Appendix G: Environmental Management Programme (EMPr)

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED NEW ESKOM KLIPKOP-LEHATING 132KV POWERLINE, NORTHERN CAPE

JG AFRIKA Reference No: 3909

March 2016

Prepared For:

Eskom

Prepared by:

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VERIFICATION PAGE

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TITLE : ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED NEW ESKOM KLIPKOP-LEHATING 132KV POWERLINE, NORTHERN CAPE		
JGI NO. : 3909	**DATE :** 09/03/2015	**REPORT STATUS :** Draft EMP

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AUTHOR :	**CLIENT CONTACT PERSON :**
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SYNOPSIS :

Environmental Management Plan for the Eskom Klipkop-Lehating 132KV Powerlines.

KEY WORDS :

Environmental Management Plan.

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO9001: 2008 which has been independently certified by DEKRA Certification under certificate number 90906882

Verification	Capacity	Name	Signature	Date
By Author	Senior Environmental Scientist	Sonja van der Merwe		09/03/2016
Checked by	Technical Director	Cecilia Canahai		09/03/2016
Authorised by	Technical Director	Cecilia Canahai		09/03/2016

ENVIRONMENTAL MANAGEMENT PLAN FOR THE PROPOSED NEW ESKOM KLIPKOP-LEHATING 132KV POWERLINE, NORTHERN CAPE

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1 INTRODUCTION

It is the intention of Eskom Distribution, Northern Cape Operating Unit , to construct the new Klipkop-Lehating 132 kV Double Circuit Chickadee powerline (±14km in length) between the new Lehating Substation and the existing Klipkop Substation, Northern Cape Province. The new Lehating Substation is not part of this project and approval has already been obtained for this (see paragraph 4 below). The existing Klipkop Substation is situated 12km North West of Hotazel, and the Lehating Substation will be situated approximately 14km north of the existing Klipkop Substation. In addition, the new Klipkop-Lehating Line will loop in and out of the existing Wessels Substation. These loop-in and loop-out lines also form part of the proposed project. Refer to Figure 1 which shows the location of the project. Three (3) powerline route alternatives have been assessed as part of this Environmental Authorisation Process (Refer to Figure 2). Refer to Appendix A of the Basic Assessment Report for a detailed locality and project layout maps.

2 PROJECT LOCATION

The new Lehating Substation will be situated on Portion 1 of the Farm Lehating 741, and the existing Klipkop Substation is situated on Portion 9 of the Farm N`Chwaning 267. The existing Wessels Substation is situated on the Remaining Extent of the Farm Wessels 227 owned by BHP Billiton. The location of the existing Wessels Substation is shown as the red dot in Figure 2. The project is located within the Joe Morolong Local Municipality and within the John Taolo Gaetsewe District Municipality.

Substation Coordinates		
Existing Klipkop Substation:	27° 8'10.77"S	22°50'39.62"E
New Lehating Substation	27° 2'25.53"S	22°51'22.87"E
Existing Wessels Substation	27° 6'56.60"S	22°51'15.83"E

3 PROJECT NEED AND DESIRABILITY

Lehating Mining (Pty) Ltd appointed SLR Consulting to undertake an Environmental Authorisation process for the establishment of the Lehating Mine, on Portion 1 of the Farm Lehating 741. The Northern Cape Department of Environment and Nature Conservation granted authorisation for the establishment of the mine, on the 22nd of September 2014 (Ref No: NC/EIA/JIC/JOE/LEH2/2012). The construction of the Lehating Substation formed part of the application which was undertaken by SLR Consulting and authorisation was therefore obtained for the construction of the substation. Lehating Mining (Pty) Ltd approached Eskom Distribution, Northern Cape Operating Unit to assist with the supply of electricity to the new substation. The Klipkop Substation is ideally situated to provide electricity supply to the Lehating Substation.

4 Proposed Alternatives

Three powerline route alternatives between the Klipkop and Lehating Substation, via the Wessels Substation were identified. Each route alternative has a 1km wide study area which was investigated during the EA Process. Refer to Figure 2.

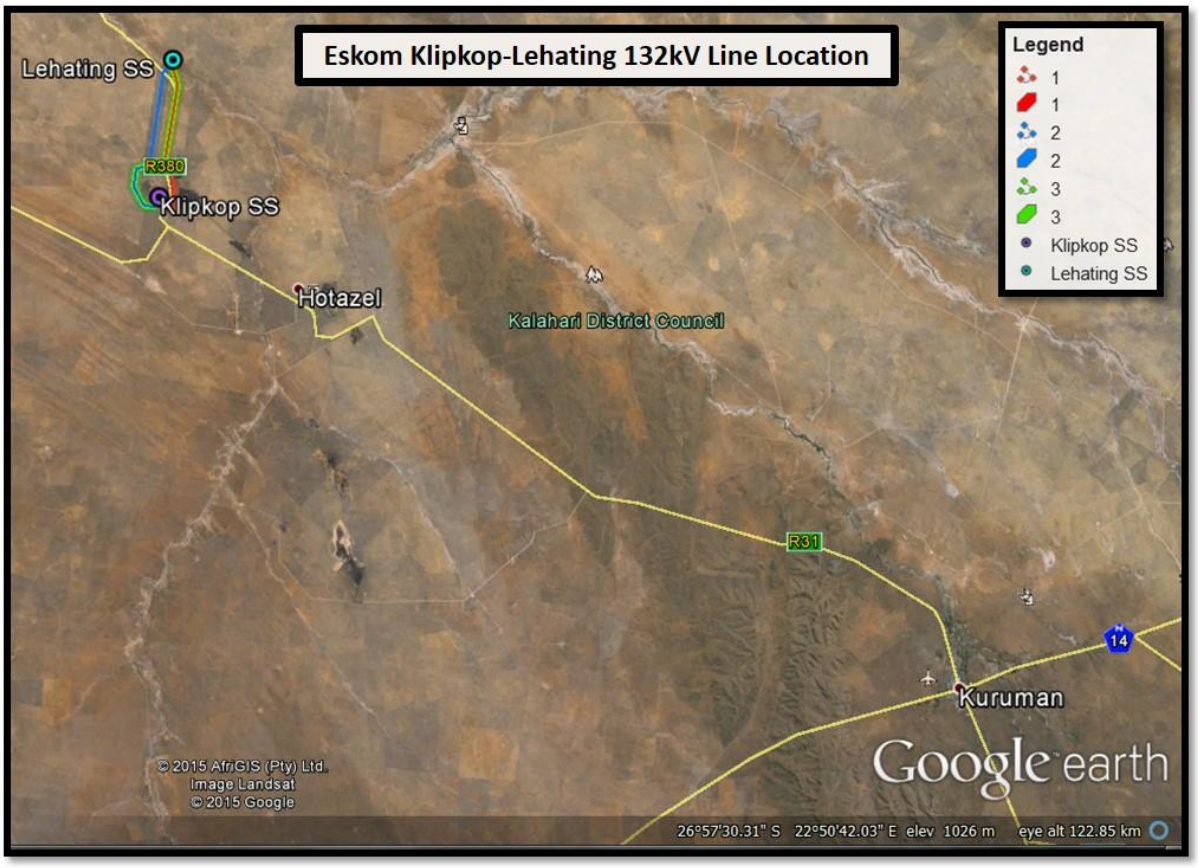

Figure 1: Project Location

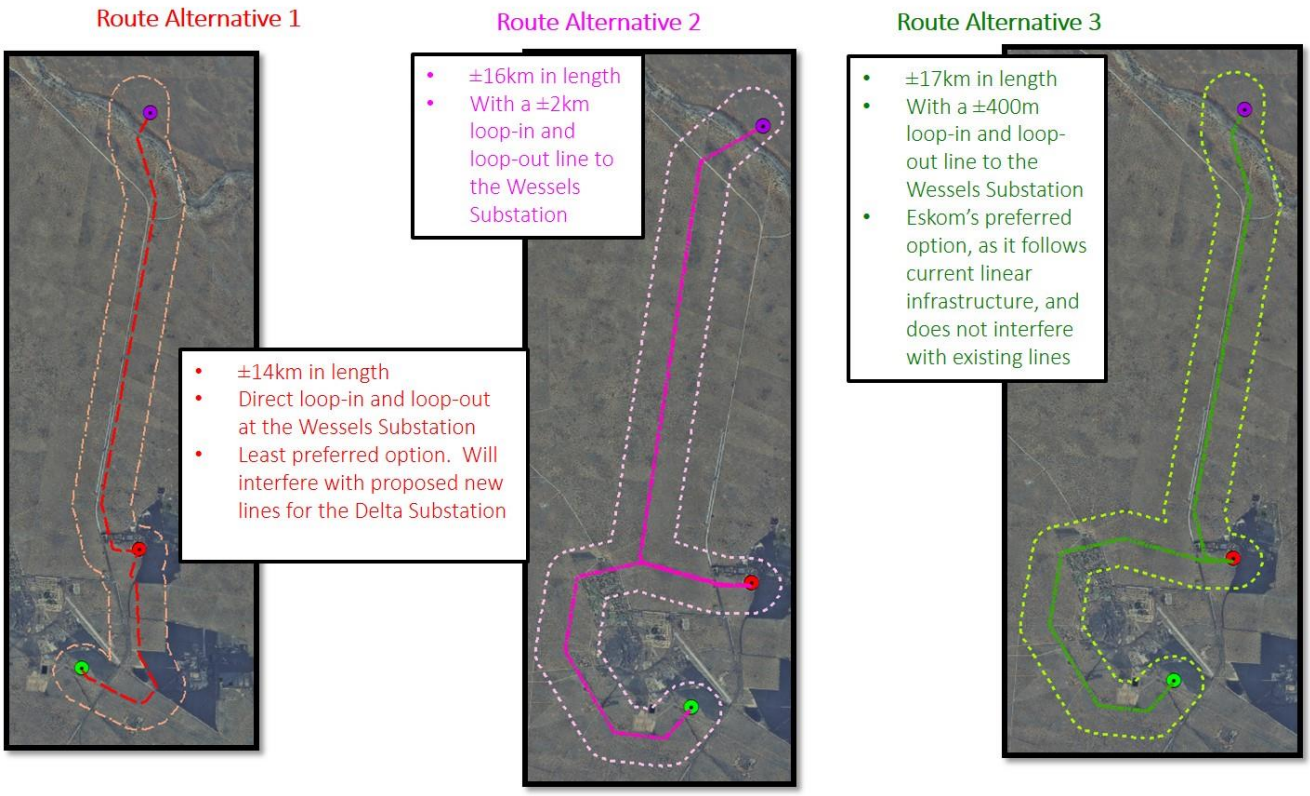

Figure 2: Proposed Alternatives

A list of all the potentially affected farm portions are provided in the table below.

Eskom Lehating Project - List of Properties Affected by the Various Line Alternatives			
21 Digit Surveyor General Code	**Portion No**	**Farm Name**	**Full Property Description**
0000C041000000000264000001	RE/264	DRAKENSTEIN 264	Remaining Extent of the Farm Drakenstein 264
0000C041000000000264000010	1/264	DRAKENSTEIN 264	Portion 1 of the Farm Drakenstein 264
0000C041000000000267000010	1/267	N`CHWANING 267	Portion 1 of the Farm N`Chwaning 267
0000C041000000000267000040	4/267	N`CHWANING 267	Portion 4 of the Farm N`Chwaning 267
0000C041000000000267000060	6/267	N`CHWANING 267	Portion 6 of the Farm N`Chwaning 267
0000C041000000000227000020	2/227	WESSELS 227	Portion 2 of the Farm Wessels 227
0000C041000000000227000010	1/227	WESSELS 227	Portion 1 of the Farm Wessels 227
0000C041000000000741000010	1/741	LEHATING 741	Portion 1 of the Farm Lehating 741
0000C041000000000228000001	RE/228	BOERDRAAI No. 228	Remaining Extent of the Farm Boerdraai 228
0000C041000000000703000730	73/703	FARM No. 703	Portion 73 of Farm No 703
0000C041000000000265000001	RE/265	MUKULU 265	Remaining Extent of the Farm Mukulu 265
0000C041000000000267000090	9/267	N`CHWANING 267	Portion 9 of the Farm N`Chwaning 267

Eskom Lehating Project - List of Properties Affected by the Various Line Alternatives			
21 Digit Surveyor General Code	**Portion No**	**Farm Name**	**Full Property Description**
0000C04100000000267000001	RE/267	N`CHWANING 267	Remaining Extent of the Farm N`Chwaning 267
0000C04100000000227000001	RE/227	WESSELS 227	Remaining Extent of the Farm Wessels 227
0000C04100000000230000010	1/230	SANTOY No. 230	Portion 1 of the Farm Santoy 230
0000C04100000000230000020	2/230	SANTOY No. 230	Portion 2 of the Farm Santoy 230
0000C04100000000230000001	RE/230	SANTOY No. 230	Remaining Extent of the Farm Santoy 230
0000C04100000000229000001	RE/229	BERGHEIM No. 229	Remaining Extent of the Farm Bergheim 229

During the Public Participation Phase, Ntsimbintle Mining / Tshipi é Ntle (hereafter referred to as Ntsimbintle) contacted Jeffares & Green and mentioned that they are proposing new mining activities within the Alternative 3 study corridor. Ntsimbintle indicated that the Farm Wessels 227 used to belong to Samancor. The Farm Wessels was then subdivided into Portions 1 and 2. The Remaining Extent of the Farm Wessels, as well as Portion 1, still belong to Samancor. Ntsimbintle now owns the surface rights of Portion 2 of the Farm Wessels, and Mr Willem Strauss has got grazing rights on Portion 2.

Ntsimbintle indicated that the current proposed centre line of the Alternative 3 study corridor will interfere with their proposed mining activities. A meeting was held with Mr Jeff Leader, from Ntsimbintle, on the 14th of March 2016 to determine how the proposed Alternative 3 centre line could be deviated in order to avoid the proposed mining areas. Two deviations for the current centre line were determined, deviation 3A and deviation 3B. Both deviations follow the current centre line of Alternative 3, from the Klipkop Substation for almost all the way. At approximately 2km south of the Lehating Substation, the deviations commence. Below is an image showing the two deviations, as well as a rough indication of where Ntsimbintle proposes their mining activities.

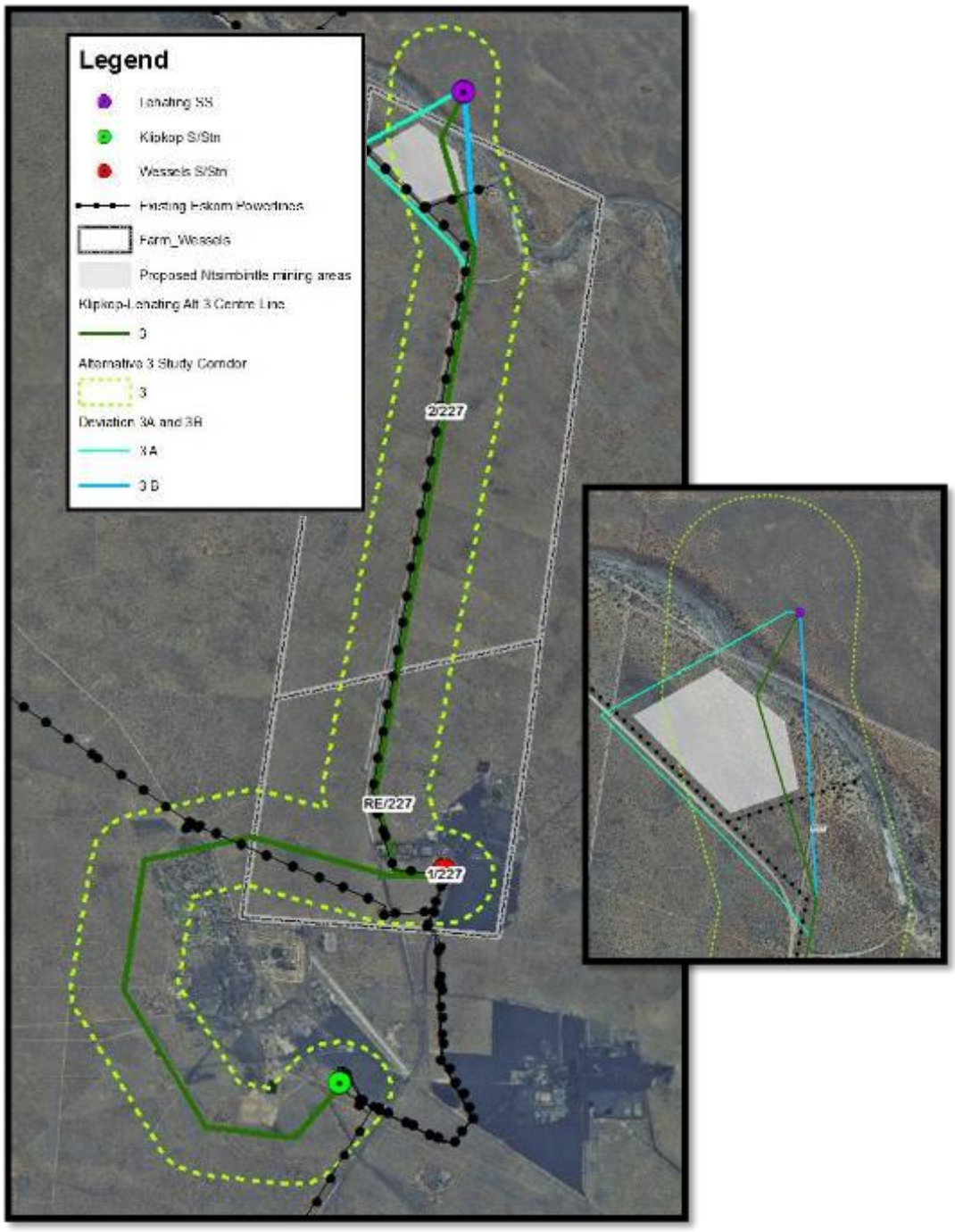

Figure 2.1: Alternative 3 Centre Line Deviations

All Specialist Assessments, as well as the impact assessment undertaken as part of this Basic Assessment process, revealed that study corridor Alternative 3 is the preferred alternative. As deviation 3A falls outside of the Alternative 3 study corridor, deviation 3A will not be considered. Alternative 3B falls within the Alternative 3 study corridor and is therefore a feasible alternative to consider. It should be noted that the Specialist Studies and impact assessment undertaken were based on the study corridors, and not the centre lines, as the exact location of the powerline within the study corridor will only be determined after Environmental Authorisation was obtained. Specialists were however asked to comment on deviation 3B to ensure that the powerline could be routed within corridor Alternative 3.

5 Infrastructure Details

Double circuit steel monopole structures will be used, which accommodates two sets of conductors (Refer to Figure 3). A lattice structure or two pole structure is sometimes used at bends or crossings (Refer to Figures 4 & 5). A single circuit steel monopole structure can also be used (refer to Figure 3.1).

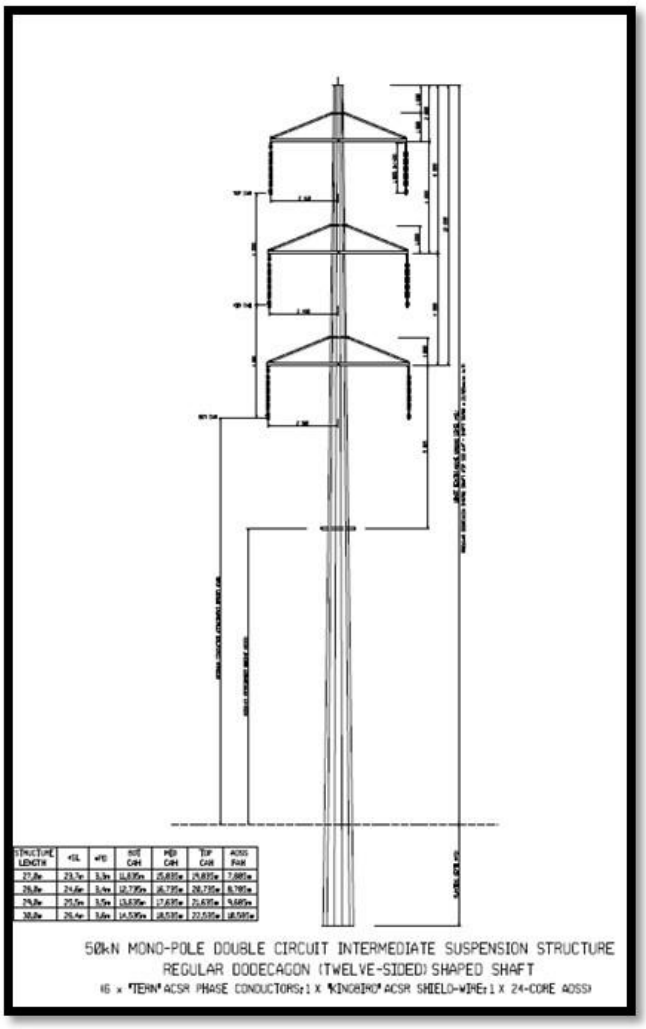

Figure 3: Double Circuit Monopole Structure

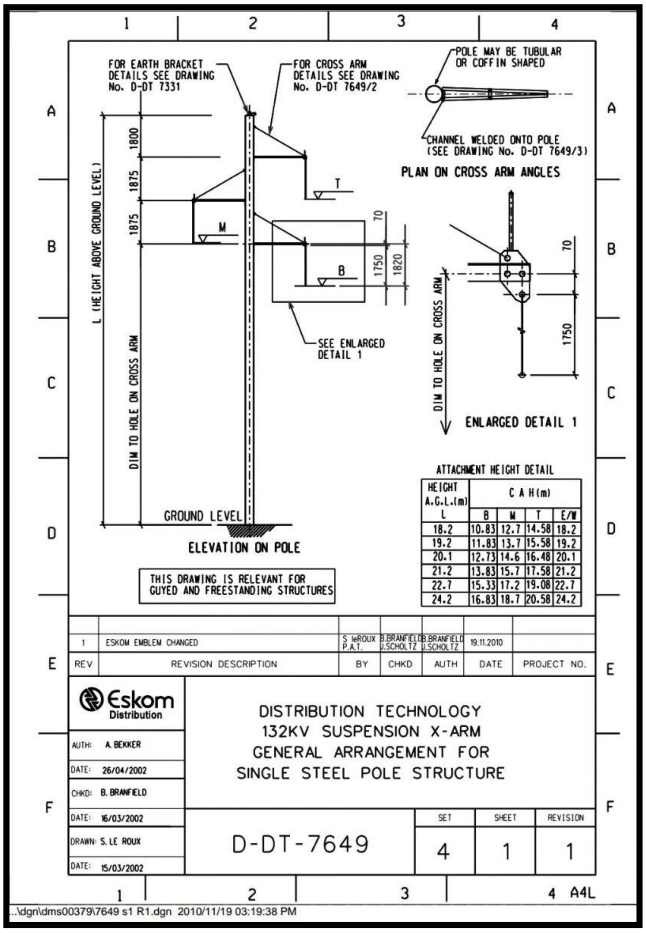

Figure 3.1: Single circuit Monopole Structure

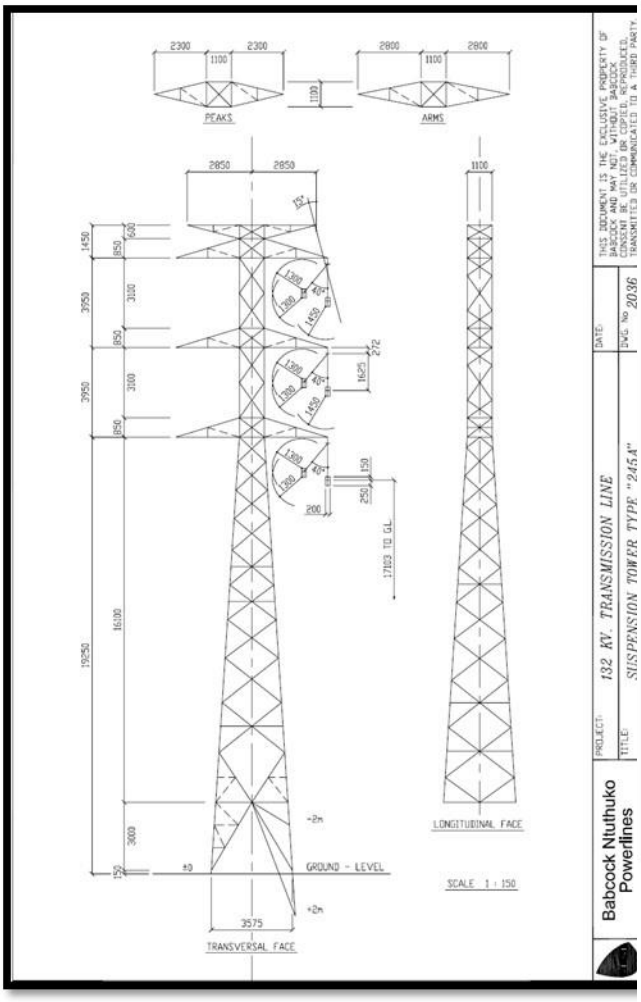

Figure 4: Lattice Structure

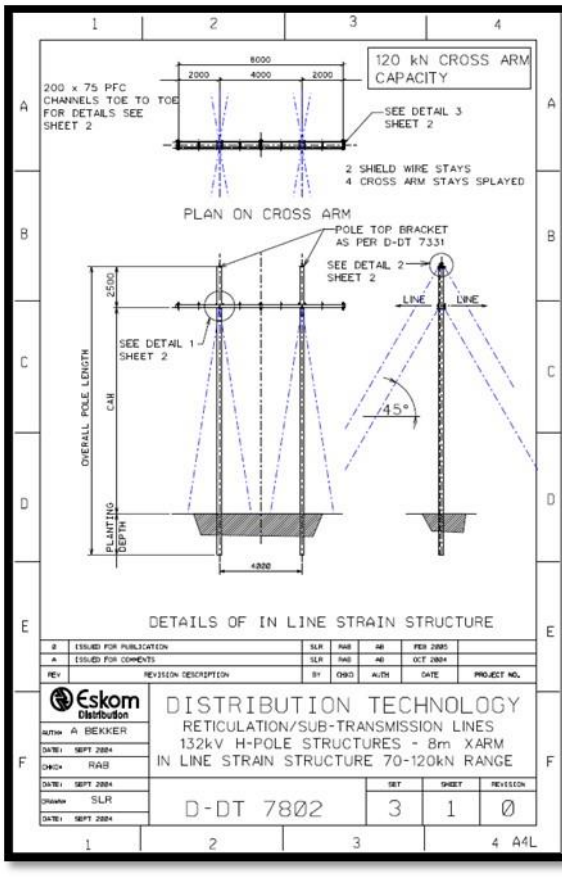

Figure 5: Two Pole Structure

6 SERVITUDE & CONSTRUCTION DETAILS

The powerlines will have a 52m wide servitude, which will include a 15.5m wide servitude on either side of the powerlines with a 21m separation distance between the two lines.

The following Eskom Procedures will be followed for the pole planting and pole compaction:

- *Eskom's Procedure for Conventional stay planting and compaction, pole planting and compaction, and Rock Anchor installation and testing DSP 34-1657). This document is not attached to this Basic Assessment Report. The document can be obtained from Eskom's website.*

As the proposed powerline will traverse the Kuruman River, some poles will have to be planted within the 1:100-year floodline of the Kuruman River, as well as within the demarcated wetland buffer areas. Refer to Wetland and Floodline Map which is attached to Appendix A of this Basic Assessment Report. The pole positions within the wetland buffer areas are not yet known. A Water Use Authorisation will be required for the construction of poles within the wetland buffer area. The exact pole positions and the method statement for the construction of the poles within the wetland buffer areas will be included in the Water Use License Technical Report.

6.1 Construction Camp and Materials Storage Area:

The construction camp and materials storage area will be situated on a site that will be rented by the Contractor. The Contractor will negotiate the location of the construction camp with relevant landowners in the nearby vicinity.

6.2 Contractors Camp

A contractor's site office and material storage facility will be established on a site that will be rented by the Contractor. All contractors will be based in Hotazel and will travel to site on a daily basis.

7 PROJECT ENVIRONMENTAL ASSESSMENT PRACTITIONER

Jeffares and Green (Pty) Ltd Engineering and Environmental Consultants have been appointed by Eskom Distribution Northern Cape Operating Unit, as the independent Environmental Assessment Practitioner to undertake the Environmental Basic Assessment and Water Use License Application processes for this project. Jeffares and Green (Pty) Ltd has rebranded to JG Afrika (Pty) Ltd in April 2016.

7.1 About Jeffares & Green (Pty) Ltd

JG Afrika is a specialist consultancy firm, offering services in the following sectors, amongst others:

- Environmental impact and environmental management;
- Geotechnical engineering;
- Geohydrology;
- Waste management; and
- Various engineering sectors (roads, structures municipal, etc).

In September 2000, JG AFRIKA obtained the international quality management certification, ISO 9001, for all of its services. Our accreditation company is DEKRA.

JG AFRIKA is one of the longest established consulting engineering practices in South Africa, with more than 90 years of engineering and environmental consultancy experience since its founding. JG AFRIKA is a **Level 3 BBBEE** company partly owned by black professionals who are registered civil engineers, technologists, Institutional & Social Development (ISD) and training consultants. The company BEE information is attached to the Tender Document in Appendix E. The company has offices throughout South Africa and employs a staff of approximately 300.

JG AFRIKA possesses a fundamental understanding of civil engineering construction methodologies and practices and hence will apply this knowledge by assisting the Employer to develop the appropriate project design from an environmental perspective.

A fundamental requirement for performance as a subservice is the demand for independence. The definition of independent given in the EIA regulations shall apply. JG AFRIKA has no interest in the contract (other than a commercial one directly flowing from the subservice contract itself) and will sign as such if appointed at contract commencement and at all subsequent times of environmental management input.

JG AFRIKA is familiar with the statutory requirements of the Occupational Health and Safety Act (85 of 1993) and the latest published version of the accompanying Construction Regulations as they will apply whenever the EAP enters the project site.

8 PROJECT TEAM

The details of the relevant Environmental Assessment Practitioners responsible for the compilation of the EMP are provided below:

Company Name:	Jeffares & Green (Pty) Ltd
Authors:	Mrs S van der Merwe (Senior Environmental Scientist)
Reviewed by:	Mrs S van der Merwe (Senior Environmental Scientist)
Authorised by:	Mrs C Canahai (Technical Director)
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	Sunning hill
Tel:	011 231 2200
Fax:	011 807 1607
E-mail:	vandermerwes@gji.co.za

Relevant Expertise of the Independent Environmental Assessment Practitioners is provided in the table below.

8.1 Experience of Project Team

Name	Position in Firm	Qualification	Years' Experience	Experience
Mrs Cecilia Canahai	Technical Director / Engineering Geologist	Pr Sci Nat, MSC (Eng Geology), BSc (Eng Geology	26 Year	Cecilia is a Technical Director with over 23 years of experience of which 13 as an Environmental Assessment Practitioner. Cecilia is a member of the International Association for Impact Assessment (IAIA) and the South African Institute for Environmental and Engineering Geologists. She has experience in project management, environmental impact assessments, public participation, environmental management plans and programmes, environmental control auditing, waste management, integrated development plans and engineering geology. Cecilia is a registered Professional Natural Scientist **(Registration No 400011/00)**
Mrs Sonja van der Merwe	Senior Environmental Scientist	BA (Hons) Geography and Environmental Management	10 Years	Sonja is a senior Environmental Scientist with 10 years of experience in the Environmental Consultancy Field. She has experience in project management, environmental impact assessments, basic assessments, public participation, environmental management plans and programmes, environmental control auditing, and mine closure planning and Geographic Information Systems. Sonja is a member of the International Association for Impact Assessments (IAIA).

9 PURPOSE OF THE EMP

The purpose of the Environmental Management Programme (EMP) is to ensure that the social and environmental impacts identified during the Basic Assessment process are effectively managed during construction, operation and closure phases of the proposed powerlines. The EMP will formulate mitigatory and management measures that should be made binding to Eskom and the Contractor, during the construction period and the defects liability period of the contract. The EMP will also show how mitigation and management measures will be scheduled.

The key objectives of the EMP will be to:

- Outline functions and responsibilities of responsible personnel.
- State standards and guidelines, which are required to be achieved in terms of environmental legislation.
- Outline mitigation measures and environmental specifications which are required to be implemented for all phases of the project in order to minimize the extent of negative environmental impacts,
- Maximize the effect of positive environmental impacts and manage these environmental impacts appropriately.

The EMP covers information and/ or mitigation measures that will be taken into consideration to address impacts, where relevant, in respect of:

- Planning and Design
- Pre-Construction and Construction activities
- Operation; and
- Closure

The EMP is a living document which will be periodically reviewed and updated as necessary. Any amendments made must be submitted to both the Environmental Officer and the Project Manager for approval, prior to implementation.

10 ABBREVIATIONS

E-PM	Eskom Project Manager
CNC	Customer Network Centre
DBU	Distribution Business Unit
SP	Security Personal
ECO	Environmental Control Officer
RE	Resident Engineer
C	Contractor
EMP	Environmental Management Plan
PCO	Pest Control Officer
C&OEMP	Construction and Operation Environmental Management Plan
LM	Line and Servitude Manager for the grid

11 ROLES AND RESPONSIBILITIES

11.1 Role of the Environmental Control Officer (ECO)

The Environmental Control Officer must monitor the implementation of relevant environmental legislation, conditions of the Environmental Authorisation (EA), and the Construction and Operational Environmental Management Plan (C&OEMP) for the project. It is recommended that monthly audits be undertaken during the construction phase. The Final Construction and Operational Environmental Management Plan should provide details of the ECO.

- The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team;
- The ECO must be proactive and have access to specialist expertise as and when required, these include botanists, ecologists etc.;
- The ECO must conduct audits on compliance to relevant environmental legislation, conditions of the EA and the EMP for the project;
- The size and sensitivity of the development, based on the EA, will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection should be undertaken);
- The ECO must be the liaison between the relevant authorities and the project team;
- The ECO must communicate and inform the engineers of any changes to environmental conditions as required by relevant authoritative bodies;
- The ECO must ensure that the registration and updating of all relevant EMP documentation is carried out;
- The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices;

- The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible;
- The ECO must convey the contents of this EMP to the Contractor site team (should the contractor not have its own environmental officer) and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.

11.2 Role of the Engineer

The role of the Engineer is to design and specify the project engineering aspects. Generally the engineer runs the works contract. The Engineer may also fulfil the role of Project Manager on the proponent's behalf.

11.3 Role of the Contractor

The Principle contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMP and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMP. The contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMP will be implemented.

11.4 Roles of Eskom

Eskom will be responsible for the implementation of the EMP as follows:

- Ensure that the EMP is effectively implemented;
- Liaise on a strategic level with authorities regarding any environmental issues as required;
- Provide the resources (human and financial) necessary to complete the required tasks in accordance with this EMP;
- Review the EMP; at least, annually (or when required) to assess its effectiveness and practicality and assess whether new environmental procedures are required;
- Ensure that the corrective actions and non-conformance issues are addressed with regards to the EMP;
- Liaise with public and community regarding any environmental complaints/issues (as required);
- Ensure that the site is operated in accordance with relevant permits/licenses, regulations and all appropriate policies; and,
- Maintain proper control of the site and determine what, if any, problems exist, or may be anticipated such as operational issues, regulatory requirements, and stakeholder issues, management of unacceptable waste streams, pollution and emergencies.

11.5 Roles of the CNC Supervisor during the Operational Phase

The Supervisor shall:

- Be familiar with the contents of the EMP;
- Ensure that a copy of the EMP is kept at an accessible location at the site;
- Be fully conversant with the conditions of permits/licenses and authorisations relevant to the site;
- Provide environmental awareness training to the maintenance team as required;
- Inspect the site regularly for environmental issues;
- Ensure that all site staff are fully conversant with the EMP;
- Ensure that that all safety checks and procedures have been followed and applied, as well as ensure adherence to the Occupational Health and Safety Act;
- Ensure that the site access is managed and controlled; and
- Ensure good housekeeping and proper sign postage.

11.6 Roles of Line and Servitude Manager during the Operational Phase

The Servitude Manager shall:

- Be familiar with the contents of the EMP;
- Ensure that a copy of the EMP is always accessible to ensure compliance;
- Be fully conversant with the conditions of permits/licenses and authorisations relevant to the site;
- Provide environmental awareness training to the maintenance team as required; and
- Undertake annual inspections with the maintenance team.

12 STANDARD ESKOM DOCUMENTS TO BE COMPLIED WITH

In addition to the approved Environmental Management Plan, the Environmental Authorisation and other permits and licences, the operational activities of the powerlines should also comply with the following standard Eskom documents:

- Fire Risk Management (DST 34-132);
- Eskom Procedure for Vegetation Clearance and Maintenance within overhead Powerline Servitude and on Eskom owned Land (EPC 32-247).
- Eskom Environmental Waste Management Procedure (EPC 32 – 245)
- Eskom Environmental Liaison Committee (ELC) Performance Indicator Reporting Procedure (EPC 32 -249)
- Eskom Emergency Preparedness Procedure (DST 34 – 315)
- Guideline on Operating and Maintenance of Oil Containment Structures, Oil Traps and Oil Dams (TGL41-393);
- Oil spill clean-up and rehabilitation (ESKAGAAD7);
- Access to Farms (includes strategy on dealing with game farms) DGL 34-190

13 RELEVANT LEGISLATION TO BE COMPLIED WITH

- National Environmental Management Act (Act 107 of 1998)
- Environmental Impact Assessment Regulations, 2010 & 2014
- Environment Conservation Act (Act 73 of 1989)
- National Environmental Management: Biodiversity Act (Act 10 of 2004)
- National Environmental Management: Protected Areas Act (Act 57 of 2003)
- The National Veld and Forest Act (Act 101 of 1998)
- National Forest Act (Act 84 of 1998)
- National Heritage Resources Act (Act 25 of 1999)
- National Water Act (Act 36 of 1998)
- Conservation of Agricultural Resources Act (Act 43 of 1983)
- National Environmental Management: Air Quality Act (Act No 39 of 2004)
- National Road Traffic Act (Act 83 of 1996)
- The National Environmental Management: Waste Act (Act 59 of 2008)
- Relevant Energy Sector Strategic Documents

14 SPECIALIST STUDIES

The following Specialist studies were undertaken:

- A Heritage Impact Assessment was undertaken by Dr Johnny van Schalkwyk;
- A Visual Assessment was undertaken by Terratest;
- A Faunal, Floral and Avifaunal Ecological and Impact Survey were undertaken by Enviross;
- An Aquatic and Wetland Assessment was undertaken by Jeffares & Green (Pty) Ltd; and
- A Floodline Delineation Assessment was undertaken by Jeffares & Green (Pty) Ltd

These reports (as listed above) also contain additional recommendations and mitigation measures that should be considered during the construction and operational phases. The reports are titled, and are attached to Appendix D of the Draft Basic Assessment Report.

15 POWERLINE PRE-CONSTRUCTION PHASE

Mitigation Measures	Stage / Duration	Frequency	Responsibility
15.1 Final Site Layout and Design Planning			
• Should a Geotechnical Assessment be undertaken for the construction of the powerlines, the findings and recommendations of this Assessment should be included in the Final EMP prior to the commencement of construction activities. • A Walkdown Survey of the final powerline route should be undertaken by a suitably qualified Ecologist in order to identify species of conservational significance and specially protected species. A permit for the removal of these species must then be submitted to the Northern Cape Department of Environment and Nature Conservation and Department of Agriculture, Forestry and Fisheries.	Pre-Construction phase	Once off	E-PM
15.2 Pre-Site Establishment Requirements			
• The Environmental Management Plan (EMP) compiled during the Environmental Authorisation phase should be updated to include all conditions as contained in the Environmental Authorisation. This updated EMP may have to be submitted to DEA for approval, prior to commencement of the construction activities. The Environmental Authorisation will indicate whether the submission of the Final EMP to DEA would be required.	Pre-Construction phase	Once off	E-PM
• A Contractor (C) and Environmental Control Officer (ECO) should be appointed.	Pre-Construction phase	Once off	E-PM
• The C and Resident Engineer (RE) should be provided with copies of the EMP and the EA, and both the C and RE should familiarise themselves with the content of these documents. It is recommended that an inception meeting be held with the C, RE, Eskom Project Manager (E-PM) and the ECO prior to commencing any pre-construction activities on site.	Pre-Construction phase	Once off	E-PM
• The Final Site Layout plan should be compiled by the RE and C and should take all conditions and “no-go” areas as identified in the EMP into account.	Pre-Construction phase	Once off	RE & C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
• The appointed ECO should compile an Audit Report template based on the contents of the EMP and should submit the Report to Eskom for review and approval.	Pre-Construction phase	Once off	ECO

• The ECO should provide Environmental Awareness training to the C, RE and all construction personnel prior to commencement of construction activities. Topics to be covered should include:
  • What is meant by "environment";
  • Why the environment needs to be protected and conserved;
  • How construction activities can impact on the environment;
  • What can be done to mitigate against such impacts;
  • Awareness of emergency and spills response provisions;
  • Social responsibility during construction, e.g. being considerate to local residents.
• Translators are to be used where necessary. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered. Use should be made of environmental awareness posters on site. Construction workers should be made aware that they are not to make excessive noise (e.g. shouting / hooting) as the site is near to residential areas. The need for a "clean site" policy also needs to be explained to the construction workers.
• The RE & C should explain more difficult / technical issues regarding construction activities and answer questions.
	Pre-Construction phase	Once off	ECO

15.3 Demarcation and Establishment of Temporary Infrastructure			
A: Construction Camp ○ The RE and C should demarcate an area on site for the establishment of the construction camp as per the final site layout plan. The demarcated area should be fenced off. The following should apply: ○ It should be situated in the property earmarked for the siting of the construction camp. No unauthorised properties may be used for such purposes; ○ Location of adjacent properties should be taken into account; ○ "No-go" or sensitive areas should be taken into account; ○ Bins for the disposal of domestic wastes should be provided and placed at various locations; ○ Cut and fill must be avoided where possible during the set up; ○ Footprint to be kept to a minimum;	During layout and establishment	Once off	RE & C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
○ Adequate parking must be provided for staff and visitors; ○ Temporary storm water control measures as approved by the engineer and indicated on the final site layout plan should be implemented.			
○ The construction camp could comprise the following: ▪ Temporary site office/s; ▪ Ablution facilities which should include the installation of a chemical toilets ▪ Designated first aid area; ▪ Eating areas; ▪ Storage areas; ▪ A batching plant (if necessary). Water from the batching plant should drain to conservancy tank for removal from the site to a licensed disposal facility. ▪ A refuelling area (if necessary). Fuel storage tanks shall be situated in a bunded area the volume of which shall be at least 110% of the volume of the largest tank The floor of the bund shall be smooth and impermeable constructed of concrete or plastic sheeting with impermeable joints with a layer of sand over to prevent perishing. The bund walls shall be formed of well-packed earth with the impermeable lining extending to the crest. The floor of the bund shall be sloped towards an oil trap or sump to enable any spilled fuel and/or fuel-soaked water to be removed. Refuelling should be undertaken on an impervious surface to protect groundwater quality. Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected. Storage areas containing hazardous substances / materials must be clearly signed. ▪ A maintenance area (if necessary).	During layout and establishment	Once off	RE & C
B: Contractors Camp • If temporary accommodation for construction workers will be required, the RE & C should demarcate an area as per the site layout plan where temporary accommodation could be established. This area should be fenced off and the following should apply: ○ The contractor's camp should be established at an approved site. All contractors will travel to site on a daily basis. ○ Location of adjacent properties should be taken into account. ○ "No-go" or sensitive areas should be taken into account. ○ Cut and fill must be avoided where possible during the set up. ○ Footprint should be kept to a minimum.	During layout and establishment	Once off	RE & C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
○ Adequate parking must be provided for temporary residents. ○ Temporary stormwater control measures as approved by the engineer and indicated on the final site layout plan should be implemented. ○ The camp should include the following: ▪ Temporary accommodation units, ▪ Ablutions facilities which should include the installation of a temporary septic tank with sufficient capacity to accommodate sewage and waste water. The construction of "long drop" toilet is forbidden. ▪ Toilets and washing facilities. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 30 workers (preferred 1:15). Sanitation facilities shall be located within 100 m from any point of work, but not closer than 50 m to any water body {distances can be modified depending on the nature of the project}. Toilets shall be within the Contractor's Camp and at work areas more than 50m from the Contractor's Camp. All temporary/ portable toilets shall be secured to the ground to the satisfaction of the Engineer/ECO/EO to prevent them from toppling due to wind or any other cause. These facilities shall be maintained in a hygienic state and serviced regularly. Toilet paper shall be provided. Discharge of waste from toilets into the environment and burial of waste is strictly prohibited. ▪ Facilities for the washing of dishes and clothing: Waste water from these areas should drain to a temporary septic tank with sufficient capacity to accommodate the waste water; ▪ Bins for the disposal of domestic wastes should be provided and placed at various locations			
C: Material Storage Area: • The RE & C should demarcate an area as per the final site layout plan where a temporary materials storage area can be established, this area should be fenced off. This area must be situated within the boundaries of the construction camp. The following should apply: ○ Choice of location must take into consideration prevailing winds, distance to water bodies and general on site topography; ○ Necessary containment measures (sumps or oil traps) and/or bunded or the storage of hazardous materials and dangerous goods should be provided. Temporary stormwater infrastructure should be implemented to divert all stormwater away from the areas where such materials will be stored; ○ Contractors shall submit a method statement and plans for the storage of hazardous materials and emergency procedures to the Engineer.	During layout and establishment	Once off	RE & C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
D: Storm water Infrastructure: • During site establishment, proper temporary storm water control measures, as approved by the RE should be implemented;	During layout and establishment	During site set up.	RE/C
• Temporary cut off drains and berms may be required to capture storm water and promote infiltration.	During layout and establishment	During site set up.	RE/C
15.4 Access and Haulage Routes			
Location and demarcation of access and haulage routes should include the following: • Should consider all limitations and recommendations as provided in the EMP; • Contractor should demarcate access and haulage routes and manage and maintain these routes; • Demarcated routes should include construction vehicle turning areas. All vehicle traffic should be restricted to demarcated access and haulage routes, and no turning may take place outside of demarcated areas; • Route location should have minimum disturbance to residents and sensitive environmental areas; • No other roads than the ones confirmed by the contractor shall be allowed; • All construction materials should be delivered to site via these demarcated routes; • Safety of the other road users should be considered at all times when using public and demarcated access and haulage routes;	During layout and establishment	Prior to moving onto site.	RE/ECO
15.5 Routing of Services			
The location of all underground services and servitudes must be identified and confirmed if applicable.	During layout and establishment	Prior to moving onto site.	RE

Mitigation Measures	Stage / Duration	Frequency	Responsibility
15.6 Vegetation Clearance, Animal and Habitat Disturbance			
Recommendations made by NC DAFF: • The study site is known to contain protected tree species such as *Acacia (Vachellia) erioloba* and *Acacia (Vachellia) haematoxylon.* If any protected trees would be impacted on, the developed must apply and obtain a valid Forest Act License prior to construction of the powerline, but only after obtaining the Environmental Authorisation and shortly prior to construction. • Specifications for the clearance of vegetation clearance within the Servitude must be agreed upon by Eskom and DAFF/DENC. Where possible, slow growing protected trees should be avoided by deviating the line or going underground in the sections with high density protected trees. • Where the powerline will cross the Kuruman River extra care should be taken at the river crossings, because of the higher density protected trees usually associated with ephemeral drainage lines. • The developer may also need a Flora Permit from the provincial Department of Environment and Nature Conservation (DENC) should any natural indigenous, protected or specially protected plant species (under the Northern Cape Nature Conservation Act, Act 9 of 2009) be impacted on. The same applies to the TOPS listed or CITES listed plant species under the National Environmental Management Biodiversity Act (NEMBA). • Protected trees such as large Camel thorns with Sociable Weaver *Philetairus socius* nests may not be disturbed without a valid Fauna Permit from the DENC. **Recommendations made by NC DAFF:** • If the project is authorised, this Department would recommend that it be for the route option that would have the least impact on slow growing protected trees. Three 1km wide corridor alternatives will be assessed, hence it should be possible to avoid area of high density protected trees.	During layout and establishment	Prior to moving onto site.	E-PM & RE
A Walkdown Survey of the final powerline route should be undertaken by a suitably qualified Ecologist in order to identify species of conservational significance and specially protected species. A permit for the removal of these species must then be submitted to the Northern Cape Department of Environment and Nature Conservation and Department of Agriculture, Forestry and Fisheries	During layout and establishment	Prior to moving onto site.	E-PM & RE

Mitigation Measures	Stage / Duration	Frequency	Responsibility
Limit the impact to the footprint and immediate support areas, especially within the areas associated with the Lehating Substation site;	During layout and establishment	Prior to moving onto site.	E-PM & RE
Do not store building materials and excess stockpiled soils within riparian zones or within areas where natural vegetation will remain following completion of the construction phase of the development (i.e. retain impacts to areas where infrastructure is to be permanently established)	During layout and establishment	Prior to moving onto site.	E-PM & RE
Avoid indiscriminate destruction of habitat.	During layout and establishment	Prior to moving onto site.	E-PM & RE
Indigenous vegetation should be retained as far as possible in the state / structure that occurs naturally on the site.	During layout and establishment	Prior to moving onto site.	E-PM & RE
To minimise the destruction of natural vegetation, the power line route should follow agricultural fields, fence lines and/or existing power lines and should not traverse areas containing natural vegetation or areas which have been marked as highly sensitive in this report.	During layout and establishment	Prior to moving onto site.	E-PM & RE
All plant species of conservation concern or species which are nationally or provincially protected, which will not be directly affected by the developments should be cordoned off as no go areas during construction. These areas which are cordoned off should however not prevent movement of indigenous fauna.	During layout and establishment	Prior to moving onto site.	E-PM & RE
An independent Environmental Control Officer (ECO) should be appointed to oversee all construction activities.	During layout and establishment	Prior to moving onto site.	E-PM & RE
Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.	During layout and establishment	Prior to moving onto site.	E-PM & RE
Only pole structures that are approved as “bird friendly” by Eskom’s ENVIROTECH Forum should be used.	During layout and establishment	Prior to moving onto site.	E-PM & RE

Mitigation Measures	Stage / Duration	Frequency	Responsibility
Streams and drainage lines should not be crossed perpendicularly with power lines where possible.	During layout and establishment	Prior to moving onto site.	E-PM & RE
Power lines should be routed alongside existing infrastructure such as existing power lines, roads, buildings, and railway lines where possible.	During layout and establishment	Prior to moving onto site.	E-PM & RE
No trees / shrubs / groundcover may be removed, or vegetation stripped, without the prior permission of the Engineer / ECO.	During layout and establishment	On-going.	RE/ECO
Removal of vegetation will be avoided until such time as soil stripping is required.	All Phases	On going	RE/C
Except to the extent necessary for the carrying out of the works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.	During layout and establishment	During site set up, and ongoing.	RE/ECO
Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas.	During layout and establishment	Ongoing in camp site, haulage areas.	ECO
Disturbance to birds, animals and reptiles and their habitats should be minimised wherever possible.	During layout and establishment	During surveys and preliminary investigations and ongoing.	RE/ECO
Trapping, poisoning and/ or shooting of animals is strictly forbidden. No domestic pets or livestock are permitted on site.	During layout and establishment	During site set up, and ongoing.	RE/ECO
Where the use of herbicides, pesticides and other poisonous substances has been specified, the Contractor shall submit a Method Statement.	During layout and establishment	During site set up, and ongoing.	RE/ECO

Mitigation Measures	Stage / Duration	Frequency	Responsibility
Gathering of firewood, fruit, muthi plants or any other natural material on site or in adjacent areas is prohibited.	During layout and establishment	Monitoring throughout the duration of the project.	ECO
Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place. This significantly reduces the amount of time and money that must be spent on alien plant management during rehabilitation.	During layout and establishment	Monitoring throughout the duration of the project.	ECO
Areas identified as being sensitive by Specialists, the Engineer or the ECO and adjacent to any construction work are to be suitably demarcated to prevent damage by plant and labour. Temporary barricading should be used and should be moved in phases as the construction progresses from one area to the next.	During layout and establishment	During surveys and preliminary investigations and ongoing.	RE/ECO
15.7 Waste Management			
For waste management principles to be implemented during all phases of the project, refer to Section 8.7 of the EMP.	During layout and establishment	Monitoring throughout the duration of the project.	ECO
15.8 Landowner Consultation			
Prior to commencement of site establishment activities, Eskom and the Contractor should put agreements in place with the affected landowners with regards to compensation for damage to property caused as a result of construction activities (where applicable).	During layout and establishment	Prior to moving onto site.	RE/C
Any damage caused to adjacent properties or infrastructure, as a result of construction activities, should be fixed by the Contractor to the satisfaction of the landowner.	During layout and establishment	Prior to moving onto site.	RE/C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
The ECO should encourage open communication with affected landowners, to ensure that landowner issues and concerns are dealt with according to agreements made between Eskom, the contractor and the landowner.	During layout and establishment	Four monthly meetings	ECO
The contractor must ensure that he informs the affected landowners before he enters his/her property for construction	During layout and establishment	Prior to moving onto site.	E/C
15.9 Visual Impacts			
Limiting the number of trees surrounding the construction site that will be removed.	During layout and establishment	During surveys and preliminary investigations and site set up.	E/ECO
Using neutral, mat-finish paint colours for any ancillary structures or buildings in order to improve visual absorption in the landscape.	During layout and establishment	Monitoring throughout the duration of the project.	E/C
Highly reflective materials should be avoided, and if this is not possible, a mat-finish paint should be applied to conceal glare and reflection.	During layout and establishment	Monitoring throughout the duration of the project.	E/C
Visible dust will be present at the construction site due to earth moving equipment and vehicles on the dirt access roads. This will temporarily decrease the visual quality of the local area. Standard dust control mitigation should be followed as per the site specific EMPr.	During layout and establishment	Monitoring throughout the duration of the project.	E/C

Mitigation Measures	Stage / Duration	Frequency	Responsibility
The construction area and site camp should be kept tidy and litter-free throughout construction as visible litter is visually unpleasant for adjacent sensitive receptors, i.e. residents, and passing vehicular traffic. All construction materials should be stored on site. Construction sites should be screened in the form of shade cloths at fence level. This will obstruct views of construction elements on site. All substances such as cement which may be toxic to flora and fauna should be strictly controlled to avoid degradation of the surrounding environment. No foreign material generated/deposited during construction shall remain on site.	During layout and establishment	Monitoring throughout the duration of the project.	E/C
Should construction activities take place at night, it is recommended that construction lighting be directed downward and inward (towards the construction centre). This will limit construction spill light at night time, which can be visually intrusive.	During layout and establishment	Monitoring throughout the duration of the project.	E/C
15.10 Heritage Impacts			
Known sites should be clearly marked in order that they can be avoided during construction activities	During layout and establishment	During site set up and ongoing.	E/C/ECO
The contractors and workers should be notified that archaeological sites might be exposed during the construction work	During layout and establishment	During site set up and ongoing.	E/C/ECO
Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible	During layout and establishment	During site set up and ongoing.	E/C/ECO
All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken	During layout and establishment	During site set up and ongoing.	E/C/ECO
Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site	During layout and establishment	During site set up and ongoing.	E/C/ECO

Mitigation Measures	Stage / Duration	Frequency	Responsibility
Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).	During layout and establishment	During site set up and ongoing.	E/C/ECO
A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage	During layout and establishment	During site set up and ongoing.	E/C/ECO
Known sites should be located and isolated, e.g. by fencing them off. All residents and their visitors should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.	During layout and establishment	During site set up and ongoing.	E/C/ECO
In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.	During layout and establishment	During site set up and ongoing.	E/C/ECO
15.11 Safety and Security			
The site should be secured with fencing, in order to reduce the opportunity for criminal activity in the locality of the construction site.	During layout and establishment	Monitoring throughout the duration of the project.	RE/C
Flammable materials should be stored as far as possible from adjacent residents / businesses. Firefighting equipment should be present on site at all times as per OHSA.	During layout and establishment	Monitoring throughout the duration of the project.	RE/C

16 POWERLINE CONSTRUCTION PHASE

Mitigation Measures	Stage / Duration	Frequency	Responsibility
16.1 Stormwater Management			
A: Construction Camp ○ The C and RE must monitor and attend to the drainage of the construction camp site to avoid standing water and / or sheet erosion during the construction phase. ○ Run-off from the camp site must not discharge into neighbours' properties.	Construction Phase	Continuous	RE & C
B: Contractors Camp ○ The C and RE must monitor and attend to the drainage of the contractors camp site to avoid standing water and / or sheet erosion during the construction phase. ○ Run-off from the camp site must not discharge into neighbours' properties.	Construction Phase	Continuous	RE & C
16.2 Surface and Groundwater Pollution Prevention			
Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
Water from the cement mixing area should be channelled to a conservancy tank for removal from the site to a licensed disposal facility.	Construction Phase	During site set up, to be monitored weekly	C/RE

16.3 Vegetation Clearance, Animal and Habitat Disturbance			
Also refer to Section 11.6 under the Pre-Construction Phase			
• No open fires should be allowed in areas containing natural vegetation, especially during the dry season.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• A rubble clean-up plan must be implemented throughout the duration of the construction phase.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• During construction, the construction area and immediate surroundings should be monitored regularly for emergent invasive vegetation.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• Surrounding natural vegetation should not be disturbed, to minimize chances of invasion by alien vegetation.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction site. This should be verified by the RE/ECO.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• As far as possible, construction should be limited to the daylight hours in order to minimise the need for lights to avoid unnecessary faunal disturbance.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• No wild animal may under any circumstance be handled, removed or be interfered with by construction workers.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO

• No wild animal may be fed on site.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• No wild animal may under any circumstance be hunted, snared, captured, injured or killed. This includes animals perceived to be vermin. Checks of the surrounding natural vegetation must be regularly undertaken to ensure no traps have been set. Any snares or traps found on or adjacent to the site must be removed and disposed of.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
• All food should be securely stored away to prevent attraction of faunal species and all rubbish should be disposed of away from the site. Bins located around the infrastructure should have tightly fitting lids to prevent faunal species raiding the bins and thereby becoming habituated to humans.	Construction Phase	Monitoring throughout the duration of the project.	RE/ECO
16.4 Material Laydown Area			
All lay down areas outside of the construction camp shall be subject to the Engineer/ECO/EO's approval. Specifications for location, demarcation, permitted heights, stabilisation, weed-, dust and erosion control of stockpiles should be implemented.	Construction Phase	Continuous	RE
16.5 Use of Chemical Toilets			
• Chemical toilets are to be maintained in a clean state and should be moved to ensure that they adequately service the work areas.	Construction Phase	Weekly inspection	RE/C
• A registered chemical waste company is to be used to remove waste from chemical toilets on site.	Construction Phase	Weekly Clean-up, or more regularly if required	RE/C
16.6 Worker Conduct			
• Under no circumstances may open areas or the surrounding bush or any adjacent areas be used as a toilet facility.	Construction Phase	Continuous Observations	RE/C

A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: • No alcohol / drugs to be present on site. • No firearms allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel). • Prevent excessive noise. • Prevent unsocial behaviour. • Bringing pets onto the site is forbidden. • No harvesting of firewood from the site or from the areas adjacent to it. • Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility is forbidden). • Trespassing on private / commercial / traditional properties adjoining the site is forbidden. • Driving under the influence of alcohol is prohibited. • Other than pre-approved security staff, no workers shall be permitted to live on site.	Construction Phase	Monitoring throughout the duration of the project.	C/ECO/RE
16.7 Waste Management, Hygiene and Cleanliness			
• Bins should have liner bags for efficient control and safe disposal of waste.	All Phases	Continuous	RE & C
• The site shall be kept neat and clean at all times. Littering is prohibited.	All Phases	Continuous	RE & C
• No on-site burying or dumping of any waste materials, vegetation, litter or refuse shall occur. The Contractor shall provide scavenger and weatherproof bins with lids of sufficient number and capacity to store the solid waste produced on a daily basis. The lids shall be kept firmly on the bins at all times. Bins shall not be allowed to become overfull and shall be emptied regularly. Waste from bins may be temporarily stored on site in a central waste area that is weatherproof and scavenger-proof, and which the RE/ECO has approved.	All Phases	Continuous	RE & C
• All solid waste shall be disposed of off-site at an approved landfill site. The Contractor shall supply the RE/ECO with a certificate of disposal.	All Phases	Continuous	C
• The Contractor shall ensure that all litter is collected from the work and camp areas daily.	All Phases	Continuous	C

• The Contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	All Phases	Weekly monitoring.	C
• Bins and / or skips should be emptied regularly and waste should be disposed of at a registered landfill site The nearest Municipal landfill site is Van Zylsrus Landfill which is situated 95km from Hotazel. Waybills for all such disposal are to be kept by the Contractor for review by the Engineer / ECO.	All Phases	Monitoring throughout the duration of the project.	C/RE/ECO
• Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	All Phases	Monitoring throughout the duration of the project.	C/RE/ECO
• The excavation and use of rubbish pits is forbidden.	All Phases	Monitoring throughout the duration of the project.	C/RE/ECO
• Burning of waste is forbidden.	All Phases	Monitoring throughout the duration of the project.	C/RE/ECO
• A fenced area must be allocated for waste sorting and temporary storage.	All Phases	During site set up.	C/RE/ECO
• Individual skips for different types of waste (e.g. 'household' type refuse, building rubble, etc.) should be provided.	All Phases	During site set up.	C/RE/ECO
16.8 Materials Delivery and Transportation			
• The Contractor shall ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Materials Specifications. The Contractor shall ensure that these delivery drivers are supervised during off loading, by someone with an adequate understanding of the requirements of the Materials Specifications.	Construction Phase	During Delivery	C

• 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 them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials.	Construction Phase	Continuous	C
16.9 Management of Materials Storage Area – Including Hazardous and Dangerous Substances			
Definition of hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic. Some examples of hazardous substances / materials: • *diesel, petroleum, oil, bituminous products* • *cement* • *solvent based paints* • *lubricants* • *explosives* • *drilling fluid* • *pesticides, herbicides* • *LPG (Liquid Petroleum Gas)*			
Storage areas containing hazardous substance / materials must be clearly sign posted.	All phases	During site set up.	RE/C
Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.	All phases	During site set up.	RE/C
The use and storage of all materials shall be controlled. Care shall be taken to ensure that fuels and chemicals do not leach into the ground. Adequate spillage containment measures shall be implemented, such as cut off drains, berms etc. Fuel and chemical storage containers shall be set on a concrete plinth and within a containment bund. The necessary firefighting equipment shall be maintained on site where construction is taking place to deal with any fire incidents.	Construction Phase	Continuous	C
Storage areas should be secure so as to minimise the risk of crime. They should be safe from access by children and animals etc.	Construction Phase	Continuous	C
All potential hazardous or polluting materials shall be stored within the fenced off materials area, as far away from oncoming traffic and from drainage inlets as possible.	Construction Phase	Continuous	C
All manufactured and/ or imported material shall be stored within the materials storage area, and, if so required by the Project Specification, out of the rain.	Construction Phase	Continuous	C

Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.	Construction Phase	Continuous	C
Where applicable, contractors shall prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners etc.) and submit these to the Engineer for approval prior to commencement of any work.	Construction Phase	On award of contract.	C/E/ECO
Where possible, a signed document from the supplier of natural materials should be obtained confirming that they have been obtained it in a sustainable manner and in compliance with the relevant legislation.	Construction Phase	On receipt of the natural materials.	C
Where materials are borrowed (mined), proof must be provided of authorisation to utilise these materials from the landowner / mineral rights owner and the Department of Mineral Resources.	Construction Phase	On receipt of the borrowed materials.	C
16.10 Refuelling of Plant			
Where reasonably practical, plant shall be refuelled at a designated re-fuelling area or at the construction camp. If it is not reasonably practical than the surface under the temporary refuelling area shall be protected against pollution to the satisfaction of the RE/C/ECO prior to any refuelling activities. The Contractor shall ensure that there is always a supply of absorbent material (not saw dust) readily available to absorb/ breakdown and where possible is designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200l of hydrocarbon liquid spill. This material must be approved by the RE/C/ECO prior to any refuelling or maintenance activities.	Construction Phase	During refuelling	RE/C/ECO
16.11 Using Materials – Non Hazardous, Hazardous and Dangerous Goods			
Heating of bitumen products shall only be undertaken using the LPG or similar zero emissions fuels.	Construction Phase	Monitoring throughout the duration of the project.	C/ECO

Staff dealing with these materials / substances must be aware of their potential impacts and follow appropriate safety measures.	Construction Phase	During staff induction and ongoing as necessary.	C/ECO
Should cement be mixed on site, it should be mixed on an impervious surface, and water from the cement mixing area should be channeled to a conservancy tank for removal from the site to a licensed disposal facility.	Construction Phase	Prior to establishment of storage area.	C
16.12 Air Quality Management / Soil Management			
Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust.	Construction Phase	Ongoing – more frequently during dry and windy conditions.	C/ECO
Vehicles travelling along the access roads must adhere to the speed limits to avoid creating excessive dust. Limit vehicle speeds on dirt road deviations to 40km/h. However, vehicle speeds is dependent on the type of vehicle and condition of the road. Generally according to Eskom's procedure the maximum speeds that are allowed on gravel roads is maximum of 60km/h.	Construction Phase	Monitoring throughout the duration of the project.	C/ECO
The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.	Construction Phase	Monitoring throughout the duration of the project. Ongoing.	E/C/ECO
Heavy vehicles and machinery should be serviced regularly to minimise exhaust fume pollution;	Construction Phase	Monitoring throughout the duration of the project. Ongoing.	E/C/ECO
Soil stockpiles will be located in sheltered areas to limit the erosive effects of the wind;	Construction Phase	Monitoring throughout the duration of the project. Ongoing.	E/C/ECO

Removal of vegetation will be avoided until such time as soil stripping is required.	Construction Phase	Monitoring throughout the duration of the project. Ongoing.	E/C/ECO
Environmental friendly soil stabilisers may be used as additional measures to control dust on gravel road and construction area, and all roads used for traffic accommodation will be surfaced.	Construction Phase	Monitoring throughout the duration of the project. Ongoing.	E/C/ECO
Existing vegetation will assist in screening the site, control dust and help prevent soil erosion. All existing vegetation on and adjacent to the development shall be retained unless otherwise instructed by the Engineer.	Construction Phase	Monitoring throughout the duration of the project.	ECO
No unnecessary stripping of vegetation shall be undertaken. The time that stripped areas are left open to exposure should be minimised wherever possible. Care should be taken to ensure that lead times are not excessive.	Construction Phase	Throughout the duration of the project.	E/ECO
Wind screening and storm water control should be undertaken to prevent soil loss from the site.	Construction Phase	During site set up.	E/ECO
Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the camp.	Construction Phase	Daily monitoring during site set up.	E/ECO
Topsoiling and re-vegetation shall commence immediately after the completion of an activity and at an agreed distance behind any particular work front.	Construction Phase	Daily monitoring during site set up.	E/ECO
16.13 Stormwater Management			
During construction un-channelled flow must be controlled to avoid soil erosion. Methods could include the use of rows of straw / hay bales that could be dug into the soil in contours to slow surface wash and capture eroded soil. The spacing between rows will be dependent on slope.	During Construction	Monitoring throughout the duration of the project.	E
Earth, stone and rubble is to be properly disposed of so as not to obstruct natural pathways over the site; i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.	During Construction	Monitoring throughout the duration of the project.	E

16.14 Watercourses / Wetland Areas / Floodline			
Construction should be undertaken in the dry season to minimise all potential impacts as assessed in the Aquatic Assessment Report	During Construction	Monitoring throughout the duration of the project	C
The powerline should span the wetland as far as practical	During Construction	Monitoring throughout the duration of the project	E/ECO
Hazardous material and chemicals should not be kept or handled within wetland areas. Hazardous substances must be kept in a demarcated area on an impervious surface. Any spillages from hazardous material should be cleaned immediately and transported to a landfill site that accepts hazardous material	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Cement and other material must be mixed in a demarcated area and not in wetland or buffer zones	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Buffer zones must be maintained at all time to ensure the protection of the aquatic resources	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Movement of contractors and vehicles within wetland and riparian areas should be avoided to ensure that compaction of sediment and water pollution will not take place	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Contractors should not be allowed to collect water or fish from the wetlands	During Construction	Monitoring throughout the duration of the project	C/E/ECO

Waste bins should be provided to ensure that litter isn't dumped in the wetlands or riparian zones	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Vehicles should be serviced on a regular basis to avoid leaks and spills	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Where possible, existing roads and access points should be utilised	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Solid waste should be removed on a regular basis and chemical toilets should be provided and should be serviced on a regular basis	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Any contractor's camps should not be placed within or near any wetlands and associated buffer zones	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Topsoil and excavated soil must not be placed within the wetland or buffer areas	During Construction	Monitoring throughout the duration of the project	C/E/ECO
The removal of vegetation must be kept to a minimum where possible. The time that soil is exposed must be limited and re-vegetation or another covering method must be applied during the construction and post construction phase	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Re-vegetation must be completed using the appropriate endemic plants. Where possible, the vegetation must be removed intact to ensure that it can be replanted again during rehabilitation	During Construction	Monitoring throughout the duration of the project	C/E/ECO

Where vegetation is removed, the compaction of wetland soils must be minimised to avoid an increase in surface runoff speeds	During Construction	Monitoring throughout the duration of the project	C/E/ECO
The establishment of exotic plants must be avoided	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Where possible the area where construction will take place should be demarcated. Demarcation of the construction areas will ensure that only the required area is cleared of vegetation	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Erosion protection must be used in all areas where erosion may occur	During Construction	Monitoring throughout the duration of the project	C/E/ECO
If any access roads will be constructed a stormwater management plan must be developed for the construction phase	During Construction	Monitoring throughout the duration of the project	C/E/ECO
For access roads, stormwater must not be concentrated at a single outlet and should be allowed to diffuse over a large area	During Construction	Monitoring throughout the duration of the project	C/E/ECO
A rehabilitation plan should be developed; only if the construction of the powerline will cause the removal of vegetation and soils in the wetland flat	During Construction	Monitoring throughout the duration of the project	C/E/ECO
A monitoring plan must be developed and implemented for the wetlands. Ideally this plan must cover the site laydown, construction and post-construction periods	During Construction	Monitoring throughout the duration of the project	C/E/ECO

Waste is not to be buried on site	During Construction	Monitoring throughout the duration of the project	C/E/ECO
Spill-sorb or similar type product must be used to absorb hydrocarbon spills in the event that such spills should occur.	During Construction	Monitoring throughout the duration of the project	C/E/ECO
16.15 Noise Impacts			
Should there be complaints from the public regarding excessive noise necessary mitigation measures should be put in place, for examples, construction vehicles could be fitted with standard silencers.	During all phases	Prior to moving onto site.	E/C
Equipment that is fitted with noise reduction facilities will be used as per operating instructions and maintained properly during site operations.	During all phases	Monitoring throughout the duration of the project.	E/C
No amplified music shall be allowed on site. The use of radios, tape recorders, compact disc players, television sets etc. shall not be permitted unless the volume is kept sufficiently low as to avoid any intrusion on members of the public within range. The Contractor shall not use sound amplification equipment on site unless in emergency situations.	During all phases	Monitoring throughout the duration of the project.	E/C

Construction activities generating output levels of 85 dB (A) or more, in residential areas, shall be confined to the hours 08h00 to 17h00 Mondays to Fridays. Should the Contractor need to work outside normal working hours, the surrounding communities shall be informed prior to the work taking place.	During all phases	Monitoring throughout the duration of the project.	E/C
16.16 Heritage Impacts			
• **Refer to Section 15.10 Above**	During all phases	Monitoring throughout the duration of the project.	E/C
16.17 Occupation Health and Safety			
Potentially hazardous areas such as trenches are to be demarcated and clearly marked.	During all phases	Monitoring throughout the duration of the project.	E/C

Obstruction to drivers' line of sight due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.	During all phases	Monitoring throughout the duration of the project.	E/C
Material stockpiles or stacks, such as pipes must be stable and well secured to avoid collapse and possible injury to site workers / local residents.	During all phases	Monitoring throughout the duration of the project.	E/C

17 Operational Phase

Eskom requested JG Afrika to remove all operational activities from the EMP, due to the following reason:

- Eskom handles operational elements through their EMS system and in-house operational EMP and relevant procedures.