second half of the 19th century well into the early 20th century. During this time period stone was used to build farmsteads and dwellings, both in urban and in rural areas. Although a contemporary stone architecture also existed in the Karoo and in the Eastern Free State Province of South Africa a wider variety of stone types were used in the Eastern Highveld. There are however no sites of vernacular stone archaeological heritage on or within the vicinity of the study site.

5.2 Socio-economic Environment

This section of the report describes the socio-economic trends of the project environment, prior to commencement of the proposed relocation of the power lines.

The following information is based information from studies for other processes at Landau Colliery, which referenced ELM's Integrated Development Plan (IDP) for 2011-2012, the Community Survey 2007 Municipal Data on Household Services, and Statistics South Africa 2001 Census.

5.2.1 Population

As mentioned previously, the project is located within the Emalahleni Local Municipality (ELM). The ELM had the largest population size of 435,217 persons in 2007. The municipality is also the most populated in the district with a population density of 162.54 persons per square meter.

The age and sex structure of the ELM shows an atypical pattern for a developing province such as Mpumalanga. In 2001, an equal size of the population occurred in the age groups between 0 to 4 years and 20 to 24 years, indicating a population stabilizing over time with stable levels of fertility. A typically aging population was determined for the ELM in 2001. In comparison, the pattern shown in 2007 has distortions in the middle ages with an unusually larger population of males compared to females between the ages of 20 and 34; this may be an indication of high economic activity within the ELM.

An annual growth rate of 7.6% (the highest in the district) was observed for the 6 year period between 2001 and 2007. By extrapolating the growth rate over-time, the projected population of the local municipality is expected to be 635,324 persons by 2012, and reach 927,438 in 2017. In 2007, the population of the ELM was mostly Black (85.8%) of the population. The remaining 14.2% of the population comprised White (12.7%), Coloured (1.2%) and Indian (0.3%).

5.2.2 Education

The provision of educational services to a population, in the ELM is higher compared to most municipalities in Mpumalanga province. In addition, improvement in educational levels was observed to occur between 2001 and 2007. About 14% of males and 15% of females over 20 years had no schooling in 2001. This was reduced to 8% for both males and females by 2007, which indicate favourable improvements in educational attainment over a period of 6 years. There was also a reduction in the percentage of persons with primary educational attainment in favour of higher educational levels. What is unexpected is the reduction in the percentage with Grade 12 between 2001 and 2007 for both males and females. This decline is not offset by more persons attaining qualifications higher than Matric, since the percentage with higher education hardly changed.

5.2.3 Employment

Employment opportunities are favourable in the ELM, roughly 61% for males and 38% for females, were employed in 2007. Previously specialist studies in the area indicate that there has been a reduction in the percentage unemployed in the district between 2001 and 2007 for both males and females. The decline is similar for males and females, although employment remains higher for males than for females.

About a third of females were unemployed in 2001 compared to 20% of males in economically active ages. By 2007, this was reduced to 18% for males and 27% for females. Also evident is that the improvements in employment are much more prominent for males rather than females by 2007. In general, the municipality has better employment opportunities in the district.

5.2.4 Access to water

The majority of households have access to safe water either through pipes to within the dwelling, or access it from a point outside the dwelling. There were some improvements in provision of piped water inside the dwelling between 2001 and 2007 (from 42% to 46%). Evidence suggests that the provision of basic services had focused its attention towards lowering the number accessing piped water from outside a dwelling. Not much change is observed from the other types of water sources, except for eliminating households that had unspecified water sources in 2001.

5.2.5 Access to sanitation

In 2001, over two thirds (75%) of households in the municipality either had a flushed toilet or pit latrine without ventilation. There is clear evidence of a local government campaign to replace pit latrines without ventilations with those that are ventilated to promote safer sanitation facilities. By 2007, almost no households were using pit latrine without vent. Although the number of households with no toilet facility has declined between 2001 and 2007, the decline is small.

5.2.6 Access to electricity

Electricity was the leading source of energy for all uses; however, it declined somewhat between 2001 and 2007 in the ELM. In 2007, electricity use for heating and cooking was observed in 47% and 60% of households, respectively. Electricity use among households was not uniform, meaning even households with electricity do not choose to use it for all their energy needs. The other sources of cooking and heating energy are paraffin and coal, the use of which increased in 2007, while the

use of electricity declined between 2001 and 2007 from 69% to 60%. The use of candles and paraffin for lighting surprisingly increased between 2001 and 2007, an unusual trend in all the Mpumalanga municipalities.

5.2.7 Dwelling type

The type of dwelling where a household resides is directly linked to well-being of household members. There is evidence that suggests that children under age 5 who reside in dwellings that have poor floor, wall and roof materials have higher prevalence of negative developmental outcomes. They have higher mortality during childhood, higher morbidity and lower school attendance. This is also because dwellings with poor building structures are often poor, have no access to other basic services, such as safe water and sanitation. The types of dwelling that prevailed in the municipality in 2007 were formal dwellings, such as houses. There was actually a decline in formal dwelling between the 6 year period, and an increase in informal dwellings.

6 Stakeholder Engagement

Stakeholder engagement forms a key component of the S&EIR process. The objectives of stakeholder engagement are outlined in this section, followed by a summary of the approach to be followed, in compliance with Chapter 6 of the EIA Regulations, 2014. The stakeholder engagement for the MRD and the relocation of the powerline will be undertaken together as the powerline transverses through the MRD.

6.1 Objectives and Approach to Stakeholder Engagement

The overall aim of stakeholder engagement is to ensure that all IAPs have adequate opportunity to provide input into the process and raise their comments and concerns. More specifically, the objectives of stakeholder engagement are to:

- Identify IAPs and inform them about the proposed development and S&EIR process;
- Provide stakeholders with the opportunity to participate effectively in the process and identify relevant issues and concerns; and
- Provide stakeholders with the opportunity to review documentation and assist in identifying mitigation and management options to address potential environmental issues.

6.2 Stakeholder Engagement Activities

The activities undertaken during the Pre-Application and Scoping Phases of the assessment are outlined in Figure 6-1 below.

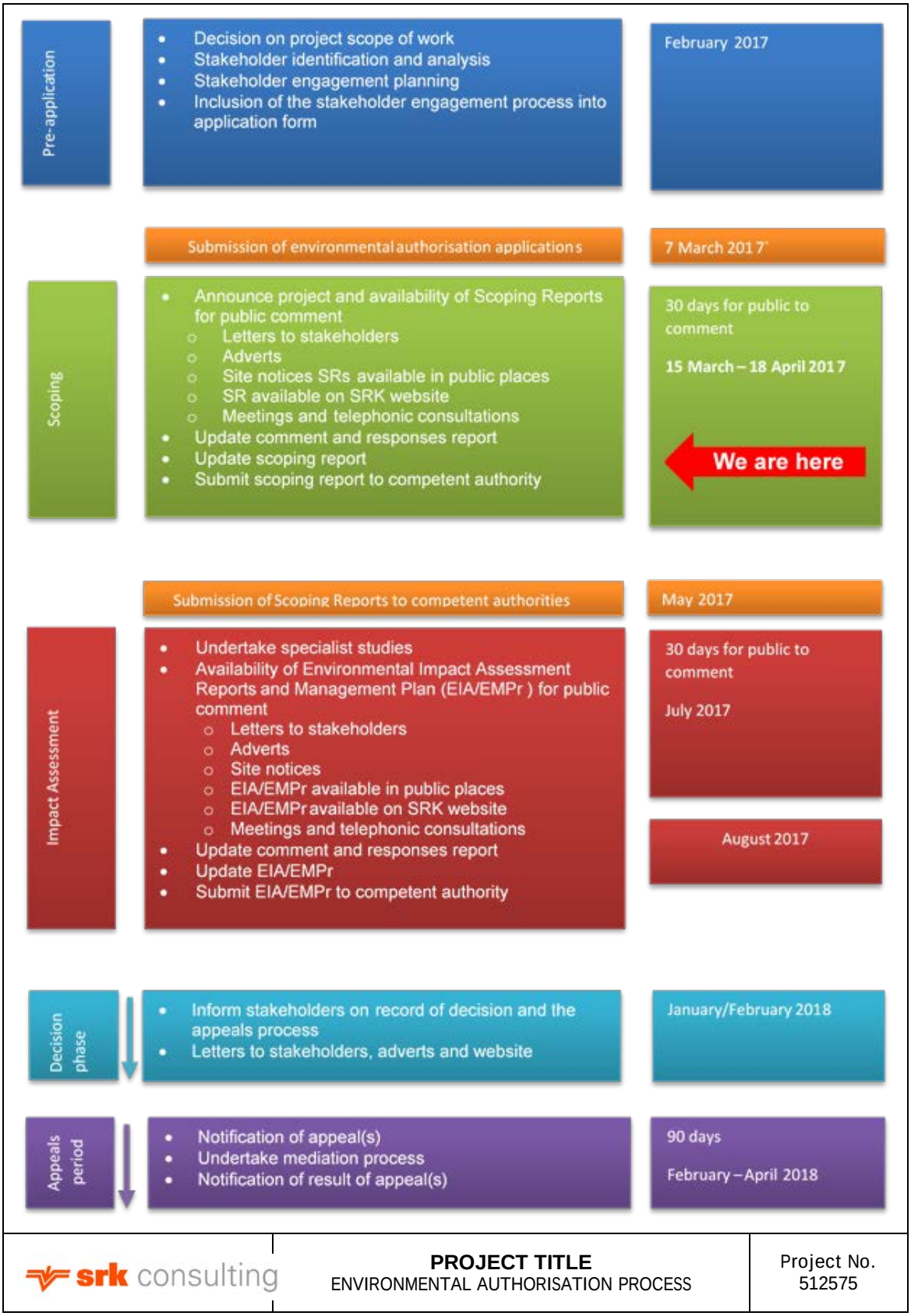


Figure 6-1: Environmental authorisation process for powerline relocation projects

The key activities undertaken in the stakeholder engagement process during the Pre-Application and Scoping Phases are described further below.

6.2.1 Identification of Key Stakeholders

As required by the EIA Regulations, 2014, relevant local, provincial and national authorities, conservation bodies, local forums, representatives and surrounding land owners and occupants have been notified of the EIA and the release of the Scoping Report for comment.

Relevant authorities (Organs of State) have been automatically registered as IAPs. In accordance with the EIA Regulations, 2014, all other persons must request in writing to be placed on the register, submit written comments or attend meetings in order to be registered as stakeholders and included in future communication regarding the project. As specified in GN R 982, all persons who submit written comments, attend meetings or request in writing to be placed on the register will be registered as IAPs, and advertisements advise that IAPs register as such.

The stakeholder database will be updated throughout the process.

6.3 Pre-Application Phase

AOL has been identified as the landowner on which the power lines are situated on. Other relevant authorities have been identified as stakeholders, which includes:

- District and local municipalities i.e, Nkangala District Municipality and eMahlahleni Local Municipality;
- Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA);
- Department of Water and Sanitation (DWS);
- Mpumalanga Tourism and Parks Agency (MTPA);
- Department of Transport; and
- South African Heritage Resource Association (SAHRA).

The steps undertaken in this phase include:

- Identification of stakeholders; and
- Compilation of a stakeholder database.

6.3.1 Meetings undertaken to date: Pre- Application Phase

- A meeting was held on the 8th of March 2017 with the eMahlahleni Local Municipality to present the project.
- A meeting was held on the 10th of March 2017 with the eMahlahleni Local Municipality: Ward Councillors to present the project.

6.4 Scoping Phase:

- A Background Information Letter will be distributed to stakeholders (via email and post), announcing the project and providing them with high level project information.
- Stakeholders will be invited to register as I&APs and comment on the Scoping Report that will be available for a public comment period of 30 days. The letters will be made available in English, Afrikaans and isiZulu. SMS notifications will be sent to stakeholders for whom no other contact details are available.

- Availability of the Scoping Report will be advertised in the local Newspaper, the Witbank News in Afrikaans, English and isiZulu, including the public venues where the report will be available for public viewing.
- In addition, notification of the public meeting will also broadcasted on the Emahlaheni Radio station in isiZulu. The document will also be made available online on the SRK website.
- A public meeting, focus group meetings and telephonic consultations (if required) will be held to obtain stakeholder comment on the scoping report.
- Site notices will be placed along the powerline route (in English, Afrikaans and isiZulu).

The steps to be undertaken in this phase include:

- Announce project and availability of Scoping Report (SR) for public comment;
- Distribution of information letters to stakeholders;
- Newspaper and radio adverts;
- Site notices;
- Scoping Report available in public venues;
- Scoping Report available on SRK website (www.srk.co.za);
- Public, focus group meetings and telephonic consultations; and
- Input of stakeholder comment and responses into the Scoping Report for submission to authorities.

6.5 Impact assessment phase:

During this phase the EIA/EMP will be made available for public comment and meetings will be held with stakeholders to discuss the findings of the EIA/EMP and to obtain comments from stakeholders. The steps undertaken in this phase include:

- Availability of EIA/EMP for public review;
- Letters to stakeholders;
- Adverts;
- EIA/EMP available in public places;
- EIA/EMP available on SRK website;
- Meetings and telephonic consultations; and
- Inputs of stakeholder comment and responses into the Scoping Report for submission to authorities.

6.6 Record of Decision phase:

Stakeholders will be informed of DEA's decision via email, post or sms. Stakeholders will also be informed of the appeals process and the associated timeframes.

The steps undertaken in this phase include:

- Inform stakeholders on record of decision and the appeals process; and
- Letters to stakeholders, adverts and documents available of the SRK website

7 Potential Environmental and Social Impacts

7.1 Environmental and Social Issues

The impacts of a project are mostly linked to the sensitivity of the receiving environment and proximity of receptors, the extent or footprint and nature of the development, potential risks in an emergency situation and stakeholders' perceptions.

Based on the above considerations as well as the professional experience of the EAP, the following potential environmental issues – potential negative impacts and potential benefits of the project in its proposed setting – have been identified in Table 7-1 below.

Table 7-1: Environmental Impacts

Aspect	Impact
Topography	• Visual impact on ridges • Erosion of affected areas on steep slopes
Surface Water	• Impacts where access roads and the transmission lines cross watercourses • Inadequate stormwater management on access roads • Damage to towers from major flood events
Geology and Soil	• Erosion on steep slopes
Flora	• Removal of vegetation for stringing, building of new access roads, tower construction and construction camp(s) establishment • Encroachment by exotic species through inadequate eradication programme. • Clearing of vegetation along maintenance road.
Fauna	• Risk to birds from collision with infrastructure and from electrocution • Impacts to livestock
Socio-economic	• Loss of land with extension of existing servitude • Relocation of structures situated within servitude
Agricultural Potential	• Loss of agricultural land • Impacts to livestock
Archaeological and Cultural Features	• Damage to heritage resources
Transportation	• Damage to roads by heavy construction vehicles • Use of maintenance roads

The potential direct, indirect and cumulative impacts (negative and positive) of the project and the No Go option, based on the impacts listed above, will be addressed in the EIA phase of this project. Specialist studies and inputs will be commissioned during the EIA Phase.

8 Plan of Study for the EIA

The proposed Plan of Study for the Impact Assessment Phase of the EIA is presented below.

8.1 Description of the Proposed EIA Process

The Impact Assessment Phase can be divided into key steps, namely:

- Consultation with relevant authorities;
- Specialist studies;
- Compilation of an EIA Report and an Environmental Management Programme (EMPr);
- Stakeholder engagement; and
- Submission of the Final EIA Report and EMPr to the competent authority, in this case DEA.

These are outlined in more detail below.

8.2 Consultation with the Relevant Authorities

Consultation will be conducted with DEA and other relevant authorities to clarify their requirements for the Impact Assessment Phase of the proposed development, other permit and licence applications for the project and to ensure that comments from the key authorities can be received in time to allow for them to be addressed in the EIA. The authorities (and other organs of state) that will be consulted include:

- DEA;
- DMR;
- Mpumalanga Department of Agriculture, Rural Development, Land and Environment Affairs;
- Nkangala District Municipality; and
- Emalahleni Local Municipality.

8.3 Specialist Studies

Specialist assessments will be undertaken as part of the Impact Assessment Phase to investigate the key potential environmental issues and impacts identified during Scoping. These key issues and impacts have been identified based on:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- The professional experience of the EIA team.

The following specialist studies are proposed for the Impact Assessment Phase:

- *Geotechnical Specialist Study (Phase 1);*
- *Terrestrial Ecology (including terrestrial fauna, as well as avifauna) Specialist Study;*
- *Heritage Specialist Study;*
- *Wetlands Specialist Study; and*
- *Soils and Land Capability Specialist Study.*

The Scope of Work for these studies are presented in Section 8.7 below.

8.4 Compilation of the Environmental Impact Assessment Report

The compilation of the EIA Report and EMPr will include the following tasks:

- Assimilation of the specialist studies / input into the EIA Report and EMPr;
- Identification and assessment of environmental impacts based on the results of the specialist studies / input and professional judgment of the EIA team. This will entail an assessment of the duration, extent, probability and intensity of the impacts to determine their significance;
- Identification of mitigation measures and recommendations for the management of the proposed project to avoid and minimise environmental impacts and maximise benefits; and
- Collation of the above information into an EIA Report and EMPr for the design, construction and operation phases of the project.

The update of the ERP falls outside the scope of the EIA and EMPr and will be undertaken/commissioned at a later stage.

8.5 Stakeholder Engagement

The stakeholder engagement process initiated during the Scoping Phase will continue in the Impact Assessment Phase of the EIA. The key activities planned during the Impact Assessment Phase are outlined in Table 8-1.

Table 8-1: Stakeholder engagement activities planned during the Impact Assessment Phase

Task	Objectives	Dates
Update stakeholder database	To register additional stakeholders identified throughout the S&EIR process	Throughout S&EIR process
Compile and release EIA Report for public comment period	To assess the impacts of the project and formulate mitigation measures and management plans.	Impact Assessment Phase
Public comment period	To provide stakeholders with the opportunity to review and comment on the outcome of the Impact Assessment Phase.	Impact Assessment Phase
Public open day/focus group meetings with key stakeholder groups	To discuss potential impacts of the project and findings of the studies. Key stakeholder groups will be identified based on findings of specialist studies and interest from stakeholders and include groups that might be significantly affected by the project, as well as local and regional authorities.	Before and/or after the release of the EIA Report for public comment

Task	Objectives	Dates
Finalise EIA Report	To present the findings of the EIA process and incorporate stakeholder comment in the final report which provides DEA with information for decision-making.	Impact Assessment Phase

8.6 Submission of the Final EIA Report and EMPr to DEA

All comments received will be incorporated into a Comments and Responses Summary which will be appended to the Final EIA Report. The Final EIA Report (including the EMPr) will then be submitted to DEA to inform their decision regarding environmental authorisation of the proposed development.

8.7 Specialist Study: Scope of Work

The assessment of impacts will be based on the professional judgment of the specialists, fieldwork and desktop analysis, as required. General scope of work applicable to all specialists, as well as specific scopes of work for each specialist study are set out below. The general scope of work may not apply equally to all specialists but are included to provide a comprehensive guideline. Specialists will be instructed to disregard those elements of the general scope of work that are not applicable to them.

Approach to the Study

Provide an outline of the approach used in the study. Assumptions, limitations and sources of information must be clearly identified. The knowledge of local people should, where possible, be incorporated in the study. The description of the approach shall include a short discussion of the appropriateness of the methods used in the specialist study. The assessment of the data shall, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgments based on professional expertise and experience.

Description of the Affected Environment or Baseline

A description of the affected environment must be provided, both at a site-specific level and for the wider region, the latter to provide an appropriate context and cumulative impact analysis. The focus of this description shall be relevant to the specialists' field of expertise.

It is essential that the relative uniqueness or irreplaceability of the area be understood in the context of the surrounding region at a local, regional (and, if necessary, national) scale. This will largely be based on a comparison to existing data sources, where available.

The baseline should provide an indication of the sensitivity of the affected environment. Sensitivity, in this instance, refers to the ‘ability’ of an affected environment to tolerate disturbance (given existing and expected cumulative impacts).

Lastly, the baseline should provide a sufficiently comprehensive description of the existing environment in the study area to ensure that a detailed assessment of the potential impacts of the proposed development can be made. The baseline should include data collected through a thorough literature review as well as field surveys (where applicable).

Impact Identification and Assessment

Clear statements identifying the potential environmental impacts of the proposed project must be presented. This includes potential impacts of the construction and operation of the project. The specialist shall clearly identify the suite of potential **direct, indirect and cumulative environmental**

impacts[5] in his/her study. The assessment of these impacts should take into account any other existing proposals in the surrounding area.

Direct impacts require a quantitative assessment which must follow the impact assessment methodology laid out in Section 8.8. The significance of impacts must be assessed both without and with assumed effective mitigation. Indirect and cumulative impacts should be described qualitatively.

The specialist shall comparatively assess environmental impacts of the development (and each alternative if applicable), and shall indicate any fatal flaws, i.e. very significant adverse environmental impacts which cannot be mitigated and which will jeopardise the project and/or activities in a particular area. All conclusions will need to be thoroughly backed up by scientific evidence.

Mitigation Measures

Specialists must recommend practicable mitigation measures or management actions that effectively minimise or eliminate negative impacts, enhance beneficial impacts, and assist project design. If appropriate, specialists must differentiate between essential mitigation and optimisation measures (i.e. implicit in the 'assuming mitigation' rating), and best practice measures (which reduce impacts, but do not affect the impact rating).

Specialists are also required to recommend appropriate monitoring and review programmes to track the efficacy of mitigation measures (if appropriate).

Specialists must indicate the environmental acceptability of the proposal (and alternatives if applicable), i.e. whether the impacts are acceptable or not. A comparison between the No Go alternative and the proposed development alternative(s) must also be included.

8.7.1 Biodiversity Specialist Study

The scope of work will include an analysis of relevant conservation databases such as the Mpumalanga Biodiversity Sector Plan and South African National Biodiversity Institute (SANBI) databases.

A field assessment will be undertaken and assessment methods will be applied to characterise the Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the environment and to identify ecosystems and biological assemblages at risk.

The ecological scan will focus on the identification of sensitive habitats and the occurrence/ potential occurrence of Red Data Listed (RDL) floral, faunal and avifaunal species and species of concern as identified by the relevant provincial databases.

The reports produced will also provide rehabilitation input and highlight key migratory measures in order to minimise impacts on both local and regional ecology. A site sensitivity map will be developed from the data gathered during the assessment and an impact assessment will be undertaken with specific emphasis on the proposed development.

The assessment will be conducted to best meet the requirements of the Mpumalanga province for ecological assessments and any other relevant regulations and other legal requirements applicable

[5] An **indirect** impact is an effect that is related to but removed from a proposed action by an intermediate step or process. **Cumulative** impacts occur when: Different impacts of one activity or impacts of different activities on the natural and social environment take place so frequently in time or so densely in space that they cannot be assimilated; or impacts of one activity combine with the impacts of the same or other activities in a synergistic manner.

on both a national and provincial level. In the field assessments will comprise of the following activities:

Terrestrial scan of the study area:

- A habitat evaluation in terms of ecological integrity and Present Ecological State (PES);

Floral assessment:

- General ecological integrity;
- Identification of dominant floral species;
- Probability of Occurrence of RDL floral species/ species of conservation concern; and
- RDL species identification and marking (if applicable) and potential habitat assessment.

Faunal assessment:

- Habitat analyses with focus on needs of threatened mammals;
- Direct observations where possible; and
- Probability of Occurrence of RDL floral species/ species of conservation concern.
- The reports produced will include a detailed impact assessment of all identified significant risks, including cumulative impacts on ecological assemblages in the region will also be made; and
- Recommendations on the management and mitigation measures (including opportunities and constraints) with regards to the proposed relocation activities in order to improve the ecology of the area.

8.7.2 Geotechnical Specialist Study

The scope of work will include an assessment of subsurface conditions pertaining to the proposed route of 3 x 20 km, high voltage, overhead power lines in the Landau region of the Mpumalanga Province.

- The proposed reticulation consists of 3 adjacent lines with 147 towers and approximately 13 inflection points. It is stated that route traverses areas of coal undermining and the client requires an assessment of geotechnical conditions along the route to assess the risk to stability of pylons over a 50-year life of project.
- Given the complexity of the investigation, SRK propose to conduct the geotechnical study in two phases. The initial phase will consist of a desk study and reconnaissance site visit to familiarise SRK with the study area. During this phase, SRK will study available geology maps, underground mining layout maps and typical exploration borehole data that the client has obtain from Anglo as the depth of mining and the nature of the material overlying the workings are deemed critical for evaluation of potential surface instability.
- The deliverable of the initial phase of investigation will be a report that will demarcate the undermined and the non-undermined sections of the alignment which will be targeted for further exploratory investigation by rotary core drilling or other methods in the subsequent investigation, which does not form part of this cost estimate. A second deliverable of the report will be recommendations and a programme for the subsequent intrusive investigation phase to characterise the risk to pylons by assessing foundation conditions and will provide foundation design for areas that are deemed both stable and potentially unstable, in terms of the likelihood and consequence of surface subsidence.

8.7.3 Heritage Specialist Study

The scope of work for the heritage will include the following:

- Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the property.
- Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value.
- Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions.
- Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources.
- Recommend suitable mitigation measure should there be any sites of significance that might be impacted upon by the proposed development.
- Review applicable legislative requirements.

8.7.4 Soils and Land Capability Specialist Study

The scope of work for the soil and land capability will include the following:

- Review and identify broad soil patterns and land capability data project area including relevant mapping;
- Identify selected points of interests (POIs) for representative soil sampling for the analysis of anticipated soil contaminants;
- Develop an understanding and propose soil management measures with regard to availability for rehabilitation; and
- Advise on mitigation measures for identified significant risks/impacts and measures to enhance positive opportunities/impacts of the project.

8.7.5 Wetlands Specialist Study

The scope of work for the wetland delineation will include the following:

- Review of available information with regards to wetlands of the area (e.g. NFEPA database etc.);
- Field verification to confirm the existing wetland delineation on site using the DWAF (2005) wetland delineation guidelines;
- Update the present ecological status (PES) and ecological importance and sensitivity (EIS) assessments of all wetlands using the WET-Health Level 1 and DWS (2013) methods as applicable;
- Update the functional assessments based on groupings of similar wetlands;
- Review of proposed development plans and method statements;
- Identification and assessment of impacts;
- Recommendation of suitable mitigation and management measures; and
- Compilation of a wetland specialist report.

8.8 Impact Rating Methodology

The impact assessment has been conducted in an integrated manner that links the biophysical components with the socio-economic components of the environment. The impact assessment is divided into issue identification, impact definition, and impact evaluation. Iteration of these parts occurs in each stage of an ESIA process to varying degrees.

The basic elements used in the evaluation of impact significance are described in Table 8-2 and the characteristics that are used to describe the consequence of an impact are outlined in Table 8-3.

Table 8-2: Key elements in the evaluation of impact significance

Element	Description	Questions applied to the test of significance
Consequence	An impact or effect can be described as the change in an environmental parameter, which results from a particular project activity or intervention. Here, the term "consequence" refers to: (a) The sensitivity of the receiving environment, including its capacity to accommodate the kinds of changes the project may bring about. (b) The type of change and the key characteristics of the change (these are magnitude, extent and duration). (c) The importance of the change (the level of public concern/ value attached to environment by the stakeholders and the change effected by the project). The following should be considered in the determination of impact consequence: (a) Standards and guidelines (thresholds). (b) Scientific evidence and professional judgment. (c) Points of reference from comparable cases. (d) Levels of stakeholder concern.	Will there be a change in the biophysical and/or social environment? Is the change of consequence (of any importance)?
Probability	Likelihood/chances of an impact occurring.	What is the likelihood of the change occurring?
Effectiveness of the management measures	The significance of the impact needs to be determined both without management measures and with management measures. The significance of the unmanaged impact needs to be determined so there is an appreciation of what could occur in the absence of management measures and of the effectiveness of the proposed management measures.	Will the management measures reduce the impact to an acceptable level?
Uncertainty/ Confidence	Uncertainty in impact prediction and the effectiveness of the proposed management measures. Sources of uncertainty in impact prediction include: (a) Scientific uncertainty – limited understanding of an ecosystem (or affected stakeholders) and the processes that govern change. (b) Data uncertainty – restrictions introduced by incomplete, contradictory or incomparable information, or by insufficient measurement techniques. (c) Policy uncertainty – unclear or disputed objectives, standards or guidelines. There are a number of approaches that can be used to address uncertainty in impact prediction, including: (a) 'Best' and 'worst' case prediction to illustrate the spread of uncertainty. (b) Attaching confidence limits to impact predictions. (c) Sensitivity analysis to determine the effect of small changes in impact magnitude.	What is the degree of confidence in the significance ascribed to the impact?

Impact significance rating

Practicable management measures will be recommended that avoid, and if avoidance is not possible, then reduce, restore, compensate/offset negative impacts, enhance positive impacts and assist project design. The impact significance rating system is presented in Table 8-3 and involves four parts:

- Part A: Defines impact consequence using the three primary impact characteristics of magnitude, spatial scale and duration
- Part B: Uses the matrix to determine a rating for impact consequence based on the definitions identified in Part A
- Part C: Uses the matrix to determine the impact significance rating, which is a function of the impact consequence rating (from Part B) and the probability of occurrence and
- Part D: Defines the Confidence level.

Table 8-3: Method for rating the significance of impacts

PART A: DEFINING CONSEQUENCE IN TERMS OF MAGNITUDE, DURATION AND SPATIAL SCALE ***Use these definitions to define the consequence in Part B***		
Impact characteristics	**Definition**	**Criteria**
MAGNITUDE	Major -	Substantial deterioration or harm to receptors; receiving environment has an inherent value to stakeholders; receptors of impact are of conservation importance; or identified threshold often exceeded
	Moderate -	Moderate/measurable deterioration or harm to receptors; receiving environment moderately sensitive; or identified threshold occasionally exceeded
	Minor -	Minor deterioration (nuisance or minor deterioration) or harm to receptors; change to receiving environment not measurable; or identified threshold never exceeded
	Minor +	Minor improvement; change not measurable; or threshold never exceeded
	Moderate +	Moderate improvement; within or better than the threshold; or no observed reaction
	Major +	Substantial improvement; within or better than the threshold; or favourable publicity
SPATIAL SCALE OR POPULATION	Site or local	Site specific or confined to the immediate project area
	Regional	May be defined in various ways, e.g. cadastral, catchment, topographic
	National/ International	Nationally or beyond
DURATION	Short term	Up to 18 months.
	Medium term	18 months to 5 years
	Long term	Longer than 5 years

PART B: DETERMINING CONSEQUENCE RATING ***Rate consequence based on definition of magnitude, spatial extent and duration***					
			SPATIAL SCALE/ POPULATION		
			Site or Local	**Regional**	**National/ international**
MAGNITUDE					
Minor	**DURATION**	**Long term**	Medium	Medium	High
		Medium term	Low	Low	Medium
		Short term	Low	Low	Medium
Moderate	**DURATION**	**Long term**	Medium	High	High
		Medium term	Medium	Medium	High
		Short term	Low	Medium	Medium
Major	**DURATION**	**Long term**	High	High	High
		Medium term	Medium	Medium	High
		Short term	Medium	Medium	High

PART C: DETERMINING SIGNIFICANCE RATING *Rate significance based on consequence and probability*			
	CONSEQUENCE		
	Low	**Medium**	**High**

Using the matrix, the significance of each described impact is initially rated. This rating assumes the management measures inherent in the project design are in place.

Management recommendations and post management significance

Practicable **management measures** were then listed, using the IFC's management hierarchy:

"Recommendations for management should focus on *avoidance, and if avoidance is not possible, then to reduce, restore, compensate/offset negative impacts*, enhance positive impacts and assist project design."

The significance of impacts was then re-assessed **with** assumed management measures in place ("**after management**"). Specialists also recommended and described appropriate **monitoring** and review programs to track the efficacy of management measures. These are included in the Action Plans.

An example of the table used to report the significance rating for each impact before and after the implementation of mitigation / management measures, and listing these measures, is provided as Table 8-4.

Table 8-4: Impact significance rating and mitigation measures for the Impact

Impact xx: Habitat disturbance resulting in invasion by exotic fauna and flora								
	Magnitude	**Duration**	**Scale**	**Consequence**	**Probability**	**SIGNIFICANCE**	**+ /-**	**Confidence**
Before Management	*Moderate*	*Long term*	*Site / local*	***Medium***	*Possible*	***Medium***	-	*Medium*
Management Measures:								
After Management	*Minor*	*Short term*	*Site / local*	***Low***	*Unlikely*	***Low***	-	*Medium*

9 Conclusions

This report contains the following information regarding the proposed relocation of three Eskom 400kV power lines at Khwezela Colliery:

- Background to the project;
- Governance Framework;
- Environmental Process;
- Project Description including alternatives;
- Description of the Affected Environment
- Stakeholder Engagement Process;
- Potential environmental and social impacts associated with those; and
- The way forward in the EIA phase.

A comprehensive stakeholder engagement programme has been proposed for the scoping phase, and it is assumed that all critical issues would have been identified following the finalization of the Scoping Report. Key issues will be assessed during the EIA phase, and commitments made in the EMP.

The environmental authorisation process is, however, an iterative process, and additional issues and concerns may be identified during the EIA phase. Modifications to the scope of work will take place should the need arise. Specialist studies will be undertaken in the EIA phase of the project.

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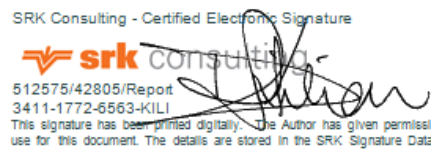

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All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

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Reception	Greenside Village	5	14 March 2017	Darryll Kilian
Reception (first floor) and Spatial Planning (3rd floor)	Emalahleni Local Municipality	6 & 7	14 March 2017	Darryll Kilian
Human Resources and Shop Steward Kromdraai in Matimba Village	North and South Union Offices, Matimba Village	8 & 9	14 March 2017	Darryll Kilian
Director: Integrated Environmental Authorisations	Department of Environmental Affairs	10	14 March 2017	Darryll Kilian
SRK Consulting_Library	SRK Consulting	11	14 March 2017	Darryll Kilian
SRK Consulting_Enviro	SRK Consulting	12	14 March 2017	Darryll Kilian

Approval Signature: