

**PROPOSED UPGRADE OF EROS DISTRIBUTION
SUBSTATION TO A 400KV TRANSMISSION SUBSTATION**

**ENVIRONMENTAL IMPACT ASSESSMENT
EIA/6752**

SCOPING REPORT

MARCH 2006



Eyethu Engineers CC
PO Box 70358
Overport
Durban
4067
Tel. (031) 303-7630
Fax. (031) 312-9930

Prepared for:
ESKOM TRANSMISSION
PO Box 1091
Johannesburg
2000

EXECUTIVE SUMMARY	5
CHAPTER 1 THE EIA PROCESS FOLLOWED FOR THE PROJECT	6
1.1 BRIEF BACKGROUND TO THE PROJECT	6
1.2 THE EIA PROCESS FOLLOWED	6
1.2.1 Authority Consultation	10
1.2.2 Specialist Input	10
1.2.3 Site Visit	10
1.2.4 Information Gathering	10
1.3 PUBLIC PARTICIPATION	11
1.4 CONTENTS OF THE SCOPING REPORT	11
CHAPTER 2 THE LEGAL POSITION	12
2.1 INTRODUCTION	12
2.2 PERTINENT ENVIRONMENTAL LEGISLATION	12
2.3 SPECIFIC RELEVANT ENVIRONMENTAL LEGISLATION	13
2.3.1 Environmental Conservation Act No 73 of 1989 (ECA)	13
2.3.2 National Environmental Management Act No 107 of 1998 (NEMA)	14
CHAPTER 3 THE NEED FOR THE UPGRADE OF THE EROS SUBSTATION	15
3.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE STUDY AREA	16
3.1.1 Institutional context	16
3.1.2 Surrounding land use	16
3.1.3 Transport routes	17
3.1.4 Archaeological and cultural resources	17
3.2 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA	17
3.2.1 Climate and Topography	17
3.2.2 Geomorphology and Soils	17
3.2.3 Fauna & Flora	17
3.2.4 Avi-fauna	17
3.2.5 Hydrology	18
CHAPTER 4 DESCRIPTION OF PROJECT	19
4.1 INTRODUCTION	19
4.2 DESCRIPTION OF SUBSTATION EXTENSION AND NEW STRUCTURES	19

4.3	THE CONSTRUCTION PHASE	19
4.4	ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION	22
4.5	SITE STAFF	22
CHAPTER 5 IDENTIFICATION OF POTENTIAL ISSUES AND IMPACTS		23
5.1	POSSIBLE SOCIAL ISSUES / IMPACTS	23
5.1.1	Social Environment - general mitigation measures	23
5.2	POSSIBLE CULTURAL HERITAGE ISSUES / IMPACTS	23
5.2.1	Cultural heritage - general mitigation measures	23
5.3	POSSIBLE ISSUES / IMPACTS RELATING TO PHYSICAL ENVIRONMENT	24
5.3.1	Physical Environment – general mitigation measures	24
CHAPTER 6 PROJECT ALTERNATIVES		25
6.1	INTRODUCTION	25
6.1.1	Alternative Designs	25
6.1.2	Strategic Alternatives	25
6.1.2.1	<i>The “Do Nothing” Option</i>	25
6.1.2.2	<i>Demand-side Management</i>	25
6.1.2.3	<i>Upgrade Eros substation to a 400kV primary voltage (this project)</i>	26
6.1.2.4	<i>Build additional 132kV lines</i>	26
CHAPTER 7 CONCLUSIONS		27
CHAPTER 8 RECOMMENDATIONS		28

APPENDICES

- APPENDIX A Summary of Public Participation Process followed, includes IAP Database, BID & Adverts
- APPENDIX B Copies of Comments Received
- APPENDIX C Eskom Transmission Generic Environmental Management Plan for construction activities
- APPENDIX D Site layout plan

FIGURES

- FIGURE 1 Conceptual Framework for EIA Study
- FIGURE 2 Locality Map
- FIGURE 3 Site plan showing extent of proposed extension
- FIGURE 4 Eskom's transmission network

PHOTOGRAPHS

- PHOTO 1 Aerial photograph of Eros Substation
- Photo 2 Maize fields on the site of the proposed extension
- PHOTO 3 Transformer foundations
- PHOTO 4 Transformer foundations
- PHOTO 5 Transformer installation
- PHOTO 6 Transformer installation
- PHOTO 7 Stormwater and erosion control
- PHOTO 8 Stormwater and erosion control
- PHOTO 9 Erection of steelwork
- PHOTO 10 Erection of steelwork

LIST OF ACRONYMS

DAEA	KZN Department of Agriculture and Environmental Affairs
DEAT	National Department of Environmental Affairs & Tourism
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ENG	Eros-Neptune-Grassridge Transmission Line (Proposed)
I&AP's	Interested and Affected Parties
MW	Megawatts
NEMA	National Environmental Management Act
PPP	Public Participation Process
RoD	Record of Decision
SR	Scoping Report

EXECUTIVE SUMMARY

INTRODUCTION

Eskom propose the upgrade of the Eros Distribution substation in Harding, Southern KZN, to a 400kV transmission substation.

The purpose of the upgrade is to increase the security of supply to the regions of the Natal South Coast, Eastern Cape and former Transkei.

PROJECT DESCRIPTION

In line with environmental legislation, Eskom Transmission has appointed Eyethu Engineers cc as the Independent Environmental Consultant to undertake the Environmental Impact Assessment (EIA) for the proposed substation upgrade. The upgrade of the Eros substation was originally contained in the terms of reference for the Eros-Neptune-Grassridge Transmission Line EIA that is also currently underway. However, due to the urgency of the upgrade at Eros (irrelevant of the outcome of the Eros-Neptune-Grassridge EIA), Eskom Transmission approached the Department of Environmental Affairs and Tourism and requested that the substation instead have a separate application and scoping report. The specialist studies component of the Eros-Neptune-Grassridge EIA remain unchanged and have therefore fed into this scoping report where necessary. A separate Public Participation Process is being carried out for the Substation Upgrade.

The Eros Substation site was described as having a low environmental sensitivity from a botanical, archaeological and avi-fauna perspective. Social impacts are expected to be of low significance with a good chance of mitigation, largely due to the fact that the activity takes place within the Eskom Substation boundary. Visual impacts of the upgrade are expected to be minimal due to the fact that there is existing infrastructure at the site, and the viewing audience is minimal due to the rural nature of the site. The height of the new structures is similar to that of those already existing at the substation.

No objections to the proposed upgrade were received during the scoping process. The issue of compensation for damage to adjacent crops was the main issue raised during the study.

SCOPING STUDY CONCLUSIONS

The upgrade of the existing substation will have a low impact on the natural environment, while conferring considerable operating improvements to the electricity grid in the area.

Based on the findings of the study, the recommendations made and the ability to mitigate against the identified impacts, the project is considered environmentally acceptable.

CHAPTER 1 THE EIA PROCESS FOLLOWED FOR THE PROJECT

1.1 BRIEF BACKGROUND TO THE PROJECT

Eskom Transmission proposes the upgrade of the Eros distribution substation in Harding, southern KZN, to a 400kV transmission substation. Eskom Transmission is responsible for the supply of bulk electricity via high voltage lines (between 220kV and 765 kV) from the generation source to the distributors and some end users. Eskom Distribution is responsible for distributing this electricity to municipalities and some end-users via smaller voltage lines (between 11kV and 132 kV). The purpose of the upgrade is to increase the security of supply to southern KZN and the Eastern Cape. The study area for the upgrade is depicted in Figure 1.

1.2 THE EIA PROCESS FOLLOWED

This section provides a background to the EIA process and places this report in the project's current context. Eyethu Engineers cc were appointed by Eskom Transmission to undertake the necessary environmental investigations in order to obtain a Record of Decision (RoD) from the National Department of Environmental Affairs and Tourism (DEAT) on whether the proposed substation upgrade may proceed or not. The substation upgrade originally formed part of the Eros-Neptune-Grassridge Transmission Line EIA that is currently underway. However, it was decided by Eskom planners that the Eros Substation upgrade should be split from Eros-Neptune-Grassridge Transmission Line project as a separate application to DEAT for the following reasons:

- The construction of the 400kV infrastructure at the substation would require a considerably longer timeframe than the construction of the Eros-Neptune-Grassridge Transmission Line due to equipment ordering lead times.
- The upgrade of the Eros substation is necessary to increase volume and security of supply to the region even if the Eros-Neptune-Grassridge Transmission Line project should not be approved, or should it be delayed.

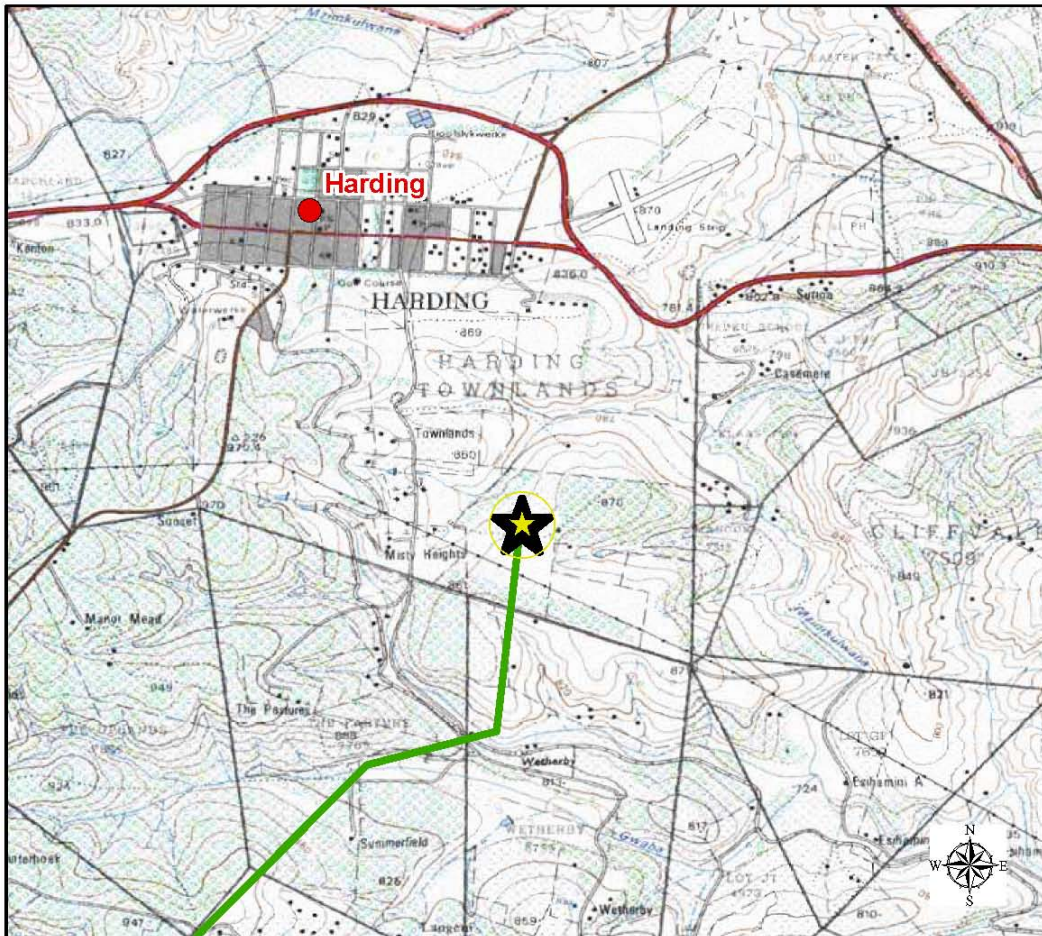
The EIA process for the Eros Substation upgrade is thus carried out according to an Integrated Environmental Management (IEM) procedure, as advocated by the Department of Environmental Affairs and Tourism (1992) and the Regulations promulgated under the Environment Conservation Act 73 of 1989. National DEAT have delegated authority for this project to the KZN Department of Agriculture and Environmental Affairs (DAEA). This report is the scoping report, and constitutes part of the abridged EIA process, as illustrated in Figure 2.

The EIA process as a whole is intended to provide information on the affected area, identify alternatives at an early stage, facilitate consultation with the landowners, key stakeholders and specialists, and to address the concerns of Interested and Affected Parties (I&APs). This report aims to collect and address all issues raised during the scoping process, and to provide sufficient information for DAEA to make a decision on the project at this stage. Based on the review of the scoping report, the DAEA will rule whether further environmental investigations

are required. The RoD will either state that the project may not proceed, or that it may proceed with conditions.

Table 1: Approach to the study

Phase	Main Action	Description
Phase 1	Need and justification	Establish the need for the project. Establish project alternatives. Identify study area.
Phase 2	Scoping study	Identify and contact I&APs. Collect background data. Identify gaps in background data. Identify problem areas. Evaluate alternatives and determine which are viable technically and environmentally
Phase 3	Environmental Scoping Report	Environmental Scoping Report (Current)
Phase 4	Review	Independent I&AP review of Scoping Report. Comments received and analysed, Final Scoping Report.
Phase 5	Decision	Final Scoping Report submitted to DAEA for approval. Decision on the project made by DAEA. Decision made public.



0 0.5 1 2 Kilometers

Scale 1: 50 000

-  Eros Substation
-  Proposed Eros-Neptune-Grassridge Transmission Line



Figure 1: Study Area

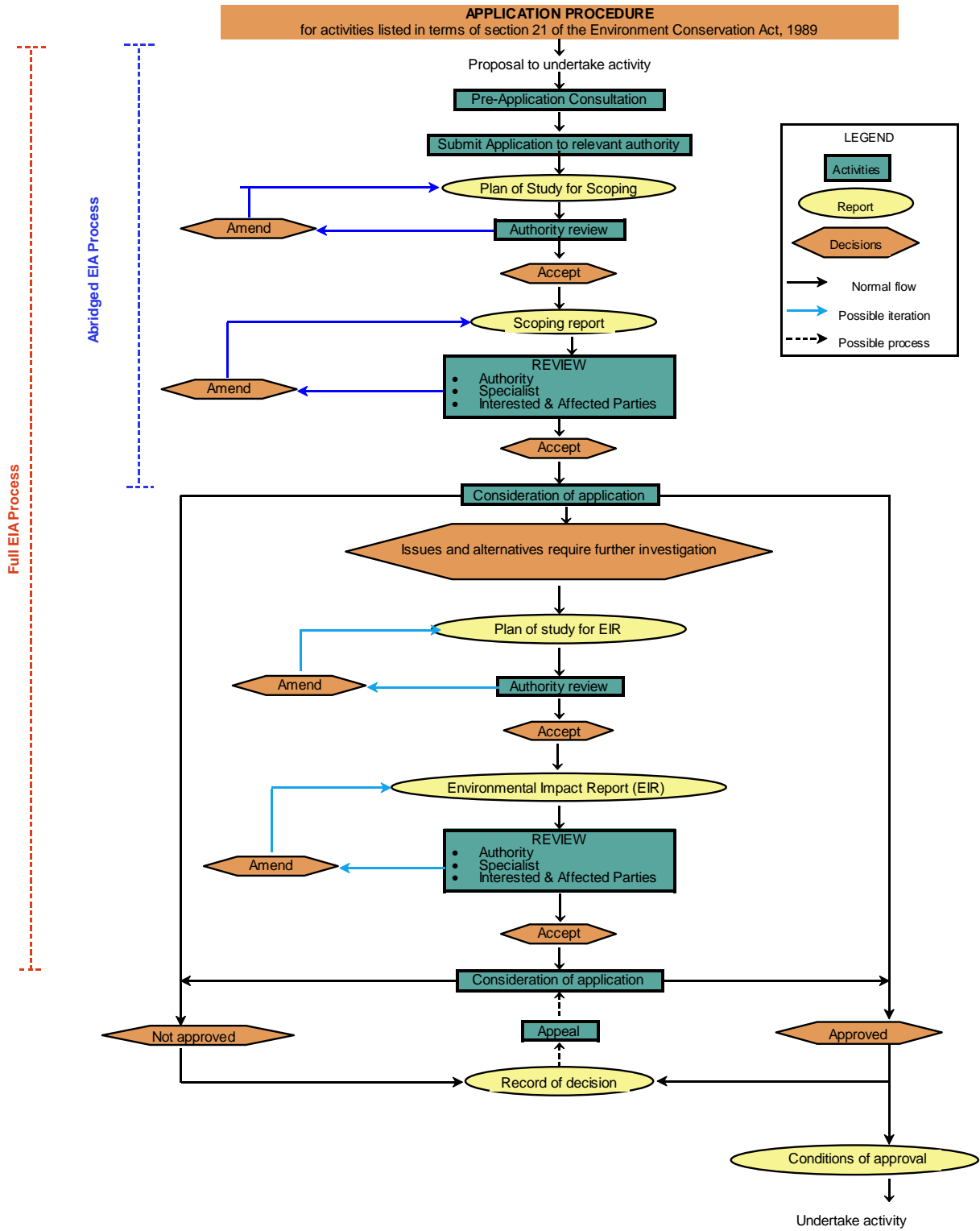


Figure 2: The EIA Process

1.2.1 Authority Consultation

Pre-application telephone calls were held on Thursday 03 November 2005 with following authorities:

- Mr Danie Smit, Department of Environmental Affairs and Tourism (National);
- Ms Joyce Green-Govender, Department of Agriculture and Environmental Affairs (KZN).

1.2.2 Specialist Input

The following specialists were consulted concerning the Eros-Neptune-Grassridge project (of which the Eros Substation originally formed a part), and produced reports at the scoping stage:

- Archaeology: Len van Schalkwyk, eThembeni Cultural Heritage
- Avifauna: Chris van Rooyen, Endangered Wildlife Trust.
- Flora: Willem de Frey, EkoInfo
- Fauna: Dewald Kamffer, EkoCheck
- Social: Johan van der Walt, Acer (Africa)
- Visual: Menno Klapwyk, Cave Klapwyk and Associates.

The aims of authority and specialist consultation at this stage was to discuss and define the following:

- the need for the Eros-Neptune-Grassridge project (including Eros Substation upgrade);
- project alternatives;
- any constraints which may be identified by Authorities;
- scope of work for the study;
- study approach and methodology with respect to data collection, data evaluation and public participation;
- identification of additional interested parties;
- the main environmental issues which require detailed study;
- relevant data;
- verification of map data;
- identification of “no go” areas.

1.2.3 Site Visit

A site visit was carried out on 24th January 2006 with Nombulelo Zungu of the KZN DAEA's Ugu office. Eskom personnel were present in order that technical and strategic questions could be addressed.

1.2.4 Information Gathering

Information gathering was carried out through:

- Correspondence with specialists and Eskom personnel
- Geographic Information System (GIS) analysis including 1:50 000 topographical maps and aerial photography of the substation

- Vegetation maps of South Africa (Mucina and Rutherford 2003)
- National Biodiversity Spatial Assessment Programme
- Heritage Databases for KZN
- Interaction with NGOs and individuals
- Interaction with Authorities

1.3 PUBLIC PARTICIPATION

Public participation forms a central part of the Scoping process. A summary of the public participation process followed is provided in Appendix A. Copies of the comments received (showing comments relevant only to the substation upgrade) included as Appendix B.

1.4 CONTENTS OF THE SCOPING REPORT

Chapter 1	The EIA Process Followed for the Project
Chapter 2	The Legal Position
Chapter 3	The Need for the Eros Substation Upgrade
Chapter 4	Description of the Receiving Environment
Chapter 5	Description of the Proposed Project
Chapter 6	Identification of Potential Issues and Impacts
Chapter 7	Alternatives
Chapter 8	Conclusions
Chapter 9	Recommendations

CHAPTER 2 THE LEGAL POSITION

2.1 INTRODUCTION

A project involving the extension or upgrade to a substation requires a review of applicable legislation, policy guidelines and administrative procedures.

This chapter reviews legislation pertaining to environment conservation, pollution prevention, use and conservation of resources, protection of the socio-cultural heritage, etc.

2.2 PERTINENT ENVIRONMENTAL LEGISLATION

Given the nature of the proposed upgrade to the Eros substation, the pertinent environment laws that are applicable to the study area have been identified and are presented in Table 2.2.1.

Table 2.2.1 Pertinent environmental legislation applicable to the project

NAME OF ACT OR ORDINANCE	AREA OF APPLICATION	CONTROLLING AUTHORITY
Advertising on Roads and Ribbon Development (Act No 21 of 1940)	Prohibition of leaving refuse, and erection and construction of structures near certain roads	Department of Transport
Agricultural Pests Act (Act no 36 of 1983)	Control to prevent agricultural pests, including the importation of exotic plants and animals	Department of Agriculture
Atmospheric Pollution Prevention Act (Act no 45 of 1965)	Control of all forms of air pollution, e.g. smoke, dust and vehicle emissions	Delegated through regulations to Local authorities, Department of Environmental Affairs and Tourism
Conservation of Agricultural Resources Act (Act no 43 of 1983)	Control of the utilisation and protection of wetlands, soil conservation and related matters, control and prevention of veld fires, control of weeds and invader plants, the control of water pollution from farming practices	Department of Agriculture
Environment Conservation Act (Act no 73 of 1989) and Regulations under the act	Matters relating to conservation, littering, combating of noise, etc.	Department of Environmental Affairs and Tourism
Eskom Act of 1987	Matters relating to Eskom	Eskom
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act no 36 of 1947)	Control of aspects concerning the importation, manufacture, registration, sale, storage and use of pesticides and herbicides	Department of Agriculture
Hazardous Substances Act (Act no 15 of 1973)	Control of substances capable of causing injury, ill-health or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature	Department of Health

NAME OF ACT OR ORDINANCE	AREA OF APPLICATION	CONTROLLING AUTHORITY
Health Act (Act no 63 of 1977)	Control of the provision of sewerage and sanitary facilities and the pollution of surface and ground water, which may endanger human health	Most powers delegated to local authorities Department of Health
National Heritage Resources Act no 25 of 1999	Control of heritage resources	South African Heritage Resources Agency
National Monuments Act (Act no 28 of 1969)	Controls for and protection of natural and historical monuments, relics and antiques	Department of National Education
National Roads Act (Act no 54 of 1971)	Disposal of waste near national roads	Department of Transport
Occupational Health and Safety Act (Act no 85 of 1993)	Controls the exposure of employees and the public to dangerous and toxic substances or activities	Department of Manpower
Physical Planning Act (Act no 125 of 1991)	Regional and urban structural plans (Sections 23-27)	Department of Regional Planning and Land Affairs
Regional Services Council Act (Act no 109 of 1985)	Enabling regional services councils to control environmental matters within their areas of jurisdiction	Regional Services Councils
National Environmental Management Act no 107 of 1998	Control of Environmental Management	Department of Environment Affairs and Tourism

Of importance are also all provincial and municipal by-laws and regulations that are not listed here. Some of the acts may have changed or are in the process of change. However, once construction starts, current legislation and all amendments will apply.

2.3 SPECIFIC RELEVANT ENVIRONMENTAL LEGISLATION

2.3.1 Environmental Conservation Act No 73 of 1989 (ECA)

The ECA created the mechanism for the implementation of compulsory EIA's by way of ministerial regulation. Section 21 empowered the minister to promulgate regulations identifying activities that may have a detrimental effect on the environment. Section 22 prohibits the undertaking of activities identified under regulations promulgated under Section 21 except by virtue of a written authorisation issued by the Minister or delegated competent authority.

Section 26 is again enabling, allowing the Minister to promulgate regulations regarding information to be submitted to the Minister to enable an informed decision to be taken in terms of Section 21.

The Minister promulgated regulations in terms of Section 21 and Section 26 in Government Gazette No 18261 in September of 1997. Regulation 1182 set out a list of activities which may have a substantial detrimental effect on the environment – including “1(a) The construction or upgrading of facilities for commercial electricity generation and supply”.

Regulation 1183 set out the application procedure for approval to carry out a listed activity. The procedure is represented in graphically in Chapter 1, Figure 2.

In terms of Section 1.1(a) of Regulation 1182 promulgated under Section 21 of ECA, Eskom is legally obliged to undertake an EIA for this project in the format prescribed under Regulation 1183 promulgated under Section 26 of ECA.

2.3.2 National Environmental Management Act No 107 of 1998 (NEMA)

In essence NEMA repealed ECA in total. Section 50(2) however, provides that Sections 21, 22 and 26 of ECA and regulations promulgated under these Sections shall have force and effect until regulations under Section 24 of NEMA are promulgated. To date no regulations have been promulgated under Section 24, hence ECA and NEMA operate side by side. NEMA focuses primarily on co-operative governance, public participation and sustainable development.

Section 2 of the act sets out a series of principles which serve as guidelines “by reference to which any organ of state must exercise any function when taking any decision in terms of this act or any statutory provision concerning the protection of the environment.” These principles include:

- The development must be sustainable.
- Pollution must be avoided or minimised and remedied.
- Negative impacts must be minimised and positives enhanced.
- Waste must be avoided or minimised, revised or recycled.

Section 2(4)(vii) effectively writes into law the “precautionary principle”, whereby a risk-averse and cautious approach is applied to the decision-making process.

Section 28 imposes a duty of care to avoid environmental damage or pollution, and where it is not possible to avoid this by taking reasonable steps, then imposes an obligation to remediate any environmental damage that may occur as a result of the activity.

2.4 Summary

To summarise: Eskom has a number of legal obligations arising out of various legislations which is currently applicable, the key aspects being:-

- (a) An obligation to undertake an EIA for activities which fall within the scope of Regulation 1182 promulgated in terms of ECA and / or the National Resources Heritage Act.
- (b) Various obligations to prevent environmental damage by taking all reasonable steps to prevent it (NEMA, National Water Act and others).

CHAPTER 3 THE NEED FOR THE UPGRADE OF THE EROS SUBSTATION

Electricity cannot be stored. It is therefore necessary to generate and deliver power over long distances at the very instant it is needed. In South Africa, thousands of kilometres of high voltage transmission lines transmit power, mainly from the power stations located at the Mpumalanga coalfields to major substations where the voltage is reduced for distribution to industry, businesses, homes and farms all over the country.

Eskom Transmission's masterplan for the its eastern region, as well as Eskom Distribution's Network Development Plan compiled in May 2005, identified that network strengthening and support was required in the southern KZN and eastern Cape regions. High load growth is expected over the next year years due to numerous electrification projects and industrial projects. Voltages below Grid Code limits are being experienced in the Kokstad, Zimbane and Oribi networks at present and are expected to worsen as demand for electricity grows.

At present, the Eros 132kV substation is supplied from the Ariadne 400/132kV substation near Pietermaritzburg, via a 400kV line that is only energised at 132kV. It is thus possible to transmit more power to the Eros substation without having to construct new lines – the existing lines can be energised at the 400kV capacity at which they were designed. The upgrading of the Eros substation from a 132kV distribution substation to a 400kV transmission substation will have the added benefit of deloading Ariadne (Pietermaritzburg) - and Illovo (Amazimtoti) Substations. This spreads the electricity spread more evenly across the regional network, resulting in reduced risk and increased security of supply.

The increase for demand in these areas can be attributed to the growth of several industries and key users, including the East London IDZ with proposed Aluminium smelter and associated "spin off" industries in the region.

In addition to industrial and manufacturing pressures placed on the electricity network, natural load growth has also taken place. Because of this, voltages below 90% in the Kokstad and Oribi networks have been experienced under normal conditions. The forecasted load growth is expected to worsen the under-voltages as confirmed by Eskom Planning studies.

CHAPTER 4 DESCRIPTION OF RECEIVING ENVIRONMENT

The information contained in this section provides a broad overview of the environmental context within which the proposed upgrade would take place, if approved. Should any gaps be identified that make decision-making difficult, components of the affected environment may need to be examined in more detail.



Photo 1: Aerial photograph of Eros substation showing receiving environment and extent of proposed upgrade

3.1 SOCIO-ECONOMIC CHARACTERISTICS OF THE STUDY AREA

3.1.1 Institutional context

The Eros substation lies in ward 3 of the uMuziwabantu Local Municipality, within the Ugu District Municipality. The site is Eskom-owned and surrounded by privately owned farmland, and does not fall within a tribal area. The town of Harding is approximately 3 kilometres from the site.

3.1.2 Surrounding land use

Surrounding land use is commercial agriculture on privately owned land. Maize is grown immediately adjacent to the site to the north and west, with forestry to the south and east. The area is rural in nature.

3.1.3 Transport routes

The N2 National Road is the closest main road to the Eros substation and is approximately 3kms away from the substation as the crow flies. The substation is accessed from Harding by travelling along the D120 district road towards Hluku. Other roads near the substation comprise private farm and forestry roads.

3.1.4 Archaeological and cultural resources

A desktop archaeological assessment of the proposed site was conducted by the eThembeni Cultural Heritage as part of the Eros-Neptune-Grassridge Transmission Line EIA. This included a site visit to inspect the property visually for any historical or archaeological material that may be impacted upon by the proposed upgrade. No evidence of this was observed during the site visit and the area is not considered archaeologically sensitive.

3.2 BIOPHYSICAL CHARACTERISTICS OF THE STUDY AREA

3.2.1 Climate and Topography

The section of the study area from Harding to Umtata is described as the Drakensberg escarpment with warm temperatures and summer rainfall. Mean annual rainfall for this section ranges between 574 and 1728mm (per quaternary catchment). The topography between Harding and Umtata comprises mostly rolling hills with grass covered valleys and plains, and is incised with gorges at major rivers towards the coast.

3.2.2 Geomorphology and Soils

Specialist geotechnical reports were undertaken by Terreco for the Eros-Neptune-Grassridge Transmission Line. The geology for the section around Harding is overlain with a thin veneer of colluvium comprising mostly clayey silts. Here soils would classify as the Mispah Form as per the Unified Soils Classification System. The area surrounding the substation is expected at times to be underlain by deep, highly compressible, very soft organic-rich clays.

3.2.3 Fauna & Flora

Specialist floral assessments were undertaken by EkoInfo for the Eros-Neptune-Grassridge Transmission Line. No natural vegetation is left at the substation site. The area within the substation fence is gravelled and kept clear of vegetation for fire risk and security reason. The area where the proposed expansion is to take place currently contains maize fields, see Photo 2 below. Very little fauna is thus supported, and the ecological sensitivity of the site can be classified as low.

3.2.4 Avi-fauna

Due to the highly disturbed nature of the substation site and lack of suitable bird habitat, expected impacts from an avi-fauna perspective are low.

3.2.5 Hydrology

A small pan exists to the north of the proposed extension. This has been drained and is currently under maize cultivation, and as such is not conservation worthy and does not support bird life.



Photo 2: Photograph of Eros substation showing maize fields on the site of the proposed extension.

CHAPTER 4 DESCRIPTION OF PROJECT

4.1 INTRODUCTION

Once the Eros substation has been upgraded by the construction of a 400kV yard, the existing powerlines that were constructed at 400 kV but are operating at 132kV will be energised at 400 kV, thus increasing the security and volume of supply of electricity to the region.

4.2 DESCRIPTION OF SUBSTATION EXTENSION AND NEW STRUCTURES

The extension to the substation will be approximately 170 metres by 160 metres in total (approximately 4 hectares including the embankments), and will take place on Eskom land. (The total extent of the project is approximately 27200 square metres). The upgrade includes the construction of a new control building, steel and cable works, and the installation of two major transformers. The height of the new infrastructure will be approximately 35-40 metres, which is the same height as the existing structures in the substation. Construction access is via existing roads and the substation fence will be moved to include the new extension. Appendix D shows the proposed extension in a "bubble" on a site layout plan.

4.3 THE CONSTRUCTION PHASE

The construction of the 400kV yard will take approximately 10 months and will include the construction of access roads within the substation, which will remain as part of the substation's permanent infrastructure. Access to the construction site will be via existing access (see figure 3), and then on the new internal roads constructed as part of this project. Aspects of the construction phase are depicted in photos 2 to 9. The construction phase will entail the following:

- Construction of new roads within the substation
- Removal of maize crop on this section
- Minor terracing (the site is relatively flat)
- Levelling of the site
- Installation of foundations for infrastructure such as transformers and control building
- Construction of bunds and oil holding dams (for emergency holding of transformer oil in the event of a spill)
- Compaction and filling with gravel of the areas between the foundations
- Creation of formal drainage and stormwater control measures
- Delivery and installation of transformers, towers, busbars and associated infrastructure
- Connection of the new infrastructure to the existing 400kV network



Photos 3 and 4: Examples of transformer foundations



Photos 5 and 6: Example showing transformer installation



Photos 7 and 8: Examples of stormwater and erosion control



Photos 9 and 10: Example showing erection of steelwork

4.4 ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION

Eskom has internal policies for managing the construction of its electrical infrastructure. These include constant monitoring of the site and construction process and an immediate response to problems. In addition, management of the construction phase is subject to a project-specific Environmental Management Plan. This will only be drawn up once a RoD has been given, and is based on Eskom's Generic EMP for construction activities, which is included as Appendix C.

4.5 SITE STAFF

It is estimated that between 30 and 40 construction staff will be on site at any one time during the extension of the substation, depending on which activities are running concurrently. Due to the specialised nature of the civil construction work required, the contractor will bring his own staff to undertake certain aspects of the upgrade. However, local employment opportunities may be created by the project. For example the contractor may require local labour for tasks such as vegetation clearing and fence installation. The construction camp will be located on Eskom owned land outside of the substation fence.

CHAPTER 5 IDENTIFICATION OF POTENTIAL ISSUES AND IMPACTS

The purpose of this chapter is to indicate that the issues raised during the scoping process have been adequately captured and understood. Very few issues relating to the proposed substation upgrade were raised from the general public. The potential issues grouped below thus comprise mostly those raised by the environmental consultant.

5.1 POSSIBLE SOCIAL ISSUES / IMPACTS

Potential social issues relating to the substation extension include possible power cuts and the adverse effects of and increase in electromagnetic fields in the area. The social environment will be further affected by the potential increase in employment opportunities and increased pressure on existing infrastructure. Further potential issues include the in-migration of the contractor's construction staff as well as work seekers, the spread of sexually transmitted diseases and HIV/AIDS and the safety of communities surrounding the construction area. Safety risks to construction teams and potential risk of fires are also relevant in the social context. No significant traffic impacts are expected in the area as a result of the substation upgrade as most of the civil construction activities will take place within the substation boundary.

5.1.1 Social Environment - general mitigation measures

Issues relating to traffic, safety and construction staff should be thoroughly addressed in the project specific EMP. Other social issues can best be addressed through on-going consultation with I&APs for the entire duration of the project. I&APs should have a clear indication of who to contact should they wish to discuss any aspect of the project with an Eskom representative at all stages of the project.

5.2 POSSIBLE CULTURAL HERITAGE ISSUES / IMPACTS

The Heritage Impact Assessment for the Eros-Neptune-Grassridge Transmission Line Scoping Report includes an assessment of the Eros Substation site. Few heritage impacts are expected on the site due to a long history of agriculture in the area, and due to previous disturbances associated with the development of the substation.

5.2.1 Cultural heritage - general mitigation measures

It is recommended that site staff are aware of the possibility of uncovering items of historical / cultural significance and are able to identify these. The EMP for the project should outline the steps to be followed to minimise the impact to cultural heritage.

5.3 POSSIBLE ISSUES / IMPACTS RELATING TO THE PHYSICAL ENVIRONMENT

In terms of the biophysical environment, few impacts are expected as both the avi-fauna and botanical specialists described the receiving environment as having a low sensitivity. Added to this is the localised nature of the activity, as well as the site's transformed state due to cultivation.

5.3.1 Physical Environment – general mitigation measures

Due to the low environmental sensitivity of the Eros Substation site, no specific mitigation measures were outlined by the avi-fauna and botanical specialists for this site. General environmental good practice and the conditions set out in the project EMP should be followed in this regard.

CHAPTER 6 PROJECT ALTERNATIVES

6.1 INTRODUCTION

One of the functions of the environmental scoping process is to describe and evaluate the alternatives to the project.

Alternatives to the proposed upgrade of the Eros substation include:

- Alternative designs for proposed 400kV yard and associated infrastructure
- Strategic Alternatives

6.1.1 Alternative Designs

The cost of a project such as this is substantial, resulting in detailed research and development being put into the design of the components of the upgraded section. The current design for the 400kV yard and associated infrastructure at Eros substation is regarded as the most cost effective whilst operationally sound for such a project.

6.1.2 Strategic Alternatives

Strategic alternatives to the upgrade of the Eros Substation include the “do nothing” option, demand-side management, the upgrade of the Eros substation to 400kV capacity, or the construction of additional 132kV lines. An overview of the strategic alternatives is outlined below.

6.1.2.1 The “Do Nothing” Option

The Department of Environmental Affairs and Tourism states that the “do nothing” or “no-go” option should be considered in cases where the proposed development could have negative impacts. For this project, the no-development option would mean not upgrading the Eros Substation. The implications of this would be no additional security of supply of electricity to the Eastern and Southern areas of the national power grid. The low perceived level of impacts associated with the upgrade and high probability of mitigation of these lead to the conclusion that the “no-go” option would not be the most viable option in this instance, given the shortfalls in electricity supply and security of supply that need to be addressed.

6.1.2.2 Demand-side Management

Demand Side Management (DSM) is a function carried out by the electricity supply utility aimed at encouraging a reduction in the amount of electricity used at peak times. This is achieved by influencing customer usage to improve efficiency and reduce overall demand. These efforts are intended to produce a flat load duration curve to ensure the most efficient use of installed network capacity. By reducing peak demand and shifting load from high load to low load periods, reductions in capital expenditure (for network capacity expansion) and operating costs can be achieved. One of the basic tools is the

price differentiation (such as time-of-use tariffs) between peak demand time and low demand time. This option is practiced to a certain extent, but is currently not considered feasible for managing the level of growth forecast for Eskom's eastern and southern regions.

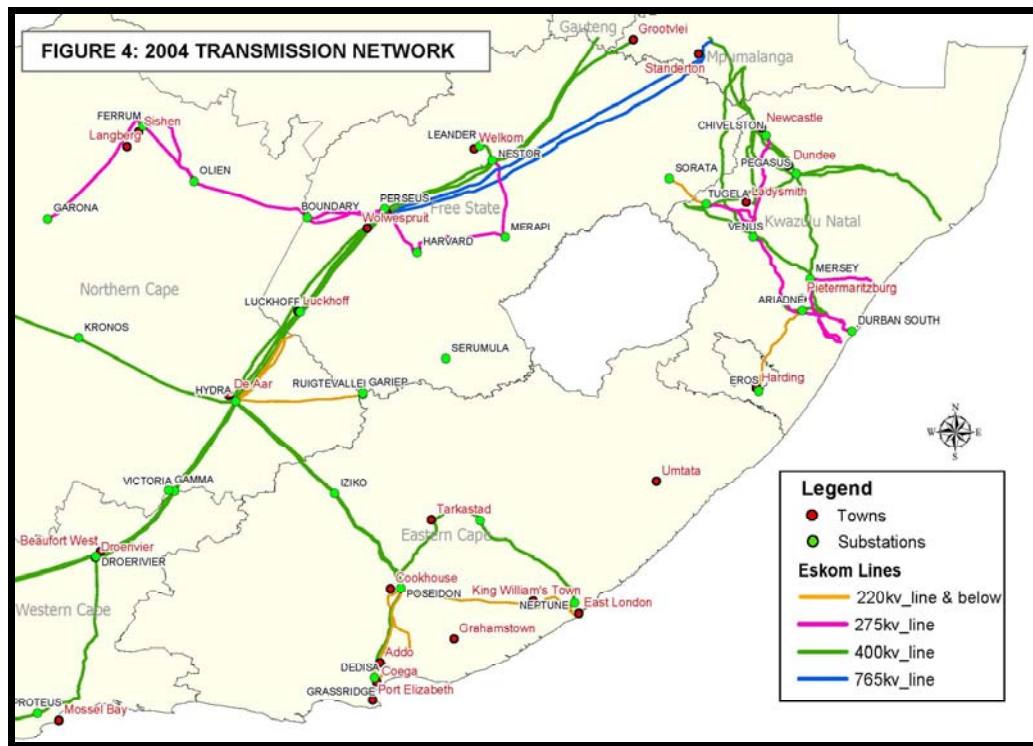
6.1.2.3 Upgrade Eros substation to a 400kV primary voltage (this project)

The existing 400kV line (currently run at 132kV) running between Ariadne (near Pietermaritzburg) and Eros (Harding) substations can be energised at 400kV and a 400kV yard could be established at Eros Substation. This option has the following advantages:

- De-loads Illovo and Ariadne substations hence defers any future transformation projects at these substations.
- Voltages within Distribution networks will be within Grid Code limits.
- Provides network strengthening to support existing loads.
- Provides network strengthening to support future load growth

6.1.2.4 Build additional 132kV lines

Eskom Distribution has already planned new 132kV single circuit lines in order to create spare capacity from Eros to Kokstad, Oribi and Zimbane. However voltages cannot be kept within statutory limits and building any further lines will not alleviate the voltage problem.



CHAPTER 7 CONCLUSIONS

From the information supplied to the consultant it is clear that the proposed upgrade at the Eros Substation will confer considerable operational benefits. The aim of this study was to identify possible impacts associated with the project, and obtain comments and concerns from interested and affected parties. It further served to address concerns and provide mitigatory options for possible impacts.

No aspects of the site were identified as environmentally sensitive and, should the recommendations of this report be followed, environmental impacts can be kept to a minimum. The compilation and implementation of an Environmental Management Plan for the construction process will further ensure this.

The scoping study thus concludes that the impact of the proposed Eros Substation upgrade on the natural environment of the area is minimal.

Visual / aesthetic impacts are expected to be minimal due to the existing infrastructure and small visual audience due to the rural nature of the site. Social impacts are expected to be marginal as the project is not large enough to have a significant effect on local employment. The contractor will be aware of his contractual obligations in this regard as part of the EMP and Eskom Transmission's environmental policy.

The benefits that will be realised by the Eros Substation upgrade are seen to substantially outweigh its impacts.

CHAPTER 8 RECOMMENDATIONS

It is recommended that the proposal to go ahead with the upgrade of the Eros Substation be approved as the regional benefits far outweigh any impacts associated with it.

1. The proposed 400kV yard should be carefully designed and all possible mitigation measures should be applied to reduce likely impacts.
2. A comprehensive Environmental Management Programme (EMP) should be drawn up to address the following:
 - Incorporate conditions of approval contained in the RoD.
 - Regulate dangerous working conditions
 - Minimise waste and pollution during construction
 - Minimise disruption to surrounding landowners, traffic and the general workings of the substation
 - Training of site staff on all possible environmental issues and impacts
 - Proper site control over construction methods and processes
 - Rehabilitation of the construction site and subsequent maintenance

The EMP should be part of the construction contract and should therefore be legally enforceable.