

ESKOM DISTRIBUTION DIVISION



**Draft Environmental Management Programme for the
installation of 132kV distribution lines from Melkhout to
Dieprivier, Cacadu District**

July 2012
J29223

We change lives

www.gibb.co.za



Arcus GIBB (Pty) Ltd Reg. 1992/007139/07

Head Office: Johannesburg, South Africa
14 Eglin Road, Sunninghill, 2191
Tel: +27 11 519 4600 Fax: +27 11 807 5670

**Draft Environmental Management Programme for the installation of 132kV
distribution lines from Melkhout to Dieprivier, Cacadu District**

CONTENTS

Chapter	Description	Page
	GLOSSARY OF TERMS, DEFINITIONS AND ABBREVIATIONS	4
1	INTRODUCTION	6
	1.1 The Environmental Management Programme	6
	1.2 Legal framework and environmental authorisation	7
	1.3 Background	8
2	MANAGEMENT AND ORGANISATIONAL STRUCTURE	12
	2.1 Contractual obligation	12
	2.2 The Developer	12
	2.3 Project Manager (PM)	13
	2.4 Environmental Control Officer (ECO)	14
	2.5 Contractor	15
	2.6 Subcontractors	16
3	IMPACTS IDENTIFIED AND MITIGATION MEASURES RECOMMENDED BY SPECIALISTS	18
	3.1 Impacts on vegetation (Construction phase)	18
	3.2 Impacts on avifauna (Construction and Operational phases)	20
	3.3 Impacts of heritage resources (Construction and Operational phases)	21
4	ENVIRONMENTAL SPECIFICATIONS DURING CONSTRUCTION PHASE	22
	4.1 Planning	22
	4.2 Environmental awareness	25
	4.3 Site establishment	25
	4.4 Vegetation impacts	26

4.5	Biodiversity impacts	27
4.6	Soil impacts	28
4.7	Construction plant and material management	29
4.8	General waste management	30
4.9	Hazardous waste management	31
4.10	Storm Water Management and Erosion	33
4.11	Air Quality	34
4.12	Noise Control	34
4.13	Impacts from construction activities	35
4.14	Social Environment	36
4.15	Security and Crime	37
4.16	Health and Safety	38
4.17	Construction site decommissioning	40
4.18	Monitoring	41
4.19	Completion of Contract	41
5	ENVIRONMENTAL SPECIFICATIONS DURING THE OPERATIONAL PHASE	42
5.1	Substations	42
5.2	Power lines	42
5.3	Access tracks	42
6	SITE DOCUMENTATION AND RECORD KEEPING	43
7	ENVIRONMENTAL AWARENESS TRAINING	44

GLOSSARY OF TERMS, DEFINITIONS AND ABBREVIATIONS

Construction Activity	A construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.
Contractor	That main organisation appointed by the Developer, through the Project Manager, to undertake construction activities on the site.
DEA	Department of Environmental Affairs.
Demolition	The tearing down of buildings and other structures: the opposite of construction.
Developer	ESKOM
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer. The ECO monitors compliance with the EMPr during the construction phase and advises the Project Manager on environmental matters relating to construction.
EMPr	Environmental Management Programme. The EMPr for the project sets out general instructions that will be included in a contract document for the construction phase of the project. The EMPr will ensure the construction activities are conducted and managed in an environmentally sound and responsible manner. The EMPr also details the organisational structure required to ensure the effective implementation of the EMPr and measures to monitor and improve the application of the EMPr.
Environment	Means the surroundings within which humans exist and that are made up of: <ol style="list-style-type: none">a. The land, water and atmosphere of the earth;b. Micro-organisms, plant and animal life;c. Any part or combination of a) and b) and the interrelationships among and between them; andd. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental	Instructions and guidelines for specific construction activities designed to help prevent, reduce and/or control the potential

Specifications	environmental implications of these construction activities.
I&AP(s)	Interested and Affected Party(s)
Method Statement	<p>A written submission by the Contractor to the Project Manager in response to the Specification setting out the plant, materials, labour, timing and method the Contractor proposes using to carry out an activity.</p> <p>The Method Statement shall cover applicable details with regard to:</p> <ul style="list-style-type: none"> • Construction procedures • Materials and equipment to be used • Getting the equipment to and from site • How the equipment/material will be moved while on site • How and where material will be stored • The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or solid material that may occur • Timing and location of activities • Compliance/ non-compliance with the Specifications • Any other information deemed necessary by the PM.
MSDS	Material Safety Data Sheet
Project	This refers to all construction activities associated with the proposed activities.
PM	<p>Project Manager</p> <p>Appointed firm responsible for overall management of the construction phase of the project including the management of all contractors.</p>
PPE	Personal Protective Equipment
Rehabilitation	Rehabilitation is defined as the return of a disturbed area, feature or structure to a state that approximates to the state (where possible) that it was before disruption, or to an improved state.
SHE	Safety, Health and Environment
Solid Waste	Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).

1 INTRODUCTION

1.1 The Environmental Management Programme

Introduction

This Environmental Management Programme forms part of the documentation submitted to the Department of Environmental Affairs (DEA) as the competent authority for the authorisation of the network strengthening and upgrade in the Patensie, Humansdorp and Kareedouw areas of the Eastern Cape.

Purpose

The preparation of an Environmental Management Programme (EMPr) is recognised as a tool in Integrated Environmental Management (IEM) to mitigate or minimise negative impacts and enhances positive impacts on site. Typically an EMPr document is aligned to the project life cycle addressing each project phase i.e. the Construction, Operation and Decommissioning phases.

This EMPr informs all relevant role-players in the project as to their duties in the fulfilment of the legal requirements for the construction, operation and decommissioning of the proposed distribution lines with particular reference to the prevention and mitigation of anticipated environmental impacts.

Objectives

The objectives of an EMPr are to:

- ✓ Ensure compliance with all relevant regulatory authority stipulations and guidelines;
- ✓ Verify environmental performance through information on impacts as they occur;
- ✓ Provide required management actions in order to respond to unforeseen events;
- ✓ Provide feedback for continual improvement in environmental performance;
- ✓ Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- ✓ Stipulate specific actions to assist in mitigating the environmental impact of the project;
- ✓ Identify measures that could optimize beneficial impacts;
- ✓ Create management structures that address the concerns and complaints of I&APs with regards to the development;
- ✓ Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- ✓ Ensure that safety recommendations are complied with;
- ✓ Specify time periods within which mitigation measures must be implemented, where appropriate;

Content

The content of the EMPr must be consistent with the requirements as set out in Regulation 33 of the EIA regulations for the construction and operation phases, and in short must contain:

- ✓ Details and experience of the person who prepared the EMPr;
- ✓ Description of the anticipated impacts, and the methods and procedures for mitigating these identified impacts;
- ✓ A description of the activities and works the draft EMPr will cover.
- ✓ An Outline of the roles and responsibilities of the project managers, engineers, contractors, subcontractors, ECO and the authorities;
- ✓ Mechanisms for monitoring compliance with the EMPr;
- ✓ Time periods within which the measures contemplated in the draft EMPr must be implemented;
- ✓ A description of the process for managing any environmental damage and identifying required site rehabilitation measures;

1.2 Legal framework and environmental authorisation

An EMPr is focused on sound environmental management practices and is based on national and international best practices, and relevant legislation, policies and guidelines. All stakeholders should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

All legislation applicable to the development must be strictly enforced, including the following:

- ❖ The Constitution of the Republic of South Africa Act 108 of 1996, (Chapter 2: Bill of Rights, Section 24: Environmental right, Section 25: Rights in property);
- ❖ National Environmental Management Act, 107 of 1998, as amended;
- ❖ Environment Conservation Act, 73 of 1989;
- ❖ National Environmental Management: Protected Areas Act, 57 of 2003;
- ❖ National Environmental Management: Biodiversity Act, 10 of 2004;
- ❖ National Forests Act, 43 of 1983;
- ❖ The National Water Act, 36 of 1998;
- ❖ Hazardous Substances Act, 15 of 1973;
- ❖ National Heritage Resources Act, 25 of 1999;
- ❖ Conservation of Agricultural Resources Act, 43 of 1983;
- ❖ Occupational Health and Safety Act, 85 of 1993;
- ❖ National Veld and Forest Fire Act, 101 of 1998;
- ❖ Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 36 of 1947;
- ❖ National Environmental Management: Waste Management Act, 59 of 2008;
- ❖ Mineral and Petroleum Resources Development Act, 28 of 2002;
- ❖ Health Act, 63 of 1977;

The list of applicable legislation provided above is intended to serve as a guideline only and is not exhaustive.

1.3 Background

1.3.1 Introduction

Eskom proposes to construct infrastructure to strengthen and upgrade the network in the Patensie, Humansdorp and Kareedouw areas. The objective of the proposed installation of 132kV distribution lines is to increase the reserve capacity on the existing lines, while providing spare capacity for the future electricity needs of the growing local economy.

1.3.2 Summary of proposed works

The study area where the proposed activity is to take place is located in close proximity to the small town of Humansdorp in the Kouga Local Municipality. The proposed line runs between the Kou-Kamma and the Kouga Local Municipalities (LMs), with the majority situated in the Kouga LM. Both LM's are located in the Eastern Cape and fall under the jurisdiction of the Cacadu District Municipality.

A new 132kV overhead power line is required to strengthen the grid supply in the Kareedouw-Humansdorp-Patensie area, Eastern Cape. The new power line will run from the existing Melkhout substation to a newly constructed Dieprivier substation. Once the proposed infrastructure has been installed it may be necessary to decommission redundant infrastructure. Where decommissioning takes place it will be necessary for a thorough rehabilitation process to be undertaken to ensure protection of the receiving environment.

The total length of the proposed power lines amounts to approximately 26 km and will involve the construction of:

- Melkhout/ Dieprivier 132 kV distribution line
- Dieprivier 2x20 MVA 132 / 22 kV substation

The tower structures used in this development include 273 guyed lattice series, 255 self-supporting strain series and 248 self supporting terminal series.

Three different routing alternatives (Preferred Alternative and two other alternatives) were considered during the Basic Assessment process. Land owner requirements have, however, proven the most influential factor in concluding that the two routing alternatives (Alternative A and B) would not be viable to implement. The Preferred Alternative emerged as the only viable routing option. The Preferred Alternative is shown in the Figure below.



Figure 1. Proposed routing of the Preferred Alternative.

1.3.3 The receiving environment

The proposed development is set in an area primarily used for agriculture surrounding a small town and settlements. The environment surrounding the proposed development is a mixture of farming land, pastures and plantations, natural vegetation, dams and wetlands. A large section of the power line follows the N2 highway.

Vegetation. The proposed powerline is situated within the Fynbos Biome. Three main vegetation types dominate the study area, with their conservation status ranging from Least Threatened to Endangered. These vegetation types are Kouga Sandstone Grassy Fynbos (Least Threatened), Langkloof Shale Renosterveld (Critically Endangered), and Humansdorp Shale Renosterveld (Endangered).

Avifauna. Up to approximately 220 bird species could be expected in the study area, based on what has been recorded by the Southern African Bird Atlas Project 2 in the six relevant pentads. Across the six pentads a total of 13 Red Listed species are present, comprising 6 Vulnerable and 7 Near-threatened species. In addition, the White Stork *Ciconia ciconia* is protected internationally under the Bonn Convention on Migratory Species. The Hamerkop *Scopus umbretta* is also considered as important since recent atlas data points to its range contracting significantly in recent times. The most important of these species for this study are the Blue Crane *Anthropoides paradiseus*, Denham's Bustard *Neotis denhami*, White-bellied Korhaan *Eupodotis senegalensis*, White Stork and Martial Eagle *Polemaetus bellicosus*. These species are all relatively abundant in the area (except for the Martial Eagle which is probably an occasional visitor) and are highly vulnerable to collision (and electrocution in the case of the eagle) with overhead power lines in South Africa.

Fauna. Caracal and leopard are the main predators in the area, although caracal may occasionally be seen, the sighting of a leopard is still a very rare occurrence. Cape clawless otter, bushpig, aardvark and a host of other smaller mammals are still reasonably common despite being seldom seen. Four tortoise species occur within the area with the marsh terrapin and the large leopard tortoise the most likely to be seen. The tent tortoise, a Cape endemic, is occasionally seen in the drier western and north-western areas while the angulate tortoise is a common resident of the southern part of the Baviaans. Four of the 24 snake species found in the area are South African endemics. The snakes most likely to be seen are Cape cobra, puffadder, boomslang, rhombic skaapsteker, Karoo and montane grass snakes and the brown water snake. The Cape cobra and puff adder, are generally regarded as the two most

dangerous. Of the 28 lizard species present, 2 newly discovered species, a dwarf chameleon *Bradypodion* sp. and a flat gecko *Afroedura* sp. are endemic to the area. A further 7 species are Cape endemics and 7 others are South African endemics. Most of these occur in the mountainous parts. In summer the Nile monitor is commonly seen near water. The ubiquitous Southern rock agama is also common.

1.3.4 Summary of predicted impacts

The proposed development is predicted to have some potentially negative environmental impacts on the surrounding environment. The most probable negative impacts are the destruction of the surrounding vegetation, increase in soil erosion and habitat destruction. The power line is predicted to have a negative effect on avifauna with collisions and electrocutions being a common interaction between birds and power lines. The main positive impact of the proposed development is the provision of the reliable electricity supply to the area to meet current and future electricity demands. The provision of electricity may promote local economic development and investment in the Kareedouw, Humansdorp, Hankie and Patensie area. Electricity provision is critical for economic development, related employment and sustainable development in South Africa. In the context of the project improvement of the 132kV supply is critical to the improvement of provision of household electricity.

Specialist studies were conducted to assess potential impacts of the electrical infrastructure and mitigation methods were recommended.

The cumulative impacts resulting from the proposed development being implemented have been identified and mainly resolve around the potential loss of vegetation types.

1.3.5 Conclusion and recommendation by EAP

In consideration of the specialist assessment reports, systematic comparisons of the preferred and alternative route options and assessment of all identified impacts the EAP has come to the following conclusions:

The "Preferred Alternative" routing option is the most expensive option to construct and maintain. However, this option has a relatively low visual impact and environmental impacts associated with this route can be successfully mitigated if the recommended mitigation measures in the EMP are adhered to. Further, all land owners whose property the proposed route will cross have agreed to allow erection of the power lines across their properties. Therefore, although not the most cost-effective or maintenance-friendly line to construct, the route is preferred as all environmental impacts can be mitigated to acceptable levels and collective landowner consent has been obtained which will ensure construction of tower structures on the identified properties.

The EAP therefore recommends that the preferred route as described and assessed in the Basic Assessment Report be considered for implementation. In the opinion of

the EAP, the proposed activity is not fatally flawed and all potential impacts can be mitigated to an acceptable level.

Further, it is recommended that the proposed construction of the substation and distribution lines continue only if all recommendations and mitigation measures stipulated in the EMP are followed and that an Environmental Control officer be employed throughout the duration of construction.

2 MANAGEMENT AND ORGANISATIONAL STRUCTURE

2.1 Contractual obligation

In order to ensure that the EMPr and/or derivatives are enforced and implemented, these documents must be given legal standing. This shall be achieved through incorporating the EMPr and/or subsequent versions as an addendum to the contract documents for the particular project and specifying under particular conditions of the contract for the tender that the requirements of the EMPr and/or derivatives apply and must be met. This will ensure that the obligations are clearly communicated to contractors and that submitted tenders have taken into account, and budgeted for the environmental requirements specified in the EMPr and/or its derivatives. The successful tender ultimately becomes the signed contract, thereby ensuring that the included EMPr becomes legally binding.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the environmental authorisation granted by the relevant environmental permitting authority.

2.2 The Developer

Eskom is the Developer and has overall responsibility for ensuring that the construction and development of the project is undertaken in an environmentally sound and responsible manner, and in particular, reflects the requirements and specifications of the EMPr and recommendations from the relevant authorities.

2.2.1 Role

The Developer will be required to assume overall responsibility for the environmental aspects of the construction and development of the project.

2.2.2 Responsibilities

The responsibilities of the Developer will include the following:

- Establish and maintain regular and proactive communications with the PM, Contractor(s) and ECO.
- Review and comment on environmental reports produced by the ECO.
- Ensure that the EMPr is reviewed and updated as necessary.

2.2.3 Reporting Structure

The developer will liaise with the following stakeholders or I&APs:

- Relevant authorities;
- Landowners;
- General Public.

2.3 Project Manager (PM)

Eskom will assume the role as the Project Manager. The PM will ensure that the approved EMPr is included in the contract documentation issued to prospective contractors.

2.3.1 Role

Specific to the implementation of the EMPr, the role of the PM will be to:

- Review and approve Method Statements produced by the Contractor in response to stipulations in the EMPr.
- Oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications.
- Liaise between and with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences.

2.3.2 Responsibilities

The PM's responsibilities will include:

- Be familiar with the contents of the EMPr, and his role and responsibilities as defined therein.
- Communicate to the Contractor, verbally and in writing, the advice of the ECO and the outcome and recommendations of the ECO reports.
- Request for, review and approve the Method Statements prepared by the Contractor in consultation with the ECO.
- Review and approve drawings produced by the Engineer, Contractor or professional team in connection with any aspect of the proposed development.
- Issue site instructions giving effect to the ECO recommendations and requirements where necessary.
- Review complaints received and make instructions as necessary.
- Discuss with the ECO the application of penalties for the infringement of the Environmental Specifications, and other possible enforcement measures when necessary.
- Issue penalties as and when necessary.
- Implement Temporary Work Stoppages as advised by the ECO, where serious environmental infringements and non-compliances continue to occur.
- Facilitate proactive communication between all role-players in the interests of effective environmental management.

2.3.3 Reporting Structure

The PM will report to the Developer, as and when required.

2.4 Environmental Control Officer (ECO)

Through the Project Manager the Developer must appoint an ECO to monitor implementation of the EMPr and measure environmental compliance during the proposed construction works. The ECO is independent from the Developer, the PM and the Contractor(s). It is recommended however that the Developer or PM appoint or bestow onto a responsible staff member the duties of an environmental officer to ensure proactive compliance with the specifications of the EMPr and to monitor environmental compliance on site on a daily basis. The ECO is given authority to ensure that the EMPr is fully implemented and that appropriate actions are undertaken to address any discrepancies and non-compliances.

2.4.1 Role

The overall role of the ECO is to be the site 'custodian' for the implementation, integration and maintenance of the EMPr in accordance with the contractual requirements. The ECO will be required to liaise with the PM on the level of compliance with the EMPr achieved by the Contractor on a regular basis for the duration of the contract.

2.4.2 Responsibilities

The ECO will have the following responsibilities, at a minimum:

- To advise the PM on the interpretation and enforcement of the Environmental Specifications (ES), including evaluation of non-compliances.
- To supply environmental information as and when required.
- To review and approve Method Statements produced by the Contractor, in conjunction with the PM.
- To demarcate particularly sensitive areas (including all No-Go areas) and to pass instructions through the PM concerning works in these areas.
- To monitor any basic physical changes to the environment as a consequence of the construction works – e.g. evidence of erosion, dust generation and silt loading in runoff – according to an audit schedule.
- Attend regular site meetings between engineers and contractors.
- To undertake regular monthly audits of the construction works and to generate monthly audit reports. These reports are to be forwarded to the PM who will communicate with the Developer.
- To communicate frequently and openly with the Contractor and the PM to ensure effective, proactive environmental management, with the overall objective of preventing or reducing negative environmental impacts and/or enhancing positive environmental impacts.
- To advise the PM on remedial actions for the protection of the environment in the event of any accidents or emergencies during construction, and to advise on appropriate clean-up activities.
- Review complaints received and make instructions as necessary.
- Identify and make recommendations for minor amendments to the EMPr as and when appropriate.

- Ensure that the Contractor, his employees and/or Subcontractors receive the appropriate environmental awareness training prior to commencing activities.

2.4.3 Reporting Structure

The ECO will report to the Project Manager, who in turn will report to the Developer.

2.5 Contractor

The Developer, or PM acting on his behalf, will appoint a Contractor(s) to implement the development. The Contractor(s) will be contractually required to undertake their activities in an environmentally responsible manner, as described in the EMPr.

2.5.1 Role

Specific to the EMPr, the role of the Contractor will be to:

- Implement, manage and maintain the EMPr for the duration of his/her contract.
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the EMPr.
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties.
- Ensure that all subcontractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site or during the provision of their services off site.
- Ensure that all subcontractors and other workers appointed by the Contractor are complying with and implementing the EMPr during the duration of their specific contracts.
- Provide appropriate resources including budgets, equipment, personnel and training for the effective control and management of the environmental risks associated with the construction.
- Maintain a record of complaints and communicate these to the Project Manager and the ECO.

2.5.2 Responsibilities

The Contractor will have the following responsibilities:

- Be familiar with the contents of the EMPr, and his role and responsibilities as defined therein.
- Comply with the Environmental Specifications contained in the EMPr and subsequent revisions.
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities.
- Prepare Method Statements, programme of activities and site plans for submission to the PM (and ECO).
- Method Statements must be submitted to the ECO for approval at least 10 working days in advance before construction activities may commence.

- Review the site inspection reports and take cognisance of the information and implement recommendations contained therein.
- Notify the ECO and PM, verbally and in writing, immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken.
- Notify the ECO and PM, verbally and in writing at least 10 working days in advance of any activity he/she has reason to believe may have significant adverse environmental impacts, so that mitigation measures may be implemented timely.
- Ensure environmental awareness among employees, subcontractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them.
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract.
- Undertake the required works within the designated working areas.
- Rehabilitating services, utilities, private/public property and other areas adversely affected by construction activities outside of demarcated areas in accordance with the PM's instructions.
- Communicate and liaise frequently and openly with the PM and ECO to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts.

2.5.3 Reporting Structure

The Contractor will report to and receive instructions from the PM.

2.6 Subcontractors

The Contractor may from time to time appoint Subcontractors.

2.6.1 Role

On behalf of the Contractor, Subcontractors perform certain services and/or provide certain products. The Subcontractors will be contractually required to undertake their activities in an environmentally responsible manner, as described in the EMPr.

2.6.2 Responsibilities

The Subcontractor will have the following responsibilities:

- Be familiar with the contents of the EMPr, and his role and responsibilities as defined therein.
- Subcontractors shall comply with the Environmental Specifications in the EMPr and associated instructions issued by the Contractor to ensure compliance.
- Notify the Contractor verbally and in writing, immediately in the event of any accidental infringements of the Environmental Specifications and ensure appropriate remedial action is taken.

- Notify the Contractor, verbally and in writing at least 10 working days in advance of any activity he/she has reason to believe may have significant adverse environmental impacts, so that mitigation measures may be implemented timely.
- Ensure environmental awareness among employees so that they are fully aware of, and understand the Environmental Specifications and the need for them.

2.6.3 Reporting Structure

Subcontractors will report to and receive instructions from the Main Contractor.

3 IMPACTS IDENTIFIED AND MITIGATION MEASURES RECOMMENDED BY SPECIALISTS

The majority of impacts associated with the construction of the 132 kV power lines relate to the impact on avifauna (collisions and electrocution) and clearing of vegetation for the servitude and footprint of towers and substations.

3.1 Impacts on vegetation (Construction phase)

- ❖ Loss of vegetation cover;
- ❖ Loss of Rocky Refugia;
- ❖ Loss of thicket or forest vegetation in drainage lines;
- ❖ Loss of riparian vegetation along drainage lines;
- ❖ Loss of seep/wetland/seasonal pan vegetation;
- ❖ Loss of habitat for Species of Special Concern;
- ❖ Loss of Species of Special Concern;
- ❖ Increased risk of alien invasion;
- ❖ Clearing of alien invasives;
- ❖ Disruptions to ecological processes as a result of habitat fragmentation .

3.1.1 Mitigations measures recommended by vegetation specialist:

1. Vegetation clearing must be kept to the minimum necessary.
2. Appropriate permits must be obtained from DAFF for removal of protected tree species if necessary.
3. Riparian areas must be avoided as far as possible and pylons should be sited at least 32 m from edge of riparian vegetation. Where unavoidable, appropriate specialist input must be obtained before activities commence and appropriate measure implemented.
4. No pylons and access roads should be constructed within 32 m of a seep, wetland and/or seasonal pan, unless no alternative is possible. Where unavoidable, appropriate specialist input must be obtained before activities commence and appropriate measure implemented.
5. Should species of special concern be identified, all reasonable measures must be implemented to minimise destruction of localised populations that may occur. Where unavoidable, permits must be obtained from respective departments (DEDEAT).
6. Rocky refugia (such as along ridges) should be avoided where possible during pylon positioning. Where unavoidable, permits must be obtained from respective departments (DEDEAT).
7. Search and Rescue of SSC to be implemented before any construction commences.
8. A suitable timeframe must be allowed before construction commences to undertake the plant rescue and relocation operation.
9. Plants that can be used during rehabilitation should be identified and stored appropriately off-site for use after construction and alien vegetation clearing.

10. Plants identified as being suitable for relocation listed above can either be removed from the site or replanted within the proposed buffer areas.
11. An alien management plan must be implemented and long-term monitoring conducted.
12. Clearing of alien vegetation must be conducted as per the recommendations of an Environmental Management Plan to ensure that the spread of seed into surrounding areas is prevented

3.1.2 Other mitigations and recommendations by vegetation specialist

General

1. An ECO/ESO should be appointed to manage the identification and relocation of Species of Special Concern and management of vegetation clearing and subsequent revegetation and rehabilitation.
2. Individual screening should be undertaken as part of the construction phase EMP for the areas identified as having elevated sensitivities, including drainage lines and river crossings with intact Thicket and areas with intact Langkloof Shale Renosterveld to micro-site the pylons in order to minimise impact.
3. The substations must avoid any wetland areas (including seasonal wetlands, pans and seeps), other sensitive vegetation (thicket and forest), drainage lines and riparian vegetation along river banks. Should it be unavoidable, relevant permissions will need to be obtained from DWAF.
4. No power line pylons should be placed within the 1:50 year flood line or on flood plains that may be susceptible to future flooding.
5. A Construction Action Plan for clearing of vegetation must be developed before construction activities are to commence.
6. Detailed Revegetation and Rehabilitation Plan to be conducted during construction and operation.

No Go Areas

1. No go areas must be clearly demarcated (using fencing and appropriate signage where applicable) before any construction commences.
2. Contractors and construction workers must be clearly informed of such no-go areas and held accountable for any infringements that may occur.
3. No access to the demarcated areas should be permitted during the construction phase and contractors must be clearly informed of these areas. A suitable control measure must be implemented to discourage infringement by contractors.
4. Activities including but not restricted to the following must not be permitted in designated no-go areas:
 - a. Dumping of any material during and after construction;
 - b. Turning of vehicles;
 - c. Trampling and urination by construction workers.

Alien vegetation clearing

1. An alien removal program must be implemented to remove alien vegetation from within the servitude during construction phase and for the lifespan of the powerline operation.
2. Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but should be temporarily stored in a demarcated area or removed from site.
3. Any seed bearing material should be removed from the drainage areas to prevent the spread of seed.
4. Chopped brushwood can be used to stabilise steep areas that may be susceptible to erosion during clearing activities.
5. A suitable revegetation or rehabilitation plan must be implemented after alien vegetation clearing.

River crossings

1. River crossing construction must be completed as timeously as possible and efforts must be in place to minimise erosion risk and sedimentation of the stream during the construction phase, especially during high rainfall events.

3.2 Impacts on avifauna (Construction and Operational phases)

- ❖ Bird collisions with overhead power lines;
- ❖ Bird electrocutions;
- ❖ Disturbance of birds;
- ❖ Habitat destruction.

3.2.1 Mitigations measures recommended by avifauna specialist:

1. Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff.
2. Mark identified sections of the line (indicated in specialist report) with anti-collision marking devices on the earth wire (as per Eskom guidelines) to increase the visibility of the line and reduce likelihood of collisions.
3. These sections of line will need to be verified by an avifaunal walk through/site specific EMP once the final route is selected and tower positions are finalised.
4. Whilst electrocution is possible on 132kV lines, the proposed tower structures (lattice structure with phase-phase of 2000mm and cross arm of 2550mm) should be safe for the birds in area.
5. Construction work should be completed outside the bird breeding season.
6. Re-location of birds' nests to be conducted according to Eskom's Guidelines for Birds Nests and by avifauna specialist.

3.3 Impacts of heritage resources (Construction and Operational phases)

- ❖ Impact on Gamtoos Scenic Route
- ❖ Impact on Palaeontological Heritage Resources

3.3.1 Mitigations measures recommended by heritage specialist:

1. It is recommended that towers should be located such that they do not interrupt skylines, and are not visible from scenic routes.
2. A heritage practitioner should complete a 'walk-through' of the final selected power line route and all other activity areas (access roads, construction camps, materials' storage areas, etc.) prior to the start of any construction activities and assess direct impacts on discrete resources such as traditional burial places, and archaeological and palaeontological sites.
3. Mitigation can usually be achieved by micro-adjustment of tower positions, the exclusion of sensitive areas, basic recording and/or obtaining a permit for alteration, destruction or removal from SAHRA.

4 ENVIRONMENTAL SPECIFICATIONS DURING CONSTRUCTION PHASE

The following section details the minimum range of constraints, controls, procedures and standards that are typically required for the construction activities of the project.

4.1 Planning

4.1.1 Environmental Principles for the Construction Works

4. The environment is considered to be composed of both biophysical and social components.
5. Construction is a disruptive activity and all due consideration must be given to the environment, including the social environment during the execution of a project to minimise the impact on affected parties.
6. Minimisation of areas disturbed by construction activities (i.e. the 'footprint' of the construction area) should minimise many of the construction related environmental impacts of the project and reduce rehabilitation requirements and costs.
7. All relevant standards relating to international best practices and standards; and national, provincial and local legislation and standards, as applicable, should be adhered to.
8. Every effort should be made to minimise, reclaim and/or recycle waste materials.

4.1.2 Compliance with Environmental Legislation and permit application

1. The ECO/PM shall maintain a database of all pertinent legislation, regulations and guidelines pertinent to the environmental management of the activities being undertaken.
2. The ECO/PM shall provide the Contractor with a list of all pertinent legislation, regulations and guidelines to adhere to. All relevant legislation can be obtained at <http://www.environment.gov.za>.
3. The Contractor shall ensure that all pertinent legislation concerning the protection of the environment is adhered to and that prevention of pollution is strictly enforced.
4. The Contractor shall ensure that all relevant permits, certificates and permissions have been obtained prior to any activities commencing on site and are strictly enforced / adhered to.
5. The Contractor shall maintain a database of all relevant permits and permissions required for the contract as a whole and for pertinent activities for the duration of the contract.

4.1.3 Method Statements

1. The Contractor shall submit written Method Statements to the PM and ECO for the activities identified by the PM and/or the ECO.

2. Method Statements indicate what will be done to comply with relevant environmental specification as set out in the EMPr.
3. Method Statements shall be submitted at least 10 working days prior to the proposed commencement of work on an activity to allow the PM and ECO time to study and approve the method statements.
4. The Contractor shall not commence work on any activity until such time as the Method Statement has been approved in writing by the ECO and/or PM.
5. The ECO may require changes to a Method Statement if it does not comply with the specification or if, in the reasonable opinion of the ECO, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the EMPr or any legislation.
6. The Contractor shall carry out the activities in accordance with the approved Method Statement.
7. Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel.
8. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract.
9. No claim for delay or additional cost incurred by the Contractor shall be entertained due to inadequacy of a Method Statement.

4.1.4 Content of Method Statements

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 following Method Statements shall be prepared by the Contractor for approval:

1. Contractor's SHE Officer and Fire Officer

The name and letter of appointment of the Contractors SHE Officer and Fire Officer must be given to the ECO and the terms of reference for the work to be undertaken must be detailed including time on site, roles and responsibility, interaction with the Contractor and environmental offices, etc.

2. Site layout

The graphical representation with detailed notes of the location, layout and method of establishment of the construction camp must be provided and must including the following:

- All Contractor's buildings, and/or offices;
- Lay down areas;
- Vehicle and plant storage areas, including wash areas;
- Workshops, if required and approved by ECO;
- Fuel storage and dispensing areas, if required and approved by ECO;
- Cement/concrete batching areas, if required and approved by ECO (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete);
- Other infrastructure required for the running of the project.

3. Access Routes

Details, including a drawing, showing where and how the access points and routes will be located and managed must be provided in a Method Statement. Final locations of planned new access roads will be subject to successful negotiations with landowners. Details of fences and gates affected or used during the construction activities, including a drawing showing the location of fences and access gates must be provided.

4. Pollution control

Expected solid waste types, quantities, methods and frequency of collection and disposal as well as location of disposal sites must be identified and stated in a Method Statement. The Method Statement shall further include methods of minimising, controlling, collecting and disposing of contaminated water, and details of any hazardous substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

5. Safety considerations

The Contractor shall provide details identifying what safety precautions will be implemented to ensure the safety of all staff, and the general public at large, on site during the life of the project. This will include protective clothing requirements for all types of construction activities on site, including protection against dust, noise, falling objects, work associated with electricity and work at heights.

6. Emergency procedures

The Contractor shall provide details regarding all relevant emergency procedures that will be implemented for fire control and accidental leaks and spillages of hazardous substances (including fuel and oil). The Contractor shall further include details of risk

reduction measures to be implemented including fire fighting equipment, fire prevention procedures and spill kits.

7. Waste management control

The Contractor shall provide details regarding how solid and liquid waste generated on the construction site and site camp will be collected, stored, transported and disposed off. Details of any service provider(s) appointed to manage this task must also be provided.

8. Storm water and erosion control

The Contractor shall provide details of how storm water emanating within or adjacent to the construction site may impact on construction activities. Details on how the Contractor will deal with storm water runoff and potential erosion within the construction footprint and servitude must be provided. Details of any service provider(s) appointed to manage this task must also be provided.

4.2 Environmental awareness

1. An initial environmental awareness training session for all of the Contractor's staff is required prior to any work commencing.
2. The ECO will provide the Contractor with the course content for the environmental awareness training course, and the Contractor shall communicate this information to his employees on the site, to any new employees coming onto site, to his subcontractors and to his suppliers.
3. The training session shall be delivered in the languages of the site staff.
4. The emphasis should be on any (potential) environmental impacts relating to the construction activities to be undertaken on site and the related environmental precautions, which need to be taken to avoid or mitigate these impacts.

4.3 Site establishment

4.3.1 Site Identification

1. A demarcated area at or close to the site must be provided for the storage of machinery and trucks as necessary. This area shall also serve as the Contractor's site camp.
2. The site for the Contractor's Camp shall be determined in collaboration with the PM and ECO before the Contractor moves on site, such that it is effectively isolated from the sensitive elements of the surrounding environment.
3. The Contractor's Camp should also be of sufficient size to accommodate the needs of all subcontractors that may work on the project.

4. The Contractor will produce a Site Layout Plan illustrating the location and layout of the proposed site camp and working areas. This plan must be approved by the PM in consultation with the ECO.
5. If the site camp is to be situated on private land, approval must be obtained from the landowner prior to site establishment.
6. The Contractor shall produce a photographic record of the area earmarked for the site camp prior to site establishment. This will serve as the benchmark against which rehabilitation will be measured and shall be kept in the site environmental file.
7. It will be the responsibility of the Contractor to reinstate the site camp to its original condition once the project has been completed.
8. The working areas shall be kept to a minimum to reduce the total physical 'footprint' of the construction site thereby reducing environmental damage.
9. Utilities and other Service Providers such as Telkom shall be advised of the construction activities. The Contractor will be responsible for any damage to these services/utilities.

4.3.2 Site Demarcation

1. Prior to construction commencing, the Contractor, PM and ECO shall inspect the site and identify any sensitive environments.
2. Where necessary, the No-Go areas shall be identified and indicated on the site map. The No-Go areas may be demarcated if need be.
3. The Contractor will be required to maintain all demarcation fencing and other demarcating materials for the duration of construction activities or as otherwise instructed by the PM.
4. The Contractor shall ensure that, insofar as he has the authority, no person, plant equipment or material will enter the No-Go areas at any time.

4.3.3 Traffic

1. The movement of trucks to and from the construction site must be well coordinated by the PM, together with the Contractor.
2. Large trucks and other heavy-duty machinery may not be left unattended outside the contractor's site camp or designated area.

4.4 Vegetation impacts

4.4.1 Vegetation clearance

1. No flora shall not be removed, damaged or disturbed nor shall any vegetation be planted except to the extent necessary for the carrying out of the construction works.
2. Vegetation clearance shall take place strictly in accordance with the Site Layout Plan developed by the Contractor.

3. The minimum amount of vegetation clearance, as advised by the ECO, must take place.
4. Site clearing must take place in phased matter, as and when required.
5. The search and rescue of rare, endemic or endangered species prior to site clearance must be carried out. The removal and stockpiling of topsoil must also be carried out in accordance with the EMPr.
6. Areas which are not to be affected by construction for a period of two months into the future must, in order to reduce erosion risks, not be cleared.
7. Areas to be cleared must be clearly demarcated and this footprint strictly maintained.
8. Spoil that is removed from the site must be removed to an approved spoil site or municipal licensed landfill site.
9. Silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include wetlands and steep areas.
10. All plants not interfering with construction should be left undisturbed.
11. Collection or wilful damage to any plants outside of the areas demarcated for clearing is not allowed.
12. The Contractor, or responsible sub-contracted service provider, must ensure that seeds from alien vegetation collected during site clearance are not dispersed so as to counter the spread of this vegetation type. Failure to do so may result in prosecution in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983, which states that any person removing any weed (which includes alien vegetation) shall ensure that it is not able to reproduce itself.

4.4.2 Protection of natural features

1. The Contractor shall not deface, paint, damage or mark any natural features situated in or around the Site for survey or other purposes unless agreed beforehand with the ECO. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the ECO.
2. The Contractor shall not permit his employees to make use of any natural water sources (e.g. springs, streams, and open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes.

4.5 Biodiversity impacts

1. Trapping, poisoning and/or shooting of animals is strictly forbidden.
2. No rock removal should occur adjacent to existing termite mounds. If any moribund termite mounds have to be destroyed a qualified herpetologist must be present in case any blind snakes or the red data Striped Harlequin Snake is unearthed. The termite mounds should be carefully excavated by hand and pick.
3. Any animals rescued or recovered will be relocated to suitable habitat away from the substation and line infrastructure.

4. Cleared vegetation can be used to form wood piles and logs and stumps. Dead or decaying wood piles should be created as these will provide valuable refuge areas especially due to the clearance of vegetation cover.
5. Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians, arachnids and scorpions.
6. Any lizards, monitors or snakes encountered should be allowed to escape to suitable habitat away from the disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project.
7. Appropriate foot wear should be worn in the field.
8. During construction activities wherever possible work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles and amphibians an opportunity to move into undisturbed areas close to their natural habitat.
9. No domestic pets or livestock are permitted on Site.
10. Bird nests shall not be removed or moved from existing electrical infrastructure without authorisation from the provincial authority. Once authorisation has been granted the bird nest must be removed according to Eskom's Bird Nesting guidelines

4.6 Soil impacts

4.6.1 Topsoil

1. Topsoil should only be stripped from areas where foundations for each tower structure will be excavated.
2. Stripping of topsoil will be undertaken in such a manner as to minimise erosion by wind or runoff.
3. Topsoil will be stripped to a depth not exceeding 150 mm from the original ground level.
4. Areas from which the topsoil is to be removed will be cleared of any foreign material which could reduce the quality of the topsoil.
5. The Contractor shall ensure that subsoil and topsoil are not mixed during stripping, excavation, reinstatement and rehabilitation.

4.6.2 Stockpiles

1. Topsoil will be temporarily stockpiled, separately from (clay) subsoil and rocky materials.
2. Topsoil will be stockpiled in areas as indicated on the site plan/s approved by the PM and ECO.
3. Soil must not be stockpiled on drainage lines or near watercourses without prior consent from the ECO.
4. Stockpiles should not exceed 2m in height.

5. If stockpiles are exposed to windy conditions or heavy rain, they should be covered to prevent loss of topsoil.
6. Stockpiles can either be vegetated with indigenous grasses or covered by a suitable fabric to prevent invasion of weeds.

4.6.3 Workshop

1. If an on-site workshop is to be established for the duration of construction, the Contractor shall obtain the approval of the PM prior to commencing activities and confine maintenance activities to the identified workshop area.
2. The Contractor shall ensure that there is no contamination of the soil or surface water from the on-site workshop. Each contractor must have a spill control kit and staff appropriately trained to utilise it.

4.7 Construction plant and material management

4.7.1 Equipment Maintenance and Storage

1. All vehicles and equipment shall be kept in good working order and shall be stored in the site camp or an area approved by the PM.
2. All vehicles and plant will be inspected daily for leaks and spills. Maintenance checks shall be logged and signed off in a site maintenance file after each inspection.
3. Leaking equipment shall be repaired immediately or removed from the site.
4. Stationary plant must be supplied with drip trays to prevent soil contamination after hours.

4.7.2 General Materials Handling, Use and Storage

1. Materials shall be appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, fine vegetation, refuse, paper and cement, shall have appropriate cover to prevent it from spilling over the side of the vehicle during transit.
2. The Contractor shall be responsible for any clean-up resulting from the failure by his staff or supplier to properly secure materials to be transported.

4.7.3 Stockpiling of construction material

1. Any stockpiling of gravel, cut, fill or any other material including spoil shall be in areas approved by the ECO within the defined working area.
2. The Contractor shall ensure that stockpiled material is not lost due to exposure to the elements. If the stockpiled material is in danger of being washed or blown away, the Contractor shall cover it with a suitable material, such as hessian or plastic. Stockpiles of topsoil shall not be covered with plastic.

3. No stockpiling of any material shall be allowed within the 100 m of any residential areas or 20 m of any “no go” area.

4.8 General waste management

4.8.1 Solid Waste Management

1. The Contractor will be required to prepare and submit a Method Statement on waste control and management at the site.
2. No burning, burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted.
3. Solid waste shall be removed from site on a weekly or fortnightly basis by the Contractor or appropriate service provider.
4. Solid waste shall be recycled where possible and the remainder spoiled at an approved municipal land fill site or waste disposal service provider.
5. Disposal certificates for each waste removal event shall be issued and kept in the site environmental file for auditing purposes.
6. No burning of cleared vegetation shall be allowed on site. Chipping or composting of vegetation shall be allowed where viable.
7. The Contractor must ensure that cleared trees and wood are removed from the Site within 45 days of commencement of rehabilitation.

4.8.2 Wastewater Management

1. The Contractor shall prepare a Method Statement on the control and management of wastewater on site, including providing for the appropriate disposal of contaminated water.
2. No grey water runoff or uncontrolled discharges from the site/working areas (including wash down areas) to adjacent or nearby water bodies shall be permitted.
3. Water containing environmental pollutants shall be discharged into a conservancy tank, where appropriate, for removal from site.
4. The Contractor shall also prevent runoff loaded with sediment and other suspended materials from the site/working areas from discharging to adjacent watercourses and/or storm water infrastructure.
5. Potential pollutants of any kind and in any form shall be kept, stored and used in such a manner that any escape can be contained.
6. Wash down areas must be approved by the PM and ECO and shall not pollute the surrounding environment.
7. The Contractor shall notify the PM and ECO of any pollution incidents on site.

4.9 Hazardous waste management

4.9.1 Sanitation

1. Adequate washing and toilet facilities are to be provided at the construction site camp.
2. Portable chemical toilets at a ratio of one toilet per 15 workers shall be provided at the site camp.
3. All temporary/portable toilets shall be secured to the ground to the satisfaction of the PM to prevent them from toppling over or being blown over by wind.
4. The type and exact location of the toilets shall be approved by the PM prior to establishment. No septic tanks are to be established.
5. The Contractor shall ensure maintenance of all toilets in a clean sanitary condition to the satisfaction of the PM. Toilets are to be serviced at least once per week and toilet paper shall be provided.
6. The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that the contents are removed from the site to an appropriate location/facility. The Contractor/service provider is to provide proof that the toilet contents are disposed of at an appropriate facility.
7. Discharge of waste from toilets into the environment and burial of toilet waste is strictly prohibited.

4.9.2 Fuels (Petrol and Diesel) and Oil

1. Unless specifically authorised, fuel shall not be stored on site, but shall be transported to the site in small quantities as and when required.
2. Where fuel is to be stored on site, all necessary approvals regarding storage and dispensing shall be obtained from the appropriate authorities.
3. The location of the fuel storage area shall be approved by the PM and ECO.
4. Areas for the storage of fuel and other flammable materials shall comply with standard fire safety regulations.
5. Fuel and chemical depot(s) shall be located at least 100 m from any water body.
6. The Contractor shall ensure that all liquid fuels and oils are stored in tanks with lids and that these are kept firmly locked at all times. The design and construction of the storage tanks shall be in accordance with a recognised code and as approved by the PM.
7. The tanks shall be situated in a bunded area that has a volume of at least 110% of the volume of the largest tank. The floor of the bunded area must be impermeable and the bunds must be without leaks.
8. Storage tanks are to be removed on completion of the works.
9. No smoking shall be allowed in the vicinity of the fuel storage area. At least one no-smoking warning sign must be erected and be clearly visible at the fuel storage area to warn all staff of associated dangers.

10. There shall be adequate fire fighting equipment at or close to the fuel storage and dispensing area(s).
11. Fuel shall be kept under lock and key at all times.
12. Where reasonably practical, plant shall be refuelled at a designated refuelling area or at the workshop as applicable. If it is not reasonably practical then the surface under the temporary refuelling area shall be protected against pollution to the reasonable satisfaction of the PM prior to any refuelling activities.
13. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/break down any hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 litres of hydrocarbon liquid spill. This material must be approved by the PM prior to any refuelling or maintenance activities.
14. In the case of a spill, contaminated material must be removed from the site immediately and disposed of at an appropriate hazardous waste facility.

4.9.3 Other Hazardous Substances

1. All potentially hazardous raw and waste materials are to be handled by the Contractor's trained staff and stored on site in accordance with manufacturer's instructions and legal requirements.
2. Appropriate training for the handling and use of such materials is to be provided by the Contractor as necessary. This includes providing for any spills and pollution threats that may occur.
3. Products should be clearly labelled and symbolic safety/hazard warning signs should be provided.
4. If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.
5. Hazardous chemical substances used during construction shall be stored in secondary containers.
6. The relevant Material Safety Data Sheets (MSDS) shall be available on site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.
7. Where hazardous substances is removed from site for disposal, proof of disposal for auditing purposes shall be kept in the form of disposal certificates.

4.9.4 Emergency Procedures

1. The Contractor shall ensure that his employees and subcontractors on site are aware of the procedure for dealing with accidental spills and leaks.

2. The Contractor shall also ensure that the necessary materials and equipment for dealing with the spills and leaks are available on site at all times.
3. The site shall have a supply of absorbent material readily available to absorb any accidental hydrocarbon spills. The quantity of such material shall be able to absorb/deal with a minimum of 200 litres of spill.
4. The contractor shall contain the spill using sand berms, sandbags, sawdust or absorbent materials.
5. The area shall be cordoned off and secured.
6. The Contractor shall notify the ECO, PM and relevant authorities of any spills that occur.
7. The treatment and remediation shall require method statements.
8. The Contractor shall assemble and clearly list the relevant emergency telephone contact numbers for staff and brief staff on the required procedures. These contact details shall be listed in Afrikaans, Xhosa and English in the site office, construction camp and any other suitable areas.
9. The treatment and remediation of areas affected by emergencies shall be undertaken to the satisfaction of the PM and ECO at the cost of the Contractor where his staff have been proven to be responsible for the emergency.

4.10 Storm Water Management and Erosion

1. The Contractor shall take all reasonable measures to control storm water and the erosive effects thereof and shall provide a Method Statement for approval by the PM and ECO.
2. During construction, the Contractor shall protect areas susceptible to erosion by installing necessary temporary or permanent drainage works as soon as possible.
3. Areas affected by construction related activities and/or susceptible to erosion must be monitored regularly for evidence of erosion.
4. On any areas where the risk of erosion is evident, special measures may be necessary to stabilise the areas and prevent erosion. These may include, but not be restricted to:
 - Confining construction activities.
 - Using cut-off berms.
 - Using mechanical cover or packing structures such as geofabric to stabilise steep slopes or hessian, gabions and mattress and retaining walls.
 - Straw stabilising.
 - Brush cut packing.
 - Constructing anti-erosion berms.
5. The erosion prevention measures must be implemented to the satisfaction of the PM and ECO.

6. Where erosion does occur on any completed work/working areas, the Contractor shall reinstate such areas and areas damaged by the erosion at his own cost and to the satisfaction of the PM and ECO.
7. Traffic and movement over stabilised areas shall be restricted and controlled. Any damage to the stabilised areas shall be repaired and maintained to the satisfaction of the PM and ECO.
8. The Contractor shall be liable for any damage to downstream property caused by the diversion of overland storm water flows.

4.11 Air Quality

4.11.1 Air emissions

1. The Contractor will be required to ensure that all vehicles and plant used are maintained in good working order to help reduce air emissions.
2. The burning of substances that may emit foul smelling smoke or vapour, e.g. oil rags, tar paper etc., is not permitted.

4.11.2 Dust Control

1. The Contractor shall be responsible for the control of dust arising from his operations and activities.
2. Control measures shall include regular spraying of working/exposed areas with water at an application rate that will not result in soil erosion or runoff. The frequency of spraying will be agreed with the PM.
3. The excavation, handling and transport of erodible materials shall be avoided under high wind conditions.
4. Soil stockpiles shall be wetted and/or sheltered from the wind, as required.

4.12 Noise Control

1. The contractor shall keep noise level within acceptable limits. The Contractor shall comply with all relevant guidelines and regulations.
2. All vehicles and machinery shall be fitted with appropriate silencing technology that shall be properly maintained.
3. Reverse hooters of heavy earthmoving vehicles must be set at such a level that the beeping sound does not create a nuisance to residents of nearby houses.
4. The use of all plant and machinery shall be appropriate to the task required in order to reduce noise levels and/or environmental damage.
5. Should the PM approve any noisy construction activities outside of normal working hours, affected residents and ECO shall be notified by the Contractor at least 5 days in advance of the event.
6. Any complaints received by the Contractor regarding noise will be recorded and communicated to the PM and ECO.

4.13 Impacts from construction activities

4.13.1 Mortar and Concrete Batching

1. The proposed location of batching areas (including the location of cement stores and sand and aggregate stockpiles) shall be indicated on the Site Layout Plan and approved by the ECO.
2. Batching areas shall not be located within 150 m of any water body or any “No-Go” areas, unless written approval has been granted by the ECO.
3. The Contractor shall ensure that minimal water is used for washing of concrete batching equipment.
4. Where possible, the Contractor should make use of ready-mix concrete.
5. Concrete and mortar shall not be mixed directly on the ground. Mixing trays, wheelbarrows or concrete mixing machines can be used.
6. The mixing works shall be kept neat and clean at all times.
7. Contaminated storm water and wastewater runoff from the mixing works and aggregate stockpiles shall be led to a pit where the water can soak away, or be tinkered off the site.
8. Used cement bags must be stored tidily in weatherproof containers until disposal off-site. Unused cement bags must be stored weatherproof to prevent leaching of cement.
9. All reasonable measures must be taken to ensure that transportation of concrete does not result in spillage.
10. Cleaning of equipment and flushing of mixers shall not result in pollution of the surrounding environment.
11. Suitable screening and containment shall be in place to prevent windblown contamination associated with any loading and batching.
12. Waste concrete, cement sludge and mortar leftovers shall be removed from site to an approved landfill site. Washing the remains into the ground is not acceptable.

4.13.2 Trenching and excavations

1. Top soil and subsoil excavated during trenching may be stockpiled next to the trench, but must be set back from the edge of the trench by a minimum distance of 1 m.
2. A ladder or exit point must always be available close to the workforce in the trench.
3. The SHE Officer must check the walls of all trenches for stability daily before staff may be allowed to enter a trench.
4. The SHE Officer shall further check all trenches for wild animals and dangerous reptiles every morning before staff will be allowed to commence work in a trench. Animals may not be harmed and must be released back into the environment away from the construction site.
5. All trenches must be demarcated or barricaded at all times to warn staff and the general public of the danger.

6. Staff must wear full protective clothing when work is conducted in trenches.
7. Staff shall not be allowed to work in isolation in a trench. Each worker will pair up with a co-worker and will work in close proximity to one another at all times while conducting work in a trench.

4.13.3 Stringing of power lines

1. The winch and stringer stations must be monitored regularly and may need rehabilitation from time to time.
2. Measures must be taken to avoid damage to any structure supplying services such as telephone and smaller power lines
3. Bird flight diverters must be used where the power line crosses or comes into close proximity of watercourse or where specified by an ornithologist

4.13.4 Access roads

1. Existing access roads must be used where possible.
2. The construction of new access roads will be subject to consultation with the ECO and the particular landowner.
3. No access roads to be constructed on slopes of greater than 20%.
4. Steps must be taken to avoid erosion.

4.13.5 Work Stoppage and Temporary Site Closure

1. The Engineer, in consultation with the ECO, shall have the right to order work to be stopped in the event of significant infringements of the Project Environmental Specifications until the situation is rectified in compliance with the specifications. In this event, the Contractor shall not be entitled to claim for delays or incurred expenses.

4.14 Social Environment

4.14.1 Community relations

1. The Contractor shall erect and maintain information boards in the positions, quantities, designs and dimensions required by municipal specifications. Such boards shall include contact details for complaints by members of the public in accordance with details provided by the ECO.
2. The Contractor must keep a Complaints Register on Site. The Register shall contain contact details of complainants, the nature of the complaint, details on the complaint itself, as well as the date and time that the complaint was made and resolved.
3. The Contractor and/or ECO shall be responsible for responding to queries or complaints.

4.14.2 Liaison with landowners

1. The Contractor must obtain a list of affected land owners, their contact details and portions of land owned from the Project Manager in advance.

2. All land owners must be informed 10 working days in advance of the desired dates at which construction is to commence on their property.
3. Details of the construction activities to be undertaken, staff undertaking these activities and any potential damage to property are to be discussed with the landowners before construction commences.

4.14.3 Non-working times

1. Ordinarily, construction works shall be executed solely between sunrise and sunset from Monday to Saturday, inclusive, of any week, unless work is necessary for the saving of life or property or for the safety of the work.
2. For any deviation from the ordinary working hours the written approval of the PM must be obtained before such works commences.

4.14.4 Social disruption (close to urban nodes)

3. The Contractor's staff shall in no way be a nuisance to residents residing in the vicinity of the construction site. Any complaints received by the PM will be investigated, addressed and, if deemed necessary, the relevant persons will be suspended from the project.
4. The Contractor shall give at least 7 days notice to the residents in the vicinity of the construction site of his intention to begin construction activities in their area.
5. The PM may request a representative of the Contractor to be available to discuss issues raised by residents and make information available to them on construction activities.

4.14.5 Prevention of damage to private property

1. The Contractor, and his staff, must be extra vigilant, during the construction activities, to prevent damage from occurring to any private property including buildings, fences, cultivated fields and roads.
2. If damage to private property occurs the contractors must notify Eskom and take photographic evidence of the event.
3. The Contractor shall be responsible, at his own cost, for the repair and reinstatement of any damages to existing structures resulting from the construction works.

Any complaints received from the public or landowners regarding any of the listings above shall be investigated and, if substantiated, may result in a fine, suspension or dismissal of the guilty party.

4.15 Security and Crime

1. No theft of private property will be tolerated while on site.
2. Unsocial activities such as the consumption or illegal selling of alcohol or drugs on site are prohibited.
3. Any staff of the Contractor or Developer found to be engaged in prohibited activities shall have disciplinary and / or criminal action taken against them.

4. No person shall enter the site unless authorised to do so by the Contractor or ECO.
5. If any fencing interferes with the construction process, it may be temporarily moved or removed until construction is completed. The extent of such moving or removal of fences shall be negotiated and agreed with the landowner in advance and in writing.
6. Trespassing on properties adjoining the site is strictly forbidden.
7. The site must be secured in order to reduce the opportunity for criminal activity at the locality of the construction site.
8. Appropriate fencing, security gates, shelter, signage and/or security guards are to be provided at the construction site to prevent theft of plant and materials, as well as to ensure the security of site staff.
9. The entrance gates to the site camp shall be locked after hours to prevent unauthorised access to the site camp.
10. All Eskom gates must be fitted with locks and kept locked at all times.

4.16 Health and Safety

4.16.1 General safety at the construction site

1. Safety precautions must be taken to ensure that residents of communities residing in the area do not come to harm.
2. All potential construction-related danger areas must be clearly demarcated with hazard tape and/or be fenced as appropriate.
3. The construction site shall be off limits to the general public at all times during the construction period and during site clean-up.
4. Emergency numbers for local police, fire department, Eskom and the Local Municipality must be placed in a prominent clearly visible area on site.
5. Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.
6. A speed limit of 40 km/h must be adhered to by all vehicles and plant.

4.16.2 Personal Protective Equipment

1. PPE must be made available to all construction staff and the wearing and use of PPE must be compulsory.
2. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs, hard hat, safety boots and overalls etc.
3. No person is to enter the site without the necessary PPE.

4.16.3 Staff safety considerations

1. All safety measures, work procedures and first aid must be implemented on site.

2. A health and safety plan in terms of the Occupational Health and Safety Act (85 of 1993) must be developed by the Contractor to govern staff safety while on site.
3. Contractors must ensure that all equipment is maintained in safe operating condition.
4. A record of health and safety incidents must be kept on site.
5. Any health and safety incidents on site must be reported to the Project Manager immediately.
6. First aid facilities must be available on site at all times.
7. Material stockpiles must be stable and well secured to avoid collapse and possible injury to site workers.

4.16.4 Cooking Facilities

1. The Contractor shall designate an all weather cooking and eating area, subject to the approval of the PM.
2. Any cooking on site shall be pre-approved by the ECO and only done on well-maintained gas cookers. These shall be located away from flammable vegetation or construction materials.
3. No fires for heating purposes shall be allowed on site.
4. The cooking and eating areas must be kept tidy and clean at all times to prevent the luring of vermin, domesticated or wild animals.
5. No workers shall be allowed to reside on site.
6. Sufficient bins with vermin proof lids for waste disposal, as described in the Environmental Specification, shall be present within a 5 m radius of the cooking/eating area at all times.

4.16.5 Fire Prevention and Control

1. The Contractor shall take all reasonable and precautionary steps to ensure that fires are not started as a consequence of his activities on site.
2. The Contractor shall ensure that there is basic fire-fighting equipment available on site. Fire-fighting equipment must be in working order and serviced to date.
3. The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Contractor shall forward the name of the Fire Officer to the ECO for his approval within 7 days of being on site.
4. Flammable materials should be stored under conditions that will limit the potential for ignition and the spread of fires.
5. Smoking shall not be permitted in those areas where there is a fire hazard, e.g. fuel storage areas and areas susceptible to the rapid spread of fires.
6. The Contractor shall hold fire prevention talks with staff to create an awareness of the risks of fire.

4.17 Construction site decommissioning

4.17.1 Removal of site camp

1. All structures, vehicles, plant and material comprising the construction camp are to be removed from site.
2. The construction camp footprint area is to be checked for spills of contaminant substances, and these shall be cleaned up and disposed of appropriately.
3. All hardened surfaces within the construction camp footprint area should be ripped, the area covered with top soil to re-vegetate.
4. The Contractor is to check that all nearby watercourses are free from building rubble, spoil materials and waste materials.
5. All residual stockpiles must be removed or spread on site as directed by the ECO.

The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.

4.17.2 Temporary services

1. The Contractor must arrange the cancellation of all temporary services.
2. Temporary roads must be closed and access across these blocked.
3. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.

4.17.3 Rehabilitation and revegetation

1. The Contractor shall rehabilitate all disturbed areas to the satisfaction of the PM and the ECO.
2. The Contractor shall appoint a suitably experienced landscaping contractor or horticulturist to compile a vegetation rehabilitation plan that will stipulate seeding methods, planting and vegetation establishment in all construction areas.
3. The Contractor shall submit the vegetation rehabilitation plan to the PM and ECO for approval.
4. Rehabilitation shall be required for all specified areas disturbed by the works and site camp.
5. Rehabilitation shall ensure that all specified areas disturbed by the works are returned to a similar or better state than before the construction works commenced.
6. The Contractor shall implement a programme of progressive rehabilitation, i.e. rehabilitation and/or re-vegetation must commence once works are complete in particular areas.
7. Where rehabilitation of an area is not successful, the Contractor will rehabilitate these areas at no additional cost to the Developer.

8. The revegetation programme must take cognisance of the climatic and seasonal conditions with the most favourable period being in spring and early summer.
9. The rehabilitated areas will be weeded by the nominated rehabilitation contractor for a period of 1 year.

4.18 Monitoring

4.18.1 Obligations of the Contractor

1. The Contractor, or suitably qualified and experienced staff member acting on his behalf, shall inspect the site on a daily basis to ensure that the environmental specifications of the EMPr are adhered to.
2. The Contractor shall provide the PM with a monthly verbal report, at a minimum, detailing compliance with the EMPr as well as environmental performance.
3. The Contractor shall maintain a record of incidents (spills, impacts, complaints, legal transgressions, etc.) as well as corrective and preventive actions taken, for submission to the PM at the scheduled project meetings.
4. The PM shall appoint a qualified and experienced ECO to ensure implementation of and adherence to the EMPr.
5. The ECO shall conduct audits to ensure that the system for implementation of the EMPr is operating effectively. The audit programme shall consist of the following at a minimum:
 - First audit no later than 1 month after construction commences;
 - Thereafter audits at monthly intervals at a minimum;
 - An audit one week prior to practical completion of the project;
 - A post construction audit within 1 week after the contractor has moved off site.

4.18.2 Compliance with the EMPr

The Contractor and/or his agents are deemed not to have complied with the EMPr and remedial action if:

- There is evidence of contravention of the EMPr clauses within the boundaries of the site or extensions.
- Environmental damage ensues due to negligence.
- The Contractor fails to comply with corrective or other instructions issued by the PM, within a time period specified by the PM.

4.19 Completion of Contract

1. Prior to completion, the Contractor is to timely notify the PM of proposed 'Practical Completion' meetings and 'snagging lists' to provide an opportunity to identify work outstanding or incomplete.
2. The PM is to approve 'Practical Completion' and must timely inform the ECO of Contract Completion so that a final audit can be arranged.

5 ENVIRONMENTAL SPECIFICATIONS DURING THE OPERATIONAL PHASE

The proposed development in itself does not have the potential to cause undue harm to the surrounding environment; therefore no extensive operational management plan is required.

5.1 Substations

1. Inspect substations fences and gates regularly for signs of vandalism or theft of plant and / or materials.
2. Ensure all signage is in place including warning signs.
3. Monitor bird nests in substations, which if present must be managed according to Eskom's Bird Nesting Guidelines.

5.2 Power lines

1. Inspect power lines regularly for signs of vandalism or theft of support structures or conductors.
2. Install anti-climb wires to deter individuals from climbing towers.
3. Monitor the growth of vegetation in the servitude and keep the clearance between vegetation and lines to those legally required.
4. Monitor bird nests on power lines, which if present must be managed according to Eskom's Bird Nesting Guidelines.

5.3 Access tracks

1. The maintenance of access tracks is the responsibility of Eskom.
2. Access tracks must be repaired when necessary to avoid the formation of ruts.
3. Eskom's Erosion Guidelines should be used manage erosion of access and servitudes.
4. All weeds and invasive vegetation in the electrical servitude should be eradicated over a five year period.

6 SITE DOCUMENTATION AND RECORD KEEPING

1. The following documents must be kept on site:

- ✓ Access negotiations and physical access plans;
- ✓ Site instructions;
- ✓ Pre-construction audit report;
- ✓ Complaints register;
- ✓ Records of all remediation / rehabilitation activities;
- ✓ Copy of this EMPr;
- ✓ Copy of the Environmental Authorisation;
- ✓ Monthly compliance report;
- ✓ Environmental training records;
- ✓ Emergency response procedures.

2. The monthly compliance report should include:

- ✓ Complaints received from affected parties and details of the actions taken;
- ✓ Environmental incidents, spills of hazardous substances, etc.
- ✓ Environmental damage which requires rehabilitation;
- ✓ Damages of private property such as buildings or crops.

7 ENVIRONMENTAL AWARENESS TRAINING

1. Training is required for all personnel involved in the proposed project. This includes all employees working on the site including temporary labourers, contractors and subcontractors.

Training should cover:

- ✓ The importance of the EMPr;
 - ✓ Specific details of the EMPr;
 - ✓ Employees role in compliance with the EMPr;
 - ✓ Environmental effects associated with the activities;
 - ✓ Training targeted at specific personnel for example operators of heavy machinery;
 - ✓ The environmental impacts, actual or potential, of their work activities;
 - ✓ The environmental benefits of improved personal performance;
 - ✓ Their roles and responsibilities in achieving conformance with the environmental policy and procedures;
 - ✓ Emergency preparedness and response requirements;
 - ✓ The potential consequences of departure from specified operating procedures;
 - ✓ The mitigation measures required to be implemented when carrying out their work activities;
 - ✓ Environmental legal requirements and obligations;
 - ✓ Details regarding floral/faunal species of special concern and protected species, and the procedures to be followed should these be encountered;
 - ✓ The importance of not littering;
 - ✓ The importance of using supplied toilet facilities;
 - ✓ The need to use water sparingly;
 - ✓ Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.
 - ✓ Details regarding archaeological and/or historical sites which may be unearthed during construction and the procedures to be followed should such be encountered.
2. Training should be conducted by a suitably qualified person and if necessary in more than one language to ensure it is understood by all workers.
 3. Copies of the environmental training must be available on site in languages appropriate to the work force.
 4. Records of training session including attendance, nature of training and date of training should be kept to ensure all staff members have received the necessary training
 5. In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. Environmental awareness and training is an important aspect of the implementation of the EMPr.
 6. Environmental awareness could be fostered in the following manner:
 - ✓ Induction course for all workers on site, before commencing work on site.
 - ✓ Refresher courses as and when required.

- ✓ Daily toolbox talks at the start of each day with all workers coming on site, where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working.
- ✓ Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

DOCUMENT CONTROL SHEET (FORM IP180/B)

CLIENT : Eskom
PROJECT NAME : **PROJECT No.** : J29223
TITLE OF DOCUMENT : Draft Environmental Management Programme for the installation of 132kV distribution lines from Melkhout to Dieprivier, Cacadu District
ELECTRONIC LOCATION : P:\J29223_Eskom_Melkhout-Diepriver_PPP (EL project)\3-Tasks\Reports\EMP\Melkhout - Dieprivier draft EMP_0.1.docx

	Approved By	Reviewed By	Prepared By
ORIGINAL	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

	Prepared by	Prepared By	Prepared By
ORIGINAL	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

	Approved By	Reviewed By	Prepared By
REVISION	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

This report, and information or advice, which it contains, is provided by Arcus GIBB solely for internal use and reliance by its Client in performance of Arcus GIBB duties and liabilities under its contract with the Client. Any advice, opinions, or recommendations within this report should be read and relied upon only in the context of the report as a whole. The advice and opinions in this report are based upon the information made available to Arcus GIBB at the date of this report and on current SA standards, codes, technology and construction practices as at the date of this report. Following final delivery of this report to the Client, Arcus GIBB will have no further obligations or duty to advise the Client on any matters, including development affecting the information or advice provided in this report. This report has been prepared by Arcus GIBB in their professional capacity as Consulting Engineers. The contents of the report do not, in any way, purport to include any manner of legal advice or opinion. This report is prepared in accordance with the terms and conditions of the Arcus GIBB contract with the Client. Regard should be had to those terms and conditions when considering and/or placing any reliance on this report. Should the Client wish to release this report to a Third Party for that party's reliance, Arcus GIBB may, at its discretion, agree to such release provided that:

- (a) Arcus GIBB written agreement is obtained prior to such release, and
- (b) By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against Arcus GIBB and Arcus GIBB, accordingly, assume no duties, liabilities or obligations to that Third Party, and
- (c) Arcus GIBB accepts no responsibility for any loss or damage incurred by the Client or for any conflict of Arcus GIBB interests arising out of the Client's release of this report to the Third Party.

GIBB (Pty) Ltd
 Postal Address :
 Contact Person :
 Telephone No. :

Website : www.gibb.co.za
 Physical Address :
 Email Address :
 Fax No. :