

PROPOSED ESTABLISHMENT OF THE ANDERSON 400kV SUBSTATION IN BROEDERSTROOM NORTH WEST PROVINCE

DRAFT SCOPING REPORT

DEA Ref No: 12/12/20/1568

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for
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TITLE PAGE

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EXECUTIVE SUMMARY

ELECTRICITY GENERATION, TRANSMISSION AND DISTRIBUTION - OVERVIEW

Electricity is generated, supplied and distributed by Eskom via a network called a "Grid". The amount of electricity being fed into the grid must always match what the customers are taking out. The amount of electricity required by the customers varies not just from day to day, but from minute to minute. As electricity demand increases, and loads are connected, more power stations and associated substations and lines need to be built to meet the electricity demands. An overview of electricity generation, transmission and distribution is provided in Section 1.1 of this Report.

BACKGROUND AND MOTIVATION: ANDERSON 400kV SUBSTATION

The Medupi integration identified the need for the new 2 x Spitskop-Dinaledi 400kV lines to transmit power further into the grid beyond Spitskop. The Dinaledi Main Transmission Substation (MTS) is the main node to link the Waterberg generation and the Mpumalanga pools. Dinaledi MTS is connected by 400kV lines to Bighorn (Rustenburg), Apollo (Pretoria) and will be connected by 2x400kV lines to Spitskop (Northam). This meshed network will be linked to the Central Grid by establishing a new 400kV line from Dinaledi MTS to a new substation called Anderson.

Over the past 15 years, load in the Pretoria area has increased by 80%. This load is anticipated to double in the next 20-30 years, to meet the future electricity requirements in this area and as part of the Tshwane Strengthening project a new substation named Anderson is proposed to feed the Hartbeespoort and neighbouring areas. This new substation will be linked to the existing Dinaledi Main Transmission Substation by a 40km 400kV line.

The proposed Anderson substation will be located to the north of the Pelindaba nuclear facility. The Dinaledi – Anderson 400kV line will transmit power from Dinaledi to the Central Grid and strengthen it. This will ensure that the transmission system north of Johannesburg, Brits and Rustenburg are heavily meshed. This will improve the reliability of the Transmission system and sustain economic growth in the three areas.

PROJECT DETAILS

Description

Eskom Holdings Limited is proposing the construction of a new 400kV Transmission Line, and a proposed new 400kV Substation as part of their Tshwane Strengthening Scheme Project. The proposed powerline will be approximately 40km in length and will run between the proposed new Anderson Substation, which will be located to the north of the Nuclear Energy Corporation of South Africa (NECSA), located in Broederstroom, to the existing Dinaledi Substation which is located approximately 8km North East of Brits. The proposed powerline will be constructed in the following two Municipal Areas: Madibeng Local Municipality (North West) and the City of Tshwane Local Municipality (Gauteng). The proposed substation is earmarked for construction within the Madibeng Local Municipality. Please note that a separate Environmental Impact Assessment (EIA) process is being undertaken for the proposed Anderson-Dinaledi 400kV Powerline. Both EIA Processes is undertaken by Nema Consulting. The Draft Scoping Report for both of these projects will be available for Public Review simultaneously.

Location

The Dinaledi Substation is located on Portion 843 of the Farm Roodekopjes of Zwartkopjes 427 JQ, which is located approximately 8km North East of Brits. Two site alternatives are being investigated for the proposed construction of the Anderson Substation. These two site alternatives are located directly to the north of NECSA, in Broederstroom, within the Madibeng Local Municipality, North West Province. During the EIA Phase a preferred substation site will be selected based on the findings of the specialist studies, as well as the outcome of the impact assessment. The Department of Environmental Affairs (DEA) may authorise the identified preferred site alternative, the Department may authorise the other alternative, or the Department may request that additional information be submitted in order to make a decision regarding the proposed project. In the past the exact location and orientation of the substation in site were only determined once authorisation have been obtained by DEA. However, DEA indicated that the exact location of the proposed powerline and loop-in and loop-out lines from the substation needs to be incorporated into the Final EIR. DEA provided this comment during a meeting which was held with the Department regarding the proposed project, width of the powerline study corridor and size of the substation site alternatives. Details regarding this meeting are provided in Section 6.1.8 of this Report and the minutes of the meeting with DEA are attached to Appendix C.

Three alternative powerline routes have been identified (refer to the locality map attached to Appendix A, and to Figure 2). A 1km buffer area has been placed around each alternative route, which will form the

study area/corridor to be investigated during the Scoping and EIA Phase. During the EIA Phase a preferred study area/corridor will be selected. The Department of Environmental Affairs (DEA) may authorise the identified preferred corridor, the Department may authorise one of the other corridors, or the Department may request that additional information be submitted in order to make a decision regarding the proposed project. Once DEA authorises a corridor, a walk down survey will be undertaken by suitably qualified specialists in order to determine the exact location of the powerline.

The two site alternatives being investigated for the proposed substation is located on various properties. The details of the affected properties are provided in the table below. Each proposed substation alternative study site is approximately 1km² in extent.

Site	Affected Properties	Size	Zoning
Site 1	Portion 82 of the Farm Weldaba 567 JQ	Total Portion = 2737ha	To be determined
Site 2	Portion 82 of the Farm Weldaba 567 JQ	Size of Portion location north of the R104 which is earmarked for possible substation construction = 200ha	
	Portion 65 of the Farm Welgedund 491 JQ	42.82ha	To be determined
	Portion 25 of the Farm Welgedund 491 JQ	168.3ha	To be determined

Construction Footprint/Construction Details

A substation is defined as a high-voltage electric system facility which is used to switch generators, equipment, and circuits or lines in and out of a system. Substations are also used to change alternating current (AC) voltages from one level to another, and/or change alternating current to direct current or visa versa. Substations are generally designed to accomplish the following functions; however, not all substations are designed to perform all of these functions. Details of the construction footprint and construction details are discussed in Section 1.3.3 of this Report.

Land uses surrounding the study sites includes NECSA, Pelindaba and the R104 to the south, and privately owned farm portions to the north, east and west. The foot of the Witwatersberg is located approximately 1km north of the study sites.

Access

Access to Portions 25 and 65 of the Farm Welgedund 491 JQ is obtained directly off the R104. Access to Portion 82 of the Farm Weldaba 567 JQ is obtained from a dirt road leading from the R104. During the construction phase an access road will be required. Access roads to substation are normally tarred roads of 6m wide. The current access road to the property could also be utilised should the landowner agree. The exact position of the access road will be determined based on landowner agreements as well as the exact location of the substation. This access road will also be used during the operational phase to access the substation. Construction and maintenance roads required for the 400kV powerline are discussed in detail in the Anderson-Dinaliedie 400kV powerline EIA Report. The access and maintenance required for the 400kV powerline will also be utilised during the construction of the loop-in and loop-out lines to and from the substation.

Roads developed for construction purposes which will not be used during maintenance procedures will be closed and rehabilitated at the end of the construction phase. Where roads need to be developed on side slopes where the slope is steeper than 4%, cut and fill operations may be required to level the roads. Road construction and levelling will be undertaken in terms of the "Transmission Line Towers and Line Construction" (TRMSCAAC1 – Rev 3) document compiled by Eskom. This document provides certain specification for road construction and levelling to ensure that side slopes are stable.

Where construction and maintenance roads intersect with fences, gates need to be installed. Furthermore all existing infrastructure along the access and maintenance roads should be maintained in its existing condition. Access points and access roads need to be negotiated with the landowners.

Zoning

The zoning of the three properties which could potentially be affected by the substation are not yet known. Details on the zoning will be included in the EIA Report. An application for rezoning may be required for the temporary construction camps, however, clarity on this matter needs to be obtained from the Local Municipalities.

Ownership

Windeed and Lexis Nexis searched were undertaken by Eskom to determine the landowners of the affected properties. Background information documents was delivered to the landowners and Eskom consulted telephonically with these landowners in order to obtain written consent from the landowners to undertake a Scoping and Environmental Impact Assessment and associated specialist studies on their properties. Only one landowner signed a Consent Form prior to making the Scoping Report available for Public Review. This Consent Form is attached to Appendix G. The Landowners Consent Forms not included in the Scoping Report will be attached to the EIA Report.

ANDERSON 400KV SUBSTATION IDENTIFICATION OF SITE ALTERNATIVES AND ANDERSON-DINALEDI 400KV POWERLINE ROUTE DESCRIPTION

Eskom Grid Planning is responsible for establishing future electricity demands as a result of growth and development. Once an area has been identified where future growth will result in electricity constraints, methods for strengthening the grid to sustain future growth patterns is considered. The Tshwane Strengthening Scheme is one of these projects which were identified by Eskom to ensure a stable and efficient electricity supply for the future. After Eskom Grid Planning has identified the selected method to strengthen the grid, the various substations and powerlines which will be required for this project was identified.

The transmission line route selection process involves the consideration of various technical criteria to determine where a line could be located within the selected study area where grid strengthening is required. The technical criteria used by Eskom to determine the route alignments are includes inter alia the following:

- The cost of construction of Transmission Line Routes is directly proportional to the total length, therefore the longer the route the more expensive construction becomes, the shortest route between two points area therefore preferable;
- Bend towers on a Powerline are extremely expensive due to the large quantities of steel and the large foundations required to construct such towers, therefore the least amount of bends in a line is preferable;
- The maximum angle for a bend tower is 60 degrees, therefore a line cannot just be deviated easily, and proper planning is required. For larger bends, special towers have to be constructed;

- Transmission line routes with existing access routes are preferred, as heavy vehicles and cranes are used for tower construction which needs to travel to the servitude area and specifically to tower positions; and
- When planning a route it is preferable to avoid construction on erosive land, land which is undermined where sinkholes occur or where sinkholes could occur in future, furthermore area with poor geotechnical conditions should be avoided as far as possible.

There are various other technical criteria which are considered during the route selection process of a proposed new powerline. A large scale detailed map which shows the proposed alternative routes and associated 1km study areas are attached to Appendix A.

The location of the substation is dependent on the underlying geology in the area, and also on how the substation needs to fit into the grid to strengthen the network in an area. The purpose of the Anderson-Dinaledi project is to bring a powerline to the Dinaledi and proposed new Anderson Substation in order to strengthen electricity supply to the area. Site alternatives were investigated for the proposed Anderson Substation. The Anderson Substation needs to be located to the south of the Magaliesberg in order to split the network north and south of the mountain. Refer to Figure 3 for a map showing the location of the alternative substation sites.

Originally, Eskom considered to construct the proposed substation within the property of the Nuclear Energy Corporation of South Africa (NECSA). There is an existing decommissioned partly demolished Anderson Substation located within the NECSA property and it was the intention to construct the new Anderson Substation on the same site as where the decommissioned partly demolished Anderson Substation is located. Various meetings were held with NECSA to discuss the possibility of the construction of the Anderson Substation within the NECSA property. Due to security reasons, limited construction space and dolomites located to the south of the NECSA property the substation cannot be constructed within the NECSA property. Details on the discussions held with NECSA as well as the outcome of the discussions are provided in Section 6.1.8 of this Report.

A detailed description of the Powerline route alternatives are provided below. Please note however that a separate Scoping Report has been compiled for the Anderson-Dinaledi 400kV powerline, as separate Environmental Authorisation Processes are being undertaken for the Powerline and Substation.

PROPERTIES AFFECTED BY 1KM STUDY AREA

A list of all properties located within the 1km study area of the three alternative proposed Powerline Routes is provided in Section 1.5 of this Report. The table also includes all the directly affected properties. The Cadastral 2006 information was used to determine the affected properties. Therefore all subdivisions undertaken after 2006 will not be reflected on this list.

UPGRADE OF EXISTING 88KV LINE

The proposed Madibeng substation project which is undertaken by Eskom Distribution forms part of the Tshwane Strengthening Scheme. This project entails the construction of a proposed Madibeng Substation which will be located at about 8km south-west of the Dinaledi Substation. The Madibeng Substation will be fed from Dinaledi MTS through 2x132kV lines and thereby split the existing 88kV network in the Tshwane and Brits area. The existing 88kV network in and around the Brits and Tshwane area will be split in such a way that an existing 88kV Lomond-De Wildt line becomes redundant. The Lomond-De Wildt line route is located within the Anderson-Dinaledi 400kV line study area and thus it can be decommissioned after the construction of the Madibeng Substation in order to accommodate the proposed Anderson-Dinaledi 400kV line.

The Madibeng substation project is scheduled to be commissioned by 2014 depending on the speed acquisition of servitudes. The current 88kV Lomond-De Wildt line route servitude is designed for 88kV lines and therefore becomes inadequate for a 400kV line route. The majority of the existing line towers are wood poles which were designed for 88kV lines in terms of clearances and insulations. It is thus necessary that the servitude be extended and the towers be re-designed or changed for the 400kV line. The foundation of the towers will most probably change as the centre line servitude may change due to the servitude extension and different towers.

The centre line will change because the existing line runs closer to another existing 88kV line. It is therefore with noting that the decommissioning and dismantling of the existing 88kV Lomond-De Wildt line for the proposed 400kV Anderson-Dinaledi line can only begin when Madibeng substation is successfully commissioned.

LEGISLATION AND GUIDELINES CONSIDERED

A summary of the legislation and guidelines which will be considered during the Scoping and Environmental Impact Assessment Phases for this project is provided in Section 3 of this Report. Please note this project will be undertaken in terms of the Environmental Impact Assessment (EIA) Regulations of 2006, as the Application Form for undertaking the Environmental Authorisation Phase for this project was submitted to the Department of Environmental Affairs (DEA) on the 29th of July 2009. However, the new EIA Regulations which was promulgated on the 18th of June 2010 and which came into effect on the 2nd of August 2010 will be considered as part of the Scoping and EIA Phases in order to ensure that listed activities under the new EIA Regulations are considered, assessed and addressed. The EIA Regulation of

2006 and of 2010 as well as the relevant listed activities which will be triggered as part of this proposed project is addressed in Section of this Report.

SCOPING AND EIA PROCESS

The proposed Anderson-Dinaledi 400kV powerline project entails certain activities that require authorisation in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA), as described in Section 4.1 of this Report. The process for seeking authorisation is undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations, 2006, promulgated in terms of Section 24(5) of the NEMA.

Section 24C(2)(d)(iii) of the National Environmental Management Amendment Act (Act 62 Of 2008) states that the Minister must be identified as the competent authority in terms of subsection (1) if an activity is undertaken, or is to be undertaken, by a statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government.

Section 4(1) of Regulation 385 of the Environmental Impact Assessment Regulation, 2006, states that if the Minister is the competent authority in respect of a specific application, the application must be submitted to the Department of Environmental Affairs (DEA). Eskom is a parastatal or statutory body, and therefore the decision-making authority for this project in the Department of Environmental Affairs (DEA). The Department will make a decision on whether authorisation will be granted for this project or not based on the content of the Scoping and Environmental Impacts Assessment Reports which will be submitted to the Department for review and decision making. The Scoping and EIA Report will also be submitted to the following authorities for comment:

- North West Department of Agriculture, Conservation and Environment;
- Department of Water Affairs (DWA);
- National Department of Agriculture (NDA);
- North West Provincial Heritage Resources Authority; and
- Madibeng Local Municipality Environmental and Town Planning Departments.

Comment received from these authorities will be incorporated into the EIA Report which will be submitted to DEA for review and decision making.

The Scoping Phase is the first phase of an Environmental Impact Assessment. Once Scoping Report Approval has been obtained from the authorising authority, the EIA phase commences. A Scoping and EIA process consist of various phases. These phases have been illustrated in a Process Flow Diagram (Figure 5).

An application to undertake Scoping and EIA for this proposed project was submitted to DEA on the 21st of July 2009. DEA acknowledged receipt of this application from and issued the project with the following reference number: 12/12/20/1567. The acknowledgement letter from DEA is attached to Appendix C.

THE RECEIVING ENVIRONMENT

The Draft Scoping Report provides a general regional and site description of the receiving environment, which allows for the identification of sensitive environmental features and the establishment of possible impacts which the proposed development could have on the receiving environment. Potential Specialist studies required were determined based on the findings of this section. The elements of the receiving environment which are addressed in this section include:

- Geology;
- Topography;
- Climate;
- Soils and Land Capability;
- Land Use;
- Flora;
- Fauna;
- Surface Water;
- Groundwater;
- Air Quality;
- Noise;
- Visual;
- Traffic;
- Socio-Economic Environment;
- Infrastructure and Services; and
- Archaeological and Cultural Historical.

PUBLIC PARTICIPATION PROCESS

A Public Participation Process was conducted as described in Regulation 58 of the EIA Regulations, 2006. The Public Participation Process included the following:

- Consultation and involvement of relevant Authorities at various levels;

- Consultation and involvement of the owners and occupiers of land adjacent to the properties earmarked for development, and within a 100m radius of the boundary of the site where the activity is to be undertaken, by hand delivering Background Information Documents (BID's) to all owners and occupiers within a 100m radius of the properties earmarked for development;
- Consultation and involvement of the municipal ward councillors of the wards in which the properties earmarked for development are located;
- Consultation and involvement of the municipality which has jurisdiction in the area;
- Consultation and involvement of any organ of state having jurisdiction in respect of any aspect of the activity;
- Compilation and placing of advertisements in local and regional newspapers;
- Compilation and placing of site notices on the properties earmarked for development;
- Compilation and distribution of Background Information Documents (BID's) to all relevant Stakeholders within a 100m radius; and
- Hosting of a Public Meeting.

The Public Participation Process is described in detail in Section 6 of this Report.

PLAN OF STUDY FOR EIA

The Draft Scoping Report is concluded with the Plan of Study for EIA, which explains the approach which will be followed to conduct the EIA Phase. The purpose of the EIA is to:

- Address issues that have been raised during the Scoping Phase;
- Assess alternatives to the proposed activity in a comparative manner;
- Assess all identified impacts and determine the significance for each impact; and
- Formulate mitigation measures.

The EIA Phase will consist of the following activities:

- Stakeholder engagement;
- Assessment of alternatives;
- Specialist Studies;
- Interaction of project design and baseline environmental criteria;
- Identification of potential impacts;
- Impact Assessment;
- Identification and description of mitigation measures; and
- Reporting and decision making.

The Plan of Study for EIA is described in detail in Section 7 of this Report.