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Proposed 400kV substation and  
power line for ACWA Power Khanyisa  
IPP Project, Mpumalanga Province  
Environmental Management Programme

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# 1 CONTEXT AND INSTITUTIONAL MATTERS

## 1.1 Background to the project

Anglo Operations (Pty) Ltd (AO) applied for an environmental authorisation for the coal-fired Khanyisa Power Station (hereinafter referred to as the Khanyisa IPP Project) and associated infrastructure proposed near eMalahleni in 2011 (see Figure 1.1). AO's goal was to procure its own dedicated supply for a portion of its electricity requirements via the Khanyisa Independent Power Producer (IPP) project. Such supply was aimed at increasing Anglo American's security of supply and limiting the impact of electricity price increases. A key motivator for the project is that electricity generating capacity in South Africa is expected to remain constrained for a number of years. An environmental authorisation (EA) for the 450 MW Khanyisa IPP Project was granted in October 2013. An amendment to this authorisation to increase the power station's generation capacity to 600 MW was authorised in July 2015 (DEA reference 12/12/20/2067AM1).

AO has transferred all duties and responsibilities related to the Khanyisa IPP project to International Company for Water and Power Project. The project will be developed under a special purpose vehicle called Paverstar Trading 32. Paverstar Trading 32 is an Independent Power Producer (IPP) and will be bidding the ACWA Power Khanyisa IPP Project under the Department of Energy's Coal Baseload Programme. Paverstar's aim is to build, own, operate and decommission the power station. The power station will contribute to relieving the national / Eskom generation capacity shortages. Paverstar Trading 32 proposes a few changes to the initial environmental authorisation and one of these changes includes the relocation of the approved substation and 400kV power line. It should be noted that the proposed substation and power line do not form part of the ACWA Power Khanyisa IPP Project, but rather a self-build agreement between Paverstar Trading 32 and Eskom requires that the applicant undertakes the EIA process on behalf of Eskom. Paverstar Trading 32 will appoint a contractor, who will be responsible for constructing the power lines and associated infrastructure. However, after construction, the ownership of the power lines and associated infrastructure will be handed over to Eskom Holdings SOC Limited (hereafter referred to as Eskom), who will maintain the power line and associated infrastructure during operation. As such, Paverstar Trading 32 and Eskom will be responsible for pre-construction / construction phases and operation and decommissioning of the project respectively.

The area where the substation and power line is proposed is in an area that has not previously been assessed during the initial EIA process. The authorisation of this substation and power line cannot be considered through an Environmental Authorisation Amendment process and therefore a Scoping and Environmental Impact Assessment process is being undertaken in order for the Department of Environmental Affairs to consider the proposed relocation of the authorised location of the substation and power line.

The EIA process is being undertaken in terms of the 2014 EIA regulations. Various specialist studies were conducted in support of the EIA. The specialists recommended various mitigation measures to minimise the impacts and these measures have been incorporated in the draft EIA Report (EIR) and Draft Environmental Management Programme (EMPr).

## 1.2 Project locality

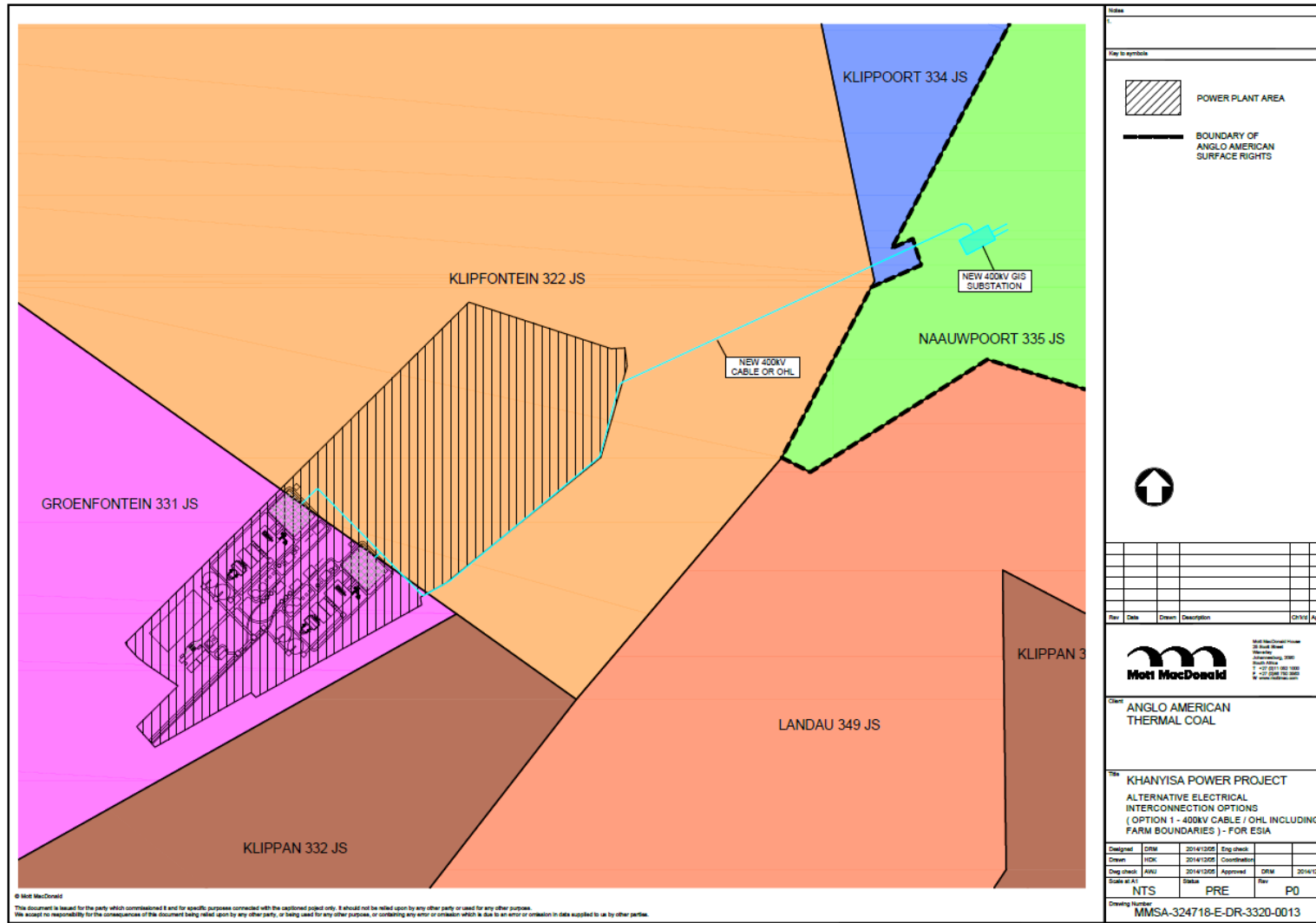



Figure 1: Locality of the proposed 400kV substation and power line in relation to the authorised Khanyisa Power Station



The proposed substation is proposed approximately 2.5km north-east of the approved Khanyisa Power Station on portion 51 of the farm Naauwpoort 335 JS. The 400kV power line will traverse three properties between the Khanyisa Power Station and the proposed substation location area. The power line will traverse the following three properties:

- The Remaining Extent of the Farm **Klippoort 334 JS**;
- **Portion 49 and 51** of the Farm **Naauwpoort 335 JS**; and
- **Portion 1 and 27** of the Farm **Klipfontein 322 JS**.

### 1.3 Purpose of this document

The purpose of this document is to provide guidelines for the environmental best practice to the Applicant or Contractor commissioned to construct the 400kV substation and power line. This document shall be used by the Applicant or issued as part of the contract (should Paverstar Trading 32 appoint a contractor). The Environmental Management Programme (EMPr) will thus form part of the enquiry document to make the recommendations and constraints, as set out in this document, enforceable under the general conditions of contract.

#### 1.3.1 The EMPr has a long-term objective to ensure that:

- Environmental Management considerations are implemented from the start of the project;
- Precautions against damage and claims arising from damage are actioned timeously; and
- The completion date of the contract is not delayed due to problems with adjacent landowners and other interested and affected parties arising during the course of construction.


#### 1.3.2 The Commitments of the Project Manager entail:

- Professional behavior on and off site;
- Ensuring quality in all work done, technical and environmental;
- Resolve problems and claims arising from damage immediately to ensure a smooth flow of operations;
- To use this EMPr for the benefit of all involved;
- To preserve the natural environment by limiting destructive actions on site; and
- To prevent and/or mitigate nuisance impacts on people close to the construction site and other impacts on the social environment.

### 1.4 Details of the EAP

Aurecon Pty Ltd has been appointed by Paverstar Trading 32 to conduct the Environmental Impact Assessment for the construction of the substation and power line for the ACWA Power Khanyisa IPP Project.

The Environmental Management Programme was compiled by Anne-Mari White, an environmental project leader with Aurecon. She will also provide overall project management (including client liaison, financial management and progress reporting). Anne-Mari is an Environmental Specialist, who started



her studies at the University of Northwest and completed her BSc (Environmental Management) degree at the University of South-Africa (UNISA) in 2007. Anne-Mari is also registered with the South African Council for Natural Scientific Professions as a Certificated Natural Scientist (Reg No 300067/15). In addition to her qualification, she has done short courses in soil classifications and wetland delineations (Terrasoil Science), Geographic Information Systems (University of KwaZulu-Natal) as well as Environmental Impact Assessments (University of Northwest). Please refer to Appendix E of the Environmental Impact Report for the consultant's CV.

## 1.5 Legal context

This EMPr has been compiled in terms of Regulations 19 and 23 of the Environmental Impact Assessment Regulations (Government Notice No. R 982 of 2014) and Appendix 4 of these regulations, which provide a framework for the content and intent of an EMPr. The EMPr also follows the rationale of the ISO 14001: Environmental Management System international standard in that it addresses and differentiates between *Activity, Aspect, Impact, Mitigation Measures, Performance Indicators, Responsibility, Resources and Time Schedule*.

The following legislation has been identified as applicable to the establishment of the substation and power line:

**Table 1: Applicable Legislation**

<b>Title of legislation, policy or guideline</b>	<b>Applicability to the project</b>	<b>Administering authority</b>	<b>Date</b>
National Environmental Management Act, 1998 (Act No. 107 of 1998)	The developer has a general duty to care for the environment and to establish measures as may be needed to demonstrate such care.	Department of Environmental Affairs	1998
Environmental Impact Assessment Regulations (Government Notice No. R 982 of 2014)	Requirements with regards to the Environmental Impact Assessment Process to be undertaken Requirements with respect to the content of an EMPr	Department of Environmental Affairs	2014
Environmental Impact Assessment Regulations (Notices No. R 983 and 985 of 2014)	Activities within this regulation are triggered and require an Environmental Authorisation.	Department of Environmental Affairs	2014
Constitution of Republic of South Africa Act (Act No. 108. of 1996)	The environmental right of the communities residing in surrounding areas has been considered by undertaking the environmental studies to avoid and minimise the impacts.	National, Provincial and Local Governments	1996
National Water Act, 1998 (Act No. 36 of 1998)	A water use license must be obtained for activities taking place within 500m of a wetland.	Department of Water Affairs	1998
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	Any possible artefacts of cultural or historical significance identified on site will need a permit for removal. However, there are no artefacts identified thus far.	South African Heritage Resources Agency	1999
National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004) (NEM:BA)	Damaging of, disturbance to or destroying of plant or animal species of conservation importance during the clearing of the site will need to adhere to the provisions of NEM:BA.	National and provincial departments responsible for environmental affairs	2004
Integrated Environmental Management Guideline: Public Participation.	This guideline lays down requirements for the public participation process to be undertaken during the Scoping and EIR process.	Department of Environmental Affairs	2014





## 2 ROLES AND RESPONSIBILITIES

### 2.1 Environmental Control Officer

The Environmental Control Officer (ECO) is the person responsible for monitoring and to assist the applicant to implement the EMPr. The ECO must be suitably qualified in the environmental sciences and management and have adequate construction site experience of monitoring, auditing and implementation of an EMPr. The ECO may either be independent of the application or may be an applicant's employee.

The ECO will report directly to the DEA. The ECO has the authority to stop any works if, in his/her opinion, there is or may be a significant threat to or impact on the environment; caused directly by the Contractor's actions or activities during the construction phase. When the construction activities are stopped, the ECO is required to furnish the applicant with reasons of work stoppage within 24 hours. The ECO is further required to provide recommendations to the applicant that will need to be implemented in order to rectify the impacts caused.

### 2.2 Project Manager

The Project Manager (PM) is the person appointed by Paverstar Trading 32 to act on its behalf as specified in the appointment contract. The responsibilities of the PM among others are to oversee the overall implementation of the project, the compliance of the project to the conditions of the EMPr and incorporate any potential environmental aspects into the project design.


### 2.3 Environmental Health and Safety Officer

Considering that the health and safety risk during the establishment phase is minimal, it is recommended that the Environmental Control Officer with relevant experience assist with the health and safety management duties at the site.

#### 2.3.1 Training and Environmental awareness on site

It is important to ensure that the workers have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm during establishment. Training needs should be identified based on the available and existing capacity of personnel to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The education/awareness programme should be aimed at all levels of management and construction workers. All new employees arriving on site shall undergo this training. Environmental induction must be done according to the Contractor's Environmental Management System, and must include all aspects of the EMPr.



Toolbox talks are to be used as a refresher for continuous training of employees and must be conducted on a weekly basis. Toolbox talks must be conducted in an interactive manner to ensure the employees understand the content and purpose of the specific EMPr requirements.

As construction continues, an effort must be made by the applicant to assess the training needs of workers on site. Cognisance must be given of the specific work to be undertaken at the time and, if necessary, additional training on environmental requirements must be conducted to ensure all workers understand the risks involved as well as how to adequately implement mitigation measures. A signed attendance register documenting all employees' environmental training and awareness programmes must be kept on record for verification purposes.

### **2.3.2 Record keeping**

The ECO is responsible for maintaining all records in relation to the EMPr requirements on site. Such records must be made available to the Project Manager on request during the monthly audits, and at any time as requested by the Project Manager. Record keeping must be done in an orderly fashion with the intent of ensuring easy reference.

## **2.4 Organisational and Institutional arrangements**

Any changes to the EMPr or conditional requirements of the Environmental Authorisation (EA) must be communicated in writing to the DEA within the timeframes as stipulated in the EA. A provisional reporting and communications structure is indicated in Figure 2 below.

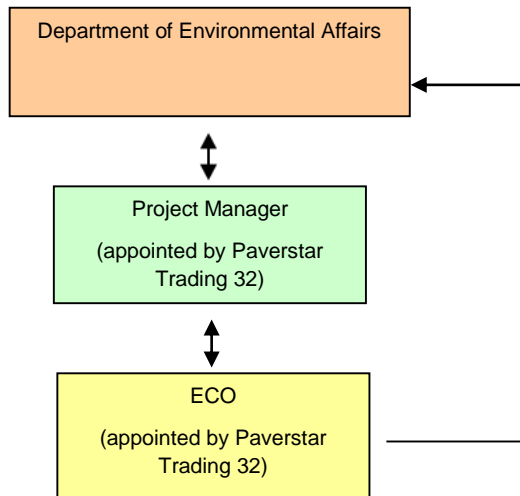


Figure 2: Proposed organisational and reporting structure

## 2.5 Monitoring and auditing framework

### 2.5.1 Monitoring programme

The purpose of the monitoring programme is to ensure that mitigation measures identified and described in the EMP are implemented. Construction of the substation and power line will be monitored and audited against the EMP on a monthly basis by the ECO. An audit report will be submitted to the project team at the end of each month prior to the progress meetings where it will form part of the agenda. The ultimate target is to achieve 100% compliance with the EMP.



## 3 DESCRIPTION OF ACTIVITIES

The activities that are going to be undertaken involve, but are not limited to:

### 3.1 Pre-construction and construction phase

#### 3.1.1. Pre-construction

- Survey controls;
- Vegetation/ faunal search and rescue (as applicable) – must be undertaken during flowering season; and
- Staff procurement, induction and training.

#### 3.1.2. Construction

- Clearing the proposed power line area of vegetation;
- Protection of archaeological sites, should any be found;
- Excavating the area where the substation and power line infrastructure is proposed; and
- Rehabilitation.



## 4 SUMMARY OF IMPACTS AND ASSOCIATED MITIGATION MEASURES

This section of the document covers the potential impacts that will result from the construction activities. It further provides mitigation measures for each identified impact.

The following sections are dealt with in the table:

- Section 5 : Pre-construction and construction
- Section 6 : Waste
- Section 7 : Air Quality / Dust
- Section 8 : Noise
- Section 9 : Flora and fauna
- Section 10 : Visual impacts
- Section 11 : Health and safety
- Section 12 : Water
- Section 13 : Archaeological and heritage sites
- Section 14 : Social impacts
- Section 15 : Operational phase

# 5 PRE-CONSTRUCTION AND CONSTRUCTION

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.1 Operation of sanitation system(s)	Sanitation systems	<p>Unpleasant odours on site</p> <p>Inadequate number of latrines on site</p> <p>Position of latrines and shower systems</p> <p>Poor management of waste water</p> <p>Impact on wetland</p>	<p><b>Objective(s):</b></p> <p>To ensure good sanitation system and management throughout the construction period.</p> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>Adequate chemical toilets must be provided for all staff. Alternatively, existing ablution facilities on site can be utilised, if available.</li> <li>Chemical toilets must be emptied / serviced twice per week to prevent them overflowing.</li> <li>A minimum of one toilet must be provided per 11 persons at each working area within 100 m from worker activity.</li> <li>Chemical toilet facilities must be placed at least 100m from any water resource.</li> </ul>	<p>Adequate toilets will be positioned at the right places as per the EMPr and ECO's instructions.</p> <p>Absence of odours, erosion and build-up of detergents.</p> <p>Absence of overflow of raw sewage into the environment</p>	Contractor	Contract and allowance in Preliminary and Generals	Pre-establishment, Establishment of site.	ECO	Once off

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
5.2 Storage of equipment	Storage of equipment	Pollution of soils  Disturbance of soils due to parking of vehicles outside of designated areas	<p><b>Objective(s):</b> To ensure vehicles are parked according to the specifications in the EMPr and that equipment is handled appropriately.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>No storage of vehicles or equipment will be allowed outside of designated areas.</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and/or for those vehicles and machinery showing evidence of leaking hydrocarbons.</li> </ul>	Drip trays must be provided and placed under vehicles and equipment that is not being utilised on site.	Project Company and ECO.	Contract and allowance in Preliminary and Generals	Throughout the construction period.	ECO	As per specified target.
5.3 Personnel conduct	Personnel	Infringement of the EMPr requirements by personnel	<p><b>Objective(s):</b> To ensure that personnel are adhering to the EMPr requirements and the health, safety and environmental requirements as set by the landowner (Anglo American).</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All personnel must undergo Environmental Awareness Training. Such training must include the requirements of the EMPr and the location of sensitive (no-go) areas of which the workers must be aware. A signed register of attendance must be kept for proof.</li> <li>Tool box talks to include aspects of the EMPr.</li> <li>Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements.</li> <li>All environmental incidents should be reported to the Environmental Health and Safety Officer, investigated, documented and kept on file.</li> </ul>	Absence of trespassers on site.  Personnel adhering to EMPr requirements created to protect sensitive features of the environment	Labourers	Contract and allowance in Preliminary and Generals	Approved Personal Protective Equipment (PPE) must be issued to all employees during pre-construction but must be used for the duration of the construction period.	ECO	Throughout establishment and construction period

# 6 WASTE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
6.1 Storage, removal and disposal of general and hazardous waste	General waste  Hazardous waste	Soil pollution  Ground water contamination	<p><b>Objective(s):</b> To ensure that soil and the rest of the surrounding environment on site is protected from pollution caused by hazardous and general waste.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The Contractor is required to take note of the National Environmental Management: Waste Act (no 59 of 2008) and the globally harmonised system for the classification of waste to determine whether any substance (new or waste) stored on site is subject to controls contained within the act</li> <li>All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility.</li> <li>Hazardous waste may only be stored on site for a period of 90 days, where after it must be disposed of at a registered hazardous waste disposal site.</li> <li>Any oil spillage on site will be excavated to a depth determined by the ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative <i>in-situ</i> remediation techniques could be used, if approved by the ECO.</li> <li>General waste must be stored in refuse bins and be disposed of.</li> </ul>	All mitigation measures with regards to hazardous waste mentioned in the EMPr are implemented.	Contractor and ECO	Contract and allowance in Preliminary and Generals	Hazardous wastes must be collected in sealable, safe containers.  Timeous removal of all forms of waste throughout the construction process.	ECO	During the entire construction period



# 7 AIR QUALITY / DUST

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
7.1 Trenching and transport of soils	Dust	Dust and smoke nuisance	<p><b>Objective(s):</b> To reduce the generation of dust and emissions on the construction site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Dust suppression of exposed soils is to be conducted during construction.</li> <li>The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent spraying during low rainfall periods or by using chemical dust binding agents approved by the ECO.</li> <li>Speed limits must be enforced in all areas to reduce the generation of dust.</li> <li>Cover dump trucks before traveling on public roads or relevant as per ECO-approved method statement.</li> <li>Keep soil loads below the freeboard of the truck to minimise fugitive dust.</li> <li>Minimise drop heights when loaders dump soil into trucks.</li> <li>Re-vegetate disturbed areas as soon as possible after disturbance.</li> <li>When feasible, shut down idling construction machinery.</li> <li>Absolutely no burning of any waste is allowed on site at any time.</li> </ul>	Dust and smoke are kept to an absolute minimum on site.	Contractor and ECO.	Contract and allowance in P&G's	Throughout construction period.	ECO	During periods of low rainfall or as required by the ECO.

# 8 NOISE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
8.1 Construction activities	Construction vehicles, plant and machinery	Noise and vibration	<p><b>Objective(s):</b> Keeping noise on site to a minimum to prevent noise nuisance for residents close to the construction site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Working hours are to be viewed as 06:00 to 18:00 on weekdays and 07:00 to 15:00 on Saturdays.</li> <li>All machinery and equipment must be maintained in good working order, and fitted with approved and specified muffler systems.</li> </ul>	<p>Construction vehicles and machinery fitted with mufflers silencers.</p> <p>Working hours are adhered to.</p>	Contractor and ECO	Contract and allowance in P&G's	Throughout the construction period	ECO	Ongoing

# 9 FLORA AND FAUNA

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.1 Clearing activities (physical issues and their control)	Vegetation	Damage to vegetation	<b>Objective(s):</b> Minimise damage to vegetation beyond the boundaries of the proposed site. Minimise possibility of erosion due to removal of vegetation.  <b>Target:</b> <ul style="list-style-type: none"> <li>No vegetation shall be pushed into heaps or left lying all over the veld.</li> <li>Vegetation clearing must be kept to the power line and substation area.</li> <li>The Black Wattle (<i>Acacia mearmsii</i>) along the northern border of the substation footprint must be removed and rehabilitated with indigenous vegetation.</li> <li>Destruction of the secondary grassland must be avoided so that connectivity with the neighboring grasslands are maintained.</li> <li>Prior to the commencement of vegetation clearance, the final site area earmarked for the power line should be searched by a specialist for any Red Data or endangered species during the growing season. Should protected or endangered species of plants and animals have to be removed, the necessary permission and permits shall be obtained from the provincial nature conservation department.</li> </ul>	No trees and vegetation removed beyond the boundaries of the proposed power line area.  No visible erosion scars three months after completion of the establishment due to vegetation removal.  No litigation due to unauthorized removal of vegetation.  All alien invasive plants within and immediately adjacent to the construction footprint eradicated	Contractor and ECO.	Contract and allowance in Preliminary and Generals	During the construction phase	ECO	
		Further degradation of the secondary grassland  Erosion due to removal of vegetation  Loss of habitat for conservation important species							Vegetation will be cleared as construction proceeds

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
9.2	Alien vegetation	Introduction or spreading of alien plants/seeds on site	<p><b>Objective(s):</b></p> <ul style="list-style-type: none"> <li>To prevent alien plants/ seeds from being introduced to site</li> <li>To remove alien plants from site,</li> <li>To prevent the spreading of alien plants already present on site</li> </ul> <p><b>Targets:</b></p> <ul style="list-style-type: none"> <li>All sites disturbed by construction activities must be monitored for exotic or invasive plant species and weeds. An alien control programme must be implemented.</li> <li>Chemicals used to remove alien vegetation shall be used in accordance with manufacturer's specification for weeds.</li> <li>Any eradicated exotic/invasive plant or weed vegetation must be removed from site and disposed of at an approved waste disposal facility.</li> </ul>	No new alien plants to establish on site	Project Company, Labourers, ECO.	Contract and allowance in Preliminary and Generals	For the duration of the construction period.	ECO	During construction
9.3	Protection of fauna	Intentional or unintentional killing of fauna on site Loss of fauna due to habitat disturbance	<p><b>Objective(s):</b></p> <p>To ensure that specimens of fauna found on site are protected and not interfered with.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>The Contractor must ensure that the site is kept clean and free of litter that could potentially attract animal pests</li> <li>Workers should be educated so as not to kill any fauna found on site.</li> <li>The footprint of disturbance should be kept to a minimum.</li> <li>Hunting or trapping is strictly prohibited. Anyone found guilty of such an act will be removed from the project.</li> </ul>	The site is kept clean and does not attract or cause any harm to fauna.	Project Company, ECO.	Contract and allowance in Preliminary and Generals	Throughout the construction and post construction period.	ECO	Ongoing

# 10 VISUAL IMPACTS

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
10.1 Construction activities	Construction rubble  Light pollution	The construction site can be very untidy and look unattractive  Flood lights could possibly be used during the night should the construction phase operate 24h per day	<b>Objective(s):</b> To keep the site as tidy as possible to reduce the negative visual impact  <b>Target:</b> <ul style="list-style-type: none"> <li>Rubble and litter must be removed regularly and be disposed of at a registered landfill site (see requirements in section 8).</li> <li>Cluster construction activities on site</li> <li>Cordon off construction site with shade cloth if necessary</li> <li>Should flood lights be used during the night, the lights may not be directed towards the motorist travelling on the adjacent road.</li> </ul>	The site is tidy and visually acceptable during the construction phase  No accidents caused due to blinding of motorists	Contractor and ECO	Contract and allowance in P&G's	During construction	ECO	Ongoing

# 11 HEALTH AND SAFETY

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
11.1 Construction activities	Construction vehicles, plant and machinery	Activities during construction could lead to injuries to staff or the public  Activities could increase the risk of fire	<p><b>Objective(s):</b> Reducing the possibility of any injuries occurring at site.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>All necessary signage and traffic measures, such as speed limits, must be implemented for safe movement of vehicles to and from the proposed development</li> <li>The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) and the National Building Regulations.</li> <li>Ensure that the handling of equipment and materials is supervised and adequately instructed.</li> <li>Adequate facilities must be available on site for the emergency treatment of staff and public.</li> <li>Appropriate road design and traffic control measures are recommended to reduce animal mortality.</li> <li>No open fires are allowed for cooking or any other purpose unless it is agreed and managed by the ECO or project manager.</li> </ul>	No injuries during the construction phase	Contractor and Health and Safety Officer.	Contract and allowance in P&G's	Throughout the construction period	ECO	Ongoing

# 12 WATER

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
12.1 Construction activities in or around watercourses.	Wetland area	<p>Pollution of water resources</p> <p>Obstruction of water flow</p> <p>Sedimentation and erosion</p>	<p><b>Objective(s):</b> Avoid and/ or mitigate activities in or around watercourses (including wetlands) to prevent negative impacts.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>No construction within the buffer zone, 32 metres from the edge of the watercourse.</li> <li>No storage areas for any materials, in particular hazardous materials (such as fuel), parking areas for vehicles or any temporary toilets should be located near the wetland area.</li> <li>The hydrological regime must be protected and maintained.</li> <li>No water may be abstracted from local water sources unless such abstraction is approved by the Department of Water Affairs or the relevant authorised user.</li> <li>All chemical toilets must be placed above the 1:100 year flood line or at least 100 m away from any water course or wet area.</li> <li>The ECO must ensure that reasonable precautions are taken to prevent the pollution of the ground and water resources on and adjacent to the sites during the construction phase.</li> <li>To prevent sedimentation and erosion, the area must be re-vegetated as soon as possible after the power line has been constructed</li> </ul>	No unnecessary damage to wetlands	Contractor and ECO.	Contract and allowance in Preliminary and Generals	During the construction phase	ECO	During entire construction phase

# 13 ARCHAEOLOGICAL AND HERITAGE SITES

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
13.1 Protection of archaeological and paleontological sites	Heritage, archaeology and palaeontology	Destruction of any possible graves and other sites of archaeological and heritage value	<p><b>Objective(s):</b> To ensure that sites of heritage interest are preserved.</p> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Should any archaeological or palaeontological sites or graves be uncovered during construction, their existence shall be reported to the ECO, DEA and SAHRA immediately.</li> <li>Construction must be immediately stopped, should any elements of cultural or heritage significance be found.</li> <li>A qualified archaeologist must conduct an investigation, thereafter establishment activities may continue, depending on the findings of the archaeologist.</li> </ul>	No places of possible heritage value are being disturbed or affected due to construction activities.	Project Company, ECO.	Contract and allowance in Preliminary and Generals	For the duration of the construction period.	ECO	Ongoing



# 14 SOCIAL IMPACTS

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
14.1 Ensuring that the public in not affected negatively	Social	<p>Possible increase in incidences of STD's, HIV and AIDS</p> <p>Possible increase in crime activities</p> <p>Positive impact with regards to job opportunities</p>	<p><b>Objective(s):</b></p> <p>With the influx of people:</p> <ul style="list-style-type: none"> <li>To minimise crime and the possibility of an increase in STD's and HIV:</li> <li>Make use of local labour</li> </ul> <p><b>Target:</b></p> <ul style="list-style-type: none"> <li>Only construction personnel should be allowed on site;</li> <li>Construction workers may not enter an unauthorised properties;</li> <li>Use local labour as far as possible to minimise the influx of people to the area and preventing social unrest.</li> </ul>	<p>No crime activities</p> <p>No social unrest</p> <p>No increase in STD's, HIV and AIDS</p>	Project Company, Contractor.	Contract and allowance in Preliminary and Generals	For the duration of the construction period.	ECO	Ongoing

# 15 OPERATIONAL PHASE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
15.1 Regular inspections and maintenance on infrastructure	Ecological and wetland area	Impact on the wetland area  Soil and water pollution	<b>Objective(s):</b> <ul style="list-style-type: none"> <li>No additional impact on the wetland or surrounding area</li> </ul> <b>Target:</b> <ul style="list-style-type: none"> <li>Maintenance vehicles must stay on the designated route for maintenance purposes;</li> <li>No littering on or near the site;</li> </ul>	No deterioration of the wetland and surrounding ecological environment	ESKOM	Contract and allowance in Preliminary and Generals	For the duration of the operational period.	Project Company	Ongoing

# 16 DECOMMISSIONING AND REHABILITATION PHASE

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Resources	Time Schedule	Verification Responsibility	Frequency
16.1 Decommissioning of all electricity generation structures and infrastructures	Ecological and wetland area	Impact on the wetland area  Soil and water pollution	<b>Objective(s):</b> <ul style="list-style-type: none"> <li>No additional impact on the wetland or surrounding area</li> </ul> <b>Target:</b> <ul style="list-style-type: none"> <li>All rubble and structures must be removed to a designated storage area or landfill site;</li> <li>No activities may take place within the wetland area</li> <li>No littering on or near the site;</li> </ul>	No deterioration of the wetland and surrounding ecological environment	ESKOM	Contract and allowance in Preliminary and Generals	For the duration of the decommissioning phase.	Project Company	During the decommissioning phase
16.2 Rehabilitation of the affected areas	Ecological and wetland area	Soil erosion  Invading alien vegetation	<b>Objective(s):</b> <ul style="list-style-type: none"> <li>Rehabilitating the ecological environment to be of the same ecological state before any construction took place within the project area.</li> </ul> <b>Target:</b> <ul style="list-style-type: none"> <li>Areas with no vegetation must be covered in top soil and revegetated with indigenous vegetation;</li> <li>All alien vegetation must be removed from the project area;</li> <li>All rubble and concrete must be removed from the site;</li> </ul>	The ecological environment is left in the same or better condition as it was before any construction activities took place.	ESKOM	Contract and allowance in Preliminary and Generals	For the duration of the decommissioning phase.	Project Company	During the decommissioning phase