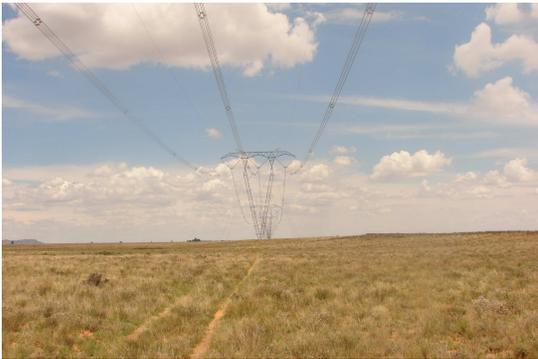




# Eskom Transmission

## Hydra-Perseus Environmental Management Plan



## Construction and Operational Environmental Management Plan

J27220

December 2008

**VOLUME I :**  
**ESKOM HYDRA-PERSEUS TRANSMISSION LINES**  
**CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN**  
**DRAFT 1**  
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## ABRREVIATIONS

Arcus GIBB	Arcus GIBB (Pty) Ltd
CED	Capital Expansion Department
CEMP	Construction Environmental Management Plan
CM	Contract Manager
DEAT	Department of Environmental Affairs and Tourism
ECO	Environmental Control Officer
Eskom	Eskom Holdings Limited – Transmission Division
EMP	Environmental Management Plan
PM	Project Manager
RoD	Record of Decision
SAHRA	South African Heritage Resources Agency
SS	Site Supervisor

## GLOSSARY OF TERMS

<b>Audit</b>	A verification process that is used to obtain information regarding the implementation of the EMP. It is an objective tool used to make improvements at the workplace.
<b>Berm</b>	A barrier that is designed to divert surface water flow. Berms will primarily be used along roads/tracks to prevent a concentrated flow of water over particular areas, thereby reducing erosion of roads.
<b>Bunding</b>	An impervious containment system for potential spillages from tanks / containers stored on site. The bunded area shall have a capacity greater than 110 % of the total tankage contained. The bunding shall be constructed of a material impermeable and resistant to the stored material.
<b>Client</b>	For the proposed 765 kV Transmission line project, Eskom Holdings Limited is the client.
<b>Construction Activities</b>	Any action undertaken by the contractor, suppliers, sub-contractors or employees during the construction process.
<b>Contractor</b>	Construction companies as well as their sub-consultants and suppliers appointed to undertake the construction activities on behalf of the client.
<b>Construction camp</b>	The area allocated for the establishment of equipment, repair area, ablution facilities, lie down and rest areas, etc. It also serves as the central point for the storage of fuel and construction material.
<b>Environment</b>	The surroundings within which humans exist and include biophysical, social and economic aspects. Examples include water, air, soil, plants and animals.
<b>Environmental Control Officer (ECO)</b>	Individual appointed by the project Manager and who is responsible for the implementation of the EMP, liaison between Eskom, Contractor and Landowners and monitoring, reviewing and verifying compliance with the CEMP by the Contractor.
<b>Environmental Specification</b>	A component of the contractor's construction activity that is likely to interact with and potentially impact on the environment.
<b>Environmental Impact</b>	A positive or negative change to the environment that results from the effect of a construction and/or operational activity. The impact may be a direct or indirect consequence of a construction and/or operational activity.
<b>Environmental Management Plan (EMP)</b>	An EMP is to be implemented by the appointed contractor, to ensure that environmental impacts that may occur due to construction activities are mitigated on site. An EMP provides environmental management guidelines, which must be complied with by the relevant parties. The undertaking of an EMP is in accordance with the requirements of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations.
<b>General Waste</b>	Domestic, commercial, non-hazardous waste and builders rubble e.g. paper, plastics, food, tins.
<b>Hazardous substance</b>	Any substance that is of risk to health and safety, property or the environment. Hazardous substances have been classified under the SABS Code 0288: 'The Identification and Classification of Dangerous Goods and Substances'.
<b>Hazardous Waste</b>	Any inorganic or organic element or compound that because of its toxicological, physical, chemical or persisting properties, may exercise detrimental acute or chronic impacts on human health or development. Hazardous wastes are classified in accordance with the 'Minimum Requirement for the Handling, Classification and Disposal of Hazardous Waste' published by the Department of Water Affairs and Forestry (1998).
<b>Hazardous Waste Landfill Site</b>	A waste disposal site that is designed and managed to accommodate the disposal of hazardous waste substances, and is permitted by the Department of Water Affairs and Forestry (DWAF).
<b>Heritage site</b>	A site that contains archaeological artefacts, graves, buildings older than 60 years, meteorological or geological fossils.
<b>Land owner</b>	The individual or company that owns the land through which the servitude crosses.
<b>Method Statement</b>	Method Statements indicate how compliance with the Environmental Specification will be achieved. The Contractor shall submit a written Method Statement to the ECO for approval, covering those activities, which are identified (in this document and/or by the ECO), as being potentially harmful to the

	environment.
<b>Servitude</b>	Defined as “the right to use someone else’s land, for a specified purpose”. In the case of a transmission line servitude, is the right to erect, operate and maintain an electric line as well as enter that land for the execution of those activities. It does not constitute full ownership and access and activities should always be carried out with due respect for the landowner. A servitude is registered in the Deeds office and forms part of the title deed of a property.
<b>Social Environment</b>	All the persons/farmers who are likely to be directly or indirectly affected by the 765 kV transmission line construction activities.
<b>Spoil</b>	Uncontaminated soil removed during excavations, culverts and roads.
<b>Topsoil</b>	The layer of soil covering the ground that allows for the successful germination of seeds, water penetration and is a source of micro-organisms and plant nutrients.
<b>Watercourse</b>	A natural channel in which water flows regularly or intermittently.
<b>Workforce</b>	All people involved in the construction activities of the 765 kV transmission line and associated infrastructure, including people employed by the client or contractor, either permanent or casual staff.

# 1 BACKGROUND AND INTRODUCTION

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## 1.1 Introduction

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Eskom Holdings Limited Transmission Division (Eskom) proposes to expand its Transmission Power line network and associated infrastructure between the Perseus substation near the town of Dealesville and the Hydra substation near the town of De Aar in the Northern Cape Province. The power lines will form part of Eskom's larger network strengthening programme, which aims to meet increased electricity demand in South Africa.

To achieve the above, Eskom Holdings Limited proposes to construct a 765 kV Transmission Power line between the Perseus Substation and a point on the existing Hydra-Gamma 765 kV line at the Hydra Substation south-west of De Aar.

The erection of a transmission line is a phased operation, which has distinct sequential activities. Each activity's actions result in change to the immediate and local natural and social environment. Both the construction and operation stages of the transmission line are addressed in this Environmental Management Plan (EMP).

Environmental aspects that are generic and specific for the construction and operation stages for individual tower locations are identified and mitigation procedures are described.

During the construction phase and maintenance of power lines and substations, some habitat destruction and alteration inevitably takes place. This happens with the construction of access roads, the clearing of servitudes and the levelling of substation yards. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line, which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through habitat modification.

Whilst the indirect impacts of the power line on avifauna through habitat destruction, and disturbance, can be mitigated by generic means, the impact of bird collision is highly specialised and site specific and therefore requires its own mitigation specific to each tower and span.

Where it is anticipated that ecological qualities of the landscape are going to be particularly altered by the tower, whether it be the position or the result of the erection requirements, it is necessary to identify that location and to

prescribe what mitigation is required. In this way the specific ecological mitigation relates to an identified condition that will result in short term or long term ecological impacts. If these are not addressed in time and in a particular manner, persistent irreversible long term ecological impacts will result.

Heritage resources, which are affected by the proposed line include archaeological material dating back to the Stone and Iron Ages. The Stone Age archaeology of the Orange River system is well known and ranges from the late Acheullian period to the 19<sup>th</sup> Century. The field study carried out between 17 and 21 November 2008 confirmed that the entire study area comprises a vast Stone Age site. Artefacts ranging from the Acheullian period (Early Stone Age) to the Smithfield Culture (Later Stone Age) occur mainly on 'open' sites throughout the study area.

Rock art (mainly engravings) is also present in the area, although none of these would be affected by the proposed power transmission line. Later Iron Age remains (such as stone enclosures) occur mainly in the Koffiefontein area on rocky outcrops. No pottery or potsherds have been located.

The terrain through which the transmission line is routed is known as a Peneplain, which is the result of the process of peneplanation, an erosion process over horizontally bedded sediments, which leaves flat topped hills as remnants in an extensive flat and featureless plain.

This landscape and topography is typical of the Karoo between Perseus and Hydra Substations. The implications from a visual impact perspective is that the visual mitigation of transmission towers over the plains can only rely on distance from the receiver and where the towers lie along the foot of flat topped hills. There are sections of the route that will traverse the hills and drainage lines and the mitigation proposed entails realignment.

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## 1.2 Background

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An Environmental Impact Assessment for the proposed 765 kV Transmission Power line from the existing Perseus substation and a point on the existing Hydra-Gamma power line adjacent to the Hydra substation in the Northern Cape Province was undertaken by Arcus GIBB (Pty) Ltd in 2006. A favourable Record of Decision (RoD) was received from the National Department of Environmental Affairs and Tourism (DEAT) (Reference No.: 12/12/20/782 and 12/12/20/828) on 29 August 2007) (See **APPENDIX 2**). Authorisation was granted for the following activities:

- The extension of the Perseus 400 kV Transmission substation near Dealesville to construct a new 765 kV high voltage yard (50 ha);
- The construction of 2 x 765 kV Transmission power lines (13 km) between Perseus substation and Beta substation, both near Dealesville; and

- The construction of 1 x 765 kV Transmission power line between Perseus substation near Dealesville and Hydra substation near De Aar (347 km) (the subject of this EMP).

The servitude width required for the construction of the power line is 80 m per 765 kV line.

A number of conditions of approval were recorded in the RoD, which was taken into account whilst compiling this EMP.

### **1.2.1 Scope of the CEMP**

As a condition of the RoD, a Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP) must be compiled and approved by DEAT, prior to the commencement of construction activities for the proposed project. This document is also in accordance with the requirements of the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations. These state that an Environmental Management Plan (EMP) is to be implemented by the appointed contractor, which will ensure that environmental impacts that may occur due to construction activities are mitigated on site.

The CEMP will provide environmental management guidelines, which must be complied with by the contractor during construction of the transmission line, associated towers and substation, in fulfilment of ISO 14001 requirements. The Environmental Control Officer (ECO), acting on behalf of Eskom Holdings Limited, will monitor the implementation of the CEMP. The CEMP will form part of the contractual agreement to be entered into by Eskom and the appointed contractor. Compliance with the CEMP must therefore form part of all contractor's working tender documentation and be endorsed contractually. The recommendations and constraints, as set out in this document are enforceable under the General Conditions of Contract.

### **1.2.2 Objectives of the CEMP**

The long-term objective of this CEMP is to ensure that:

- Environmental Management conditions and requirements are implemented from the start of the project;
- Precautions against damage and claims arising from damage are taken timeously,
- The completion date of the contract is not delayed due to problems with landowners arising during the course of construction;
- The Contractor is able to and shall include any costs of compliance with this CEMP into the tender price;
- Precautions against environmental damage and claims arising from such damage are taken timeously;
- The completion date of the contract is not delayed due to environmental problems with the landowner, grid staff, communities or regulatory authorities arising during the course of the project execution; and
- The asset created conforms to environmental standards required by ISO 14001 and Transmission Policy.

The CEMP requires a commitment from the Eskom Project Manager and the Contractor on the following issues:

- Take into consideration the Landowners special conditions as the line traverses private property;
- To underwrite Eskom Transmission's Environmental Policy TPL41-435 at all times (See **APPENDIX 3**);
- Ensure environmental conditions stipulated in the Record of Decision (ROD) are implemented;
- Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations;
- To implement this EMP for the benefit of all involved; and
- To preserve the natural environment by limiting destructive actions on site.

### **1.2.3 Legislative Framework**

All legislation applicable to the development must be strictly enforced both during the construction and operational phases. The contractor must be acquainted with the relevant environmental legislation, including provincial and local government regulations, which are in place to ensure the protection of the environment. The environmental legislation applicable to the project includes, but is not limited to, the following:

- The Constitution of the Republic of South Africa, 1996;
- National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA);
- NEMA: Air Quality Management Act (Act No. 39 of 2004);
- National Water Act, 1998 (Act No. 36 of 1998);
- Hazardous Substances Act, 1973 (Act No. 15 of 1973);
- Fire Brigade Services Act, 1987 (Act No. 99 of 1987);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- Conservation of Agricultural Resources Act, 1977 (Act No. 103 of 1977);
- Occupational Health and Safety Act, 1993 (Act No. 85 of 1993); and
- The White paper on integrated pollution and waste management of South Africa.

#### **(a) Permits that may be required**

Any work or access near or in a permanent drainage system may have implications in terms of the National Water Act 1998 (Act No. 36 of 1998), and therefore may well require the application of a Water Use License. Therefore, the contractor must in consultation with the ECO, assess all areas along the alignment well in advance in order to ensure the relevant Water Use License is applied for where required.

In the event that any heritage artefacts are found on site, it would be necessary to apply for a Heritage Permit under the National Heritage Resources Act, 1999 (Act No. 25 of 1999).

#### 1.2.4 Environmental Management Policies Adopted by Eskom Transmission

Eskom Transmission's Environmental Policy (TPL 41-435) describes Eskom Transmission's commitment to environmental best practise. Their policy statement states that Eskom Transmission will:

- Continually improve environmental performance;
- Comply with applicable legislation and regulations as well as Eskom Holdings policies and guidelines as a minimum; and
- Prevent pollution of the environment.

While their strategy is to minimise and prevent environmental impact by setting policy related objectives and targets in a number of areas including but not limited to:

- Undertaking Environmental Assessments, which states that Eskom Transmission will conduct environmental assessments of its activities and that this information would then be used to identify and prioritise the significant environmental aspects and to develop appropriate environmental management processes. This EMP is evidence of such commitment; and
- Environmental Incidents and Wildlife interactions, which states that Eskom Transmission must identify potential significant environmental incidents and risks and develop plans to prevent, correct and monitor their effects should they occur. This EMP also addresses this component of the environmental policy.

Eskom Transmission is committed to addressing its environmental policy requirements. The monitoring and implementation of this EMP will provide additional support to this commitment.

#### 1.2.5 CEMP Methodology

A project team including environmental consultants and various specialists have compiled this CEMP. The specialists and their associated studies which were undertaken to inform the CEMP are listed in the table below.

**Table 1: Relevant Specialist, Organisation and Function**

Specialist	Organisation	Study/Function
Tim Liversage/ Penny-Jane Cooke/ Karin Neethling	Arcus GIBB	Lead Environmental Consultants
Dewald Kamffer	Eko Info CC	Faunal Assessment
Samuel David Lawrence		Floral Assessment
Henry van Schalkwyk		
Theo Mostert		
Jon Smallie	Endangered Wildlife Trust	Avifaunal Study
Megan Diamond		
Alan Cave	Cave Klapwijk	Visual Assessment
Menno Klapwijk		
Albert van Jaarsveld	Private	Heritage Assessment
Ruth Maguire		

Prior to a five-day site visit to the proposed Hydra-Perseus alignment the specialists were provided with the profiles of this section of the line for the initial identification of potential sensitive / problematic areas. This site visit was undertaken between and including the 17th and 21st of November 2008. The project team undertook individual specialist assessments of all the proposed tower locations. Where the tower positions were found to be inappropriate from an environmental perspective recommendations for alternative locations of towers were made and recorded. In addition, the project team identified sensitive micro-environments along the route, which included water bodies, areas of high erosion, avifauna niches and ecologically significant areas.

The assessment of towers was done by two separate specialist teams, each comprising five specialists representing the various environmental fields that required assessments. One team assessed towers at the northern end of the proposed Hydra-Perseus route, at the Perseus substation near Dealesville, and proceeded south towards the Hydra substation. The second team assessed towers at the southern end of the route, near the Hydra substation situated close to De Aar, and proceeded north towards the Perseus substation. During the site visit, the tower positions were assessed either by physically walking to each co-ordinate or for those in homogeneous environments, driving by and noting the surrounding environment.

The specialist reports submitted, including potential impacts and recommendations for mitigation measures for this powerline have all been incorporated into the CEMP.

#### **1.2.6 Limitations to the Study**

The project initiation meeting held earlier this year reached consensus amongst project managers and specialists that the study would be conducted over two weeks, with two teams from each specialist field, working from opposite ends of the line. This was agreed to be the most effective way in which to do the study and would have enabled each specialist to walk to each and every tower along the alignment, equating to approximately 30 towers each per day – an achievable length of line.

However, subsequent to this decision specialists were instructed that the entire study had to be conducted in one week. The result was an unavoidable compromise on the quality of this study and its recommendations. The time available simply did not allow for each tower or section of line to be visited and viewed adequately.

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### **1.3 Description of the Affected Environment**

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#### **1.3.1 Introduction**

The landscape through which the Transmission line is aligned is generally described as extensive large plains vegetated by grass and low (400 mm high) shrubs, with irregularly spaced low ridges and koppies that are mostly flat topped. This area is largely homogenous and similar environmental impacts are associated with the entire length of the line.

In general, the area through which the Transmission line crosses is not regarded as highly sensitive, while habitat diversity is fairly low. However, at several tower sites the vegetation seems to be more sensitive (drainage channels, rocky outcrops).

### **1.3.2 Potential Environmental Impacts Identified by the Project Team**

Notwithstanding the potential environmental impacts identified in the EIA, that preceded this CEMP, the environmental impacts identified by the CEMP project team as well as impacts identified by Eskom through their past experience have been considered in this comprehensive CEMP. These include the following:

- Potential impacts on ecology (fauna and flora);
- Potential impacts on avifauna;
- Potential visual impacts;
- Potential impacts on heritage / archaeology sites;
- Potential impacts on surface water; and
- Potential social impacts.

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## **1.4 Project Description**

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The project involves the construction of a 765 kV transmission line between the Perseus Substation and a point on the existing Hydra-Gamma 765 kV line at the Hydra Substation south-west of De Aar.

### **1.4.1 Technical Specifications of the Hydra-Perseus Transmission Line**

A 765 kV Transmission line will be constructed between the Perseus Substation and a point on the existing Hydra-Gamma Transmission line near the Hydra Substation. One 80 m servitude is required to accommodate the towers that will support the 765 kV Transmission lines.

### **1.4.2 Major Construction Activities of the Project**

The construction of the 765 kV Transmission line will require the following construction related activities, amongst others:

1. Determination of appropriate location for construction camp site and the erection thereof in consultation with the ECO;
2. Bush clearing at tower locations, to facilitate access where necessary, for construction and the safe operation and maintenance of the line as required;
3. Transportation of construction materials, equipment and workforce;
4. Installation of foundations for the towers, which involves placing construction material into piles and fencing the area with wire strands;
5. Steelwork;
6. Tower assembly, which will require many construction staff;

7. Erection of towers which will be completed with the painting of nuts and bolts prior to erection;
8. Stringing and regulation of conductors;
9. Rehabilitation of disturbed areas (to start after a maximum of 60 towers have been strung). This will include re-vegetation where necessary and measures for erosion prevention of tracks;
10. Final inspection of the line and hand over to the region for operation;
11. Signing off landowners;
12. Handing and taking over of the servitude;
13. Operation and maintenance of the line;
14. Negotiations for access roads to the servitude where required; and
15. Servitude gate installation to facilitate access to the servitude.

One year after the completion of the project, the final inspection for the release of the Contractors' guarantee will take place. The line will be in operation immediately after completion of the project and will stay operational for the 30-year lifetime of the line / substation. Ongoing maintenance and refurbishment of the line and substation may extend the operational lifetime to approximately 50 years.

A detailed activity list for the construction of a transmission line is included in **APPENDIX 4**.

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## **1.5 Environmental Monitoring and Auditing**

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To measure and ensure compliance to this EMP it is imperative that a monitoring and auditing programme be established, in which monthly reports are submitted to Eskom and DEAT to indicate the level of compliance. In addition, potential risks to the project will be identified.

Bearing in mind that this document is a living document and may be updated from time to time, should any amendments be considered such amendments need to be discussed with the appointed ECO, who will then make such amendments to the EMP if considered to be applicable. The amended EMP will be submitted to DEAT to inform them of what changes have been implemented and the reasoning behind the changes.

## 2 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

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### 2.1 Organisational Requirements

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During construction, all instructions and official communications regarding environmental matters shall follow the organisational structure shown in **Figure 1**. The organisational structure identifies and defines the authorities' structure, and the communication structure for the various parties involved in the construction of the proposed development.

Capital Expansion Department (CED) will act as the Project Manager for the proposed development. The Consultant/Engineer shall appoint a Site Supervisor / Contract Manager on site to co-ordinate and monitor the Contractor during the construction of the development.

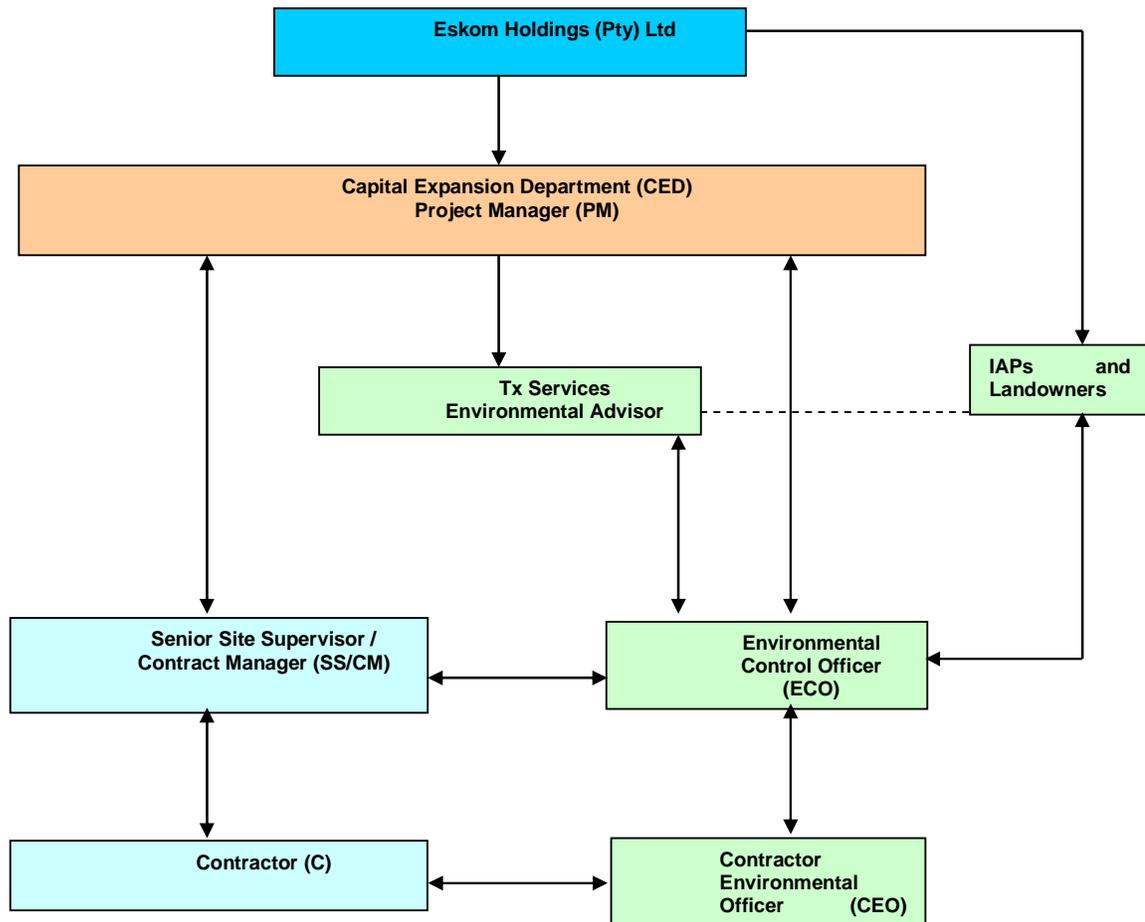


Figure 1: Organisational / Reporting Structure for implementation of the CEMP

CED shall appoint an independent Environmental Control Officer (ECO) to oversee the implementation of the CEMP on site. It will be the responsibility of the ECO to consult with the Site Supervisor (SS) regarding instructions pertaining to contravention, corrective actions, and penalties or working methods. Except in an emergency situation, where instructions may be given directly to the Contractor, all instructions given by the ECO shall go through the Site Supervisor/Contract Manager (SS/CM), who will then convey these to the Contractor.

The CEMP will be an item of the monthly site meetings, and the ECO shall attend these meetings in order to provide input with respect to compliance with the CEMP. Copies of the minutes will be sent to Eskom.

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## **2.2 Community Relations**

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When specified, the Contractor shall erect an information board containing background information for the construction activity and listing the relevant contact details of responsible persons.

The number, location and type of information boards will be specified in the Contract documents.

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## **2.3 Penalties**

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The SS, in consultation or on the advice of the ECO, shall issue spot fines if the Contractor infringes these specifications. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his/her responsibility to recover the fine from the relevant employee. The Contractor shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. It is preferable if this training is provided in consultation with the ECO.

The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. Spot fines shall be between R500.00 and R1 000.00, depending upon the severity of the infringement. The decision on how much to impose will be made by the ECO/SS and will be final.

In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense.

A preliminary list of infringements for which spot fines will be imposed is as follows:

- Using areas outside the working areas without permission/accessing “no-go areas”;
- Clearing and/or levelling area outside of the working areas;

- Littering of the site and surrounds;
- Burying waste on site and surrounds;
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, etc;
- Picking/damaging plant material;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction;
- Additional fines as determined by the ECO and added to this list; and
- Damage to heritage sites.

The Site Supervisor shall:

- Retain records for fines issued. Monies for the spot fines will be deducted from the Contractors monthly certificate; and
- The SS, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the CEMP (i.e. more than three cases of repeated infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

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## **2.4 Payment for Environmental Specifications**

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The Contractor's costs incurred for compliance with this CEMP shall be on a lump sum basis.

## 2.5 Roles and Responsibilities

Function	Name / Cell Number	Responsibility
Project Manager (PM) Capital Expansion Projects		<p>The overall management of the project and implementation, administration and enforcement of the CEMP. The PM shall:</p> <ul style="list-style-type: none"> <li>• Ensure that the CEMP specifications are included in all tender documents issued for the development works and activities on site, and shall ensure that the prospective Tenderers/Contractors abide by the provisions thereof;</li> <li>• Appoint an ECO to monitor implementation of and compliance with the CEMP for the duration of the works. The SS/CM may be required to fulfil this function when the ECO is not available;</li> <li>• Be liable/accountable, to the relevant authority, DEAT, for any contravention/non-compliance by any Contractor under their supervision; and</li> <li>• Through the SS/CM, issue fines or stop works orders for contravention of the CEMP and give instruction regarding corrective action</li> </ul>
Senior Site Supervisor (SS)/ Contract Manager (CM)		<p>Oversees site works, liaison with Contractor, PM and ECO. The SS/CM will be responsible for monitoring, reviewing and verifying compliance with the CEMP by the Contractor when the ECO is not available. The CM's duties, over and above his contractual obligations, will include the following:</p> <ul style="list-style-type: none"> <li>• Comply with the contents of this CEMP specifications to ensure that the requirements of the CEMP are met;</li> <li>• Monitor and verify that the CEMP is adhered to at all times and take action if the specifications are not followed;</li> <li>• Monitor and verify that environmental impacts are kept to a minimum;</li> <li>• Review construction Method Statements in conjunction with the ECO;</li> <li>• Assist the Contractor in finding environmentally responsible solutions to problems with input from the ECO;</li> <li>• Keep records of all activities/incidents concerning the environment in the site diary;</li> <li>• Inspect the site and surrounding areas on a weekly basis with regard to compliance with the CEMP;</li> <li>• Order the removal of, or issuing spot fines for, person(s) and/or equipment not complying with the specifications; and</li> <li>• Issue penalties for contravention of the CEMP.</li> </ul>
Environmental Control Officer (ECO)		<p>Implementation of CEMP, liaison between Eskom, Contractor and Landowners and monitoring, reviewing and verifying compliance with the CEMP by the Contractor. In particular, the ECO shall:</p> <ul style="list-style-type: none"> <li>• Be appointed by the PM to monitor all activities on site;</li> <li>• Visit/inspect the site on a monthly basis, to ascertain the level of compliance of works, as well as attend Contractor's meetings when necessary and monthly site meetings with the project management team and report back on the environmental issues;</li> <li>• Maintain inspection audit reports on file;</li> <li>• Assist the SS/CM in ensuring that necessary environmental authorisations and permits have been obtained;</li> <li>• Monitor and verify that the CEMP is adhered to at all times and take action if the specifications are not followed;</li> <li>• Monitor and verify that environmental impacts are kept to a minimum;</li> <li>• Review and approve construction Method Statements together with the SS/CM;</li> </ul>

		<ul style="list-style-type: none"> <li>• Assist the Contractor in finding environmentally responsible solutions to problems;</li> <li>• Keep records of all activities/incidents concerning the environment on site in the Site Diary;</li> <li>• Keep a register of complaints in the Site Office (to be situated in proximity to where the works are taking place) and deal with any community comments or issues;</li> <li>• Monitor the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site or present environmental awareness courses themselves;</li> <li>• Provide material/manuals and assistance for the environmental awareness courses;</li> <li>• Advise on the removal of person(s) and/or equipment not complying with the specifications (done via the SS/CM);</li> <li>• Recommend the issuing of fines for transgressions of site rules and penalties for contravention;</li> <li>• Maintain a photographic record of the site before, during and after construction;</li> <li>• Ensure that activities on site comply with legislation of relevance to the environment;</li> <li>• Complete checklists as necessary; and</li> <li>• Internally review the implementation of the CEMP and submit a report to Eskom and DEAT at the end of the project.</li> </ul>
Contractor ( C )		<p>Implementation and compliance with recommendations and conditions of the CEMP. The Contractor shall:</p> <ul style="list-style-type: none"> <li>• Ensure that the environmental specifications of this document (including any revisions, additions or amendments) are effectively implemented. This includes the on-site implementation of steps to mitigate environmental impacts;</li> <li>• Ensure that all employees and sub-contractors employed comply with the requirements and provisions of the CEMP;</li> <li>• Prepare Method Statements for submission to the ECO;</li> <li>• Monitor environmental performance and conformance with the specifications contained in this document during daily site inspections;</li> <li>• Discuss implementation of and compliance with this document with staff at routine site meetings;</li> <li>• Be responsible for sub-contractors preparing sites and erecting the towers;</li> <li>• Report progress towards implementation of and non-conformances with this document at site meetings with the ECO;</li> <li>• Notify the ECO of the anticipated programme of works and fully disclose all details of activities involved;</li> <li>• Ensure that suitable records are kept and that the appropriate documentation is available to the ECO;</li> <li>• Notify the ECO of all incidents, accidents and transgressions on site with respect to environmental management as well as requirements of the CEMP and corrective actions/remedial action taken;</li> <li>• Report and record all accidents and incidents resulting in injury or death;</li> <li>• Inform the ECO of problems arising when implementing the CEMP and recommend ways of improving it;</li> <li>• Inform the ECO of any complaints received; and</li> <li>• Appoint a dedicated person (Contractor Environmental Control Officer) to work with the ECO</li> </ul>
Contractor Environmental Control Officer (CECO)		<p>Appointed by the contractor for the Implementation of the CEMP, landowner interaction, environmental control of site actions, re-remediation and rehabilitation work; and</p> <ul style="list-style-type: none"> <li>• Be available to investigate all problems arising on the work sites concerning the Landowners.</li> </ul>
Tx Environmental Advisor (Eskom)		<ul style="list-style-type: none"> <li>• Environmental advice and auditing.</li> </ul>

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## 2.6 Method Statements

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The Contractor shall submit a written Method Statement to the ECO for approval, covering those activities, which are identified (in this document and/or by the ECO), as being potentially harmful to the environment.

Method Statements indicate how compliance with the Environmental Specification will be achieved.

The Method Statement shall state clearly:

- Timing of activities;
- Materials to be used;
- Equipment and staffing requirements;
- Proposed construction procedure designed to implement the relevant environmental specifications;
- The system to be implemented to ensure compliance with the above; and
- Other information deemed necessary by the ECO.

The Method Statement shall be submitted at least 14 working days prior to projected commencement of work on an activity, to allow the ECO time to study and approve the Method Statement. The Contractor shall not commence work on that activity until such time as the Method Statement has been approved in writing by the ECO, which shall be done within seven working days of receipt.

Due to changing circumstances, it may be necessary to modify Method Statements. In such cases, the proposed modifications must be indicated and agreed upon in writing between the ECO and RE.

The ECO and SS must retain records of any amendments and ensure that the most current version of any Method Statement is being used.

The following are typical Method Statements, which will be called for by the ECO:

- Location, layout and preparation of the construction camp(s) and materials storage areas;
- Location, layout and preparation of cement/concrete batching facilities including the methods employed for the mixing of concrete and the management of runoff water from such areas;
- Contaminated water management plan, including the containment of runoff and polluted water;
- Emergency construction Method Statements (including details of methods for fuel spills and clean up operations);
- Rehabilitation of disturbed areas and revegetation after construction is complete;
- Solid waste management and removal of waste from site; and
- Crossing of erosion trenches and drainage lines.

The specific activities for which a Method Statement is required is indicated in Section 2.7 by the following asterisk (√) Please note that wherever the √ appears, the Contractor shall submit a Method Statement. Additional Method Statements may be required by the ECO during the course of works, depending on the nature of the construction works and the location thereof.

The SS and ECO shall approve any deviation from a Method Statement.

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## 2.7 Generic Mitigation Measures

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## **2.8 Environmental Specifications for the Construction Phase of the Development**

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## 2.9 Site Specific Mitigation measures

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The following table identifies specific towers and associated environmental aspects. For each identified environmental aspect, mitigation measures and relevant penalties for a transgression of such mitigation measures are prescribed. In addition, the stakeholder responsible for implementing the required mitigation measures is noted and where necessary, mitigation measures that require method statements, outlining the proposed method of implementation, are indicated with the following asterisk (\*).

The specific mitigation measures therefore address location specific conditions that are not covered by the generic mitigation measures. Thus, where a tower is not mentioned in Section 2.8 below, the Contractor must apply the general mitigation measures as prescribed in Section 2.7 above.

	<b>Archaeological / Heritage</b>		<b>Bird nesting in existing lines</b>
	<b>Watercourse / Drainage line</b>		<b>Aviation</b>
	<b>Bird flight diverters</b>		<b>Wetland / Vlei</b>
	<b>Powerline crossing</b>		<b>Erosion protection</b>
	<b>Railway line crossing</b>		<b>Landowner special conditions</b>

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## 2.10 Conclusion

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This EMP builds on the Environmental processes that have preceded it (Scoping Report and Environmental Impact Report) and has been compiled by a specialist team. This process facilitated the identification of relevant and practical mitigation measures, which may be used by the construction team and Eskom to draw up and respond to Tender documentation. It is thus key to this process that this document be included during tendering to allow all potential bidders for this work to seriously consider and cost for such mitigation. This will ensure that the document receives the necessary buy in that it requires from the outset of the project.

This EMP was compiled in an iterative manner that allowed for a pre-screening of the towers by the specialist team. This enabled specialist to identify towers that could be moved slightly from one position to another to avoid more sensitive environmental features, such as drainage lines, areas susceptible to erosion and heritage artefacts. This in turn made it possible for the technical team to revise all the profiles to the agreement of all specialists concerned.

The above-mentioned profiles for each of the various tower sections, along with visual aids to assist those undertaking the construction have been included in the EMP to enable the construction crew to familiarise themselves with the area prior to arriving at each individual site.

The document thus provides a good indication as to what a contractor needs to consider before moving into an area, which is obviously key to managing environmental aspects such as nesting birds, river crossings drainage lines and heritage artefacts.

Penalties to be imposed for the transgression of environmental specifications were also noted along with the roles and responsibilities of all stakeholders such as Eskom Transmission, The Environmental Auditing Team, The Environmental Control Officer, Project Manager, Contract Manager, the Contractors, landowners, interested and affected parties and the relevant environmental and project specialists.

In order to ensure environmental compliance, all parties undertaking the construction of these 765 kV lines shall be fully acquainted with the contents of the CEMP. This will ensure that potential negative impacts are identified, avoided or mitigated.

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