



## **ESKOM GENERATION**

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# **Proposed Installation of an additional 500m<sup>3</sup> Bulk Storage Fuel Oil Tank at Grootvlei Power Station, Mpumalanga Province**

## **Environmental Management Programme**

**Issue Date:** 27 February 2012

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The Independent Environmental Assessment Practitioner:

We, SiVEST Environmental, declare that we –

- act as the Independent Consultants in this application for the Proposed Installation of additional 500m<sup>3</sup> Bulk Storage Fuel Oil Tank at Grootvlei Power Station, Mpumalanga Province;
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2010;
- have and will not have any vested interest in the proposed activity proceeding;
- have no, and will not engage in, conflicting interests in the undertaking of the activity; and
- will provide the competent authority with access to all information at our disposal regarding the application, whether such information is favourable to the applicant or not.

# ESKOM GENERATION

## GROOTVLEI ADDITIONAL 500M<sup>3</sup> BULK STORAGE FUEL OIL TANK PROJECT

### EMPr

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**Glossary of terms:**

**Construction Phase:** The activities pertaining to the preparation for and the physical construction of the proposed development.

**Decommissioning:** Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.

**Environment:** NEMA defines "environment" as "the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any interrelationships among and between them and the physical, chemical aesthetic and cultural properties and conditions that influence human health and well-being".

**Environmental Control Officer:** The person, appointed by the Proponent, responsible for ensuring all the Main Contractor’s activities on the site including supervision of the construction staff and activities associated with the Construction Phase.

**Environmental Management Programme (EMPr):** The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPr specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project’s life-cycle.

**Eskom Environmental Officer:** The person, representing the proponent (Eskom), responsible for all the Contractor’s activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Eskom Environmental Officer will report to the Eskom Project Manager and Environmental Control Officer in order to ensure that the project is conducted in accordance with the Environmental Management Programme.

**Operational Phase (Post Construction):** The period following the Construction Phase, during which the proposed development will be operational.

**Main Contractor:** Person(s)/organisations contracted by Eskom Generation to carry out parts of the work for the proposed development.

**Main Contractor's Environmental Officer (MC EO):** The person, representing the Main Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Main Contractor's Environmental Officer will liaise with the Project Manager and Environmental Control Officer in order to ensure that the project is conducted in accordance with the Environmental Management Programme.

**Main Contractor's Project Manager:** The person appointed by the Main Contractor to oversee the work of all consultants, sub-developers, contractors appointed by the Main Contractor for the project.

**Pre-Construction Phase:** The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

**Project Manager (PM):** Person/organisation appointed by the holder of the environmental authorisation (Eskom Generation) to oversee the work of all consultants, sub-developers, contractors, residents and visitors for the project.

**Rehabilitation:** Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation must aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

**Abbreviations (Definitions are above):**

C	Contractor
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EA	Environmental Authorisation
ESS	Environmental Scoping Phase

HOD	Head Of Department
I & APs	Interested and / or Affected Parties
MC	Main Contractor
SM	Site Manager
SO	Safety Officer
PM	Project Manager
MSDS	Material Safety Data Sheets
VIP	Ventilated Improved Pit Latrine

# ESKOM GENERATION

## GROOTVLEI ADDITIONAL 500M<sup>3</sup> BULK STORAGE FUEL OIL TANK PROJECT

### EMPr

## 1 CHAPTER 1: GENERAL INTRODUCTION AND BACKGROUND

### 1.1 Introduction

Grootvlei Power Station is a coal fired power station (approximately 538.9 hectares in size). Within the Power Station there are 6 coal fired units rated at 200 MW each with a total installed capacity of 1 200 MW. The different drum boilers are fired with pulverised fuel (PF) via individual coal milling plants. The fuel oil is used to start up and shut down these boilers.

The fuel oil plant supplies oil to the burners of all six boiler units via a common 4 inch supply duct. The used fuel oil returns to the fuel oil plant via a 5 inch circulation duct. Oil tankers deliver fuel oil on a daily basis to the station to supply the existing 6 tanks. It is not anticipated that the additional fuel oil tank will increase the amount of fuel oil delivered daily, as the additional tank will function primarily as a back up fuel oil tank should the need arise. The additional tank will need to be supplied initially but ongoing fuel oil supply to this tank will be minimal. The fuel oil is predominantly supplied by Sasol from any of their two supply depots, namely Sasol Refinery and Sasol Depot. The fuel is trucked to the station.

The fuel oil in Grootvlei Power Station is stored in six storage tanks. Five tanks have a capacity of 97 m<sup>3</sup> and one with a capacity of 75 m<sup>3</sup>. The total existing capacity at the Grootvlei Power Station is therefore, 560 m<sup>3</sup>. Each tank is fitted with an outflow heater, located inside the take-off of each tank. Each tank is fitted with a drain line that features an isolating valve for draining sediment that accumulates at the bottom of the tanks, this sediment will be handled on site.

Grootvlei Power Station is proposing to install an additional (7th) bulk storage fuel oil tank (referred to in the report as the proposed tank) with a capacity of 500 m<sup>3</sup>. After the additional proposed fuel oil tank has been installed, the total capacity will be 1 060 m<sup>3</sup>.

The 7th proposed tank will be linked to the other six existing tanks and will therefore; similarly be linked to the 4 inch supply duct and the 5 inch circulation discharge line as with the other six

existing tanks. The 7th proposed tank will be manufactured off-site but assembled on-site. A site establishment and construction lay-down area will be designated for the assembly and installation of the proposed tank. A contractor's yard will also be required during the construction phase of the proposed development. The site for this construction lay-down area has not yet been identified, but will be within the boundary of the Grootvlei Power Station.

A Basic Assessment is required in accordance with the Environmental Impact Assessment (EIA) Regulations 2010 promulgated in terms of Sections 24(2) and 24D of the National Environmental Management Act (No. 107 of 1998) (NEMA), Environmental Impact Assessment Regulations.

Importantly, this draft EMPr has been compiled in line with the recommendations that have been stipulated in the various specialist studies that were carried out for the proposed development, as well as from issues identified by SiVEST Environmental Division. The recommendations made in this EMPr are activity and impact specific for the pre-construction, construction and operational phases of the project. The de-commissioning phase will be covered and form part of Grootvlei Power Station's decommissioning of the power station as a whole.



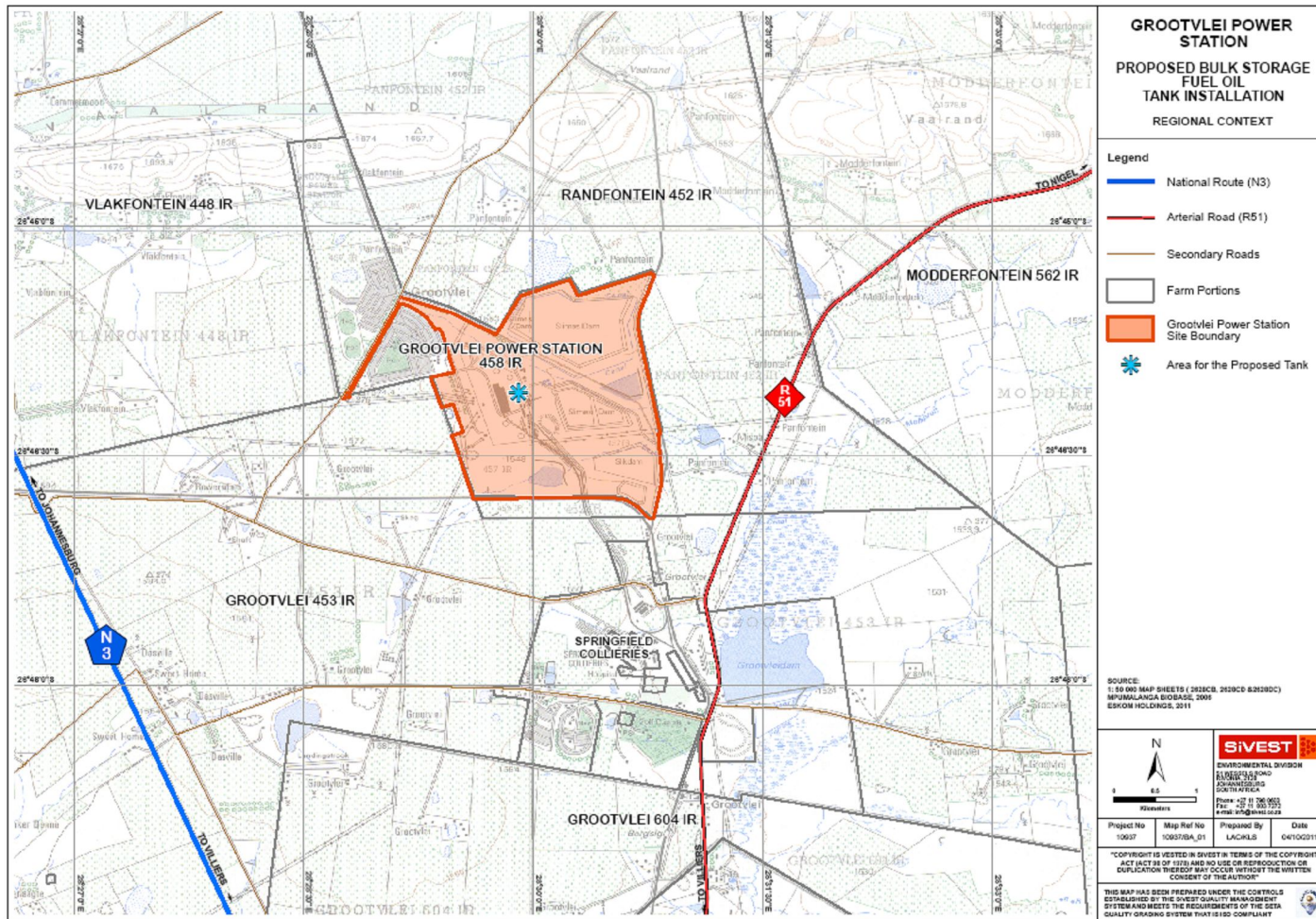


Figure 1: Locality Map



Figure 2: Google™ Locality Map



## 1.2 Project Team Roles and Responsibilities

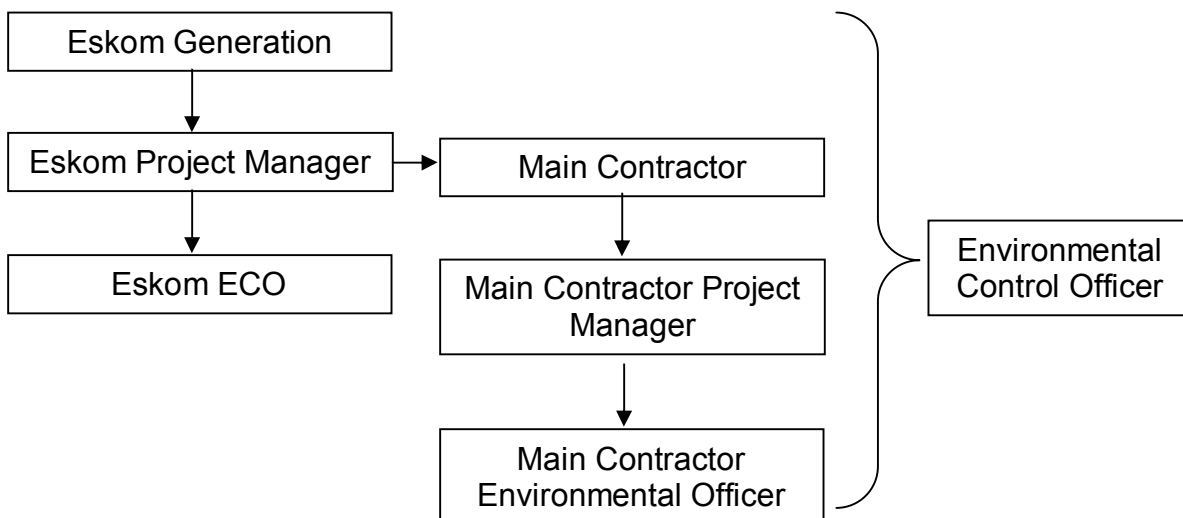
Several professionals will form part of the construction team. It is important that key procedures regarding the environmental management and implementation of this EMPr are executed by assigning formal responsibilities to the designated construction team members. The following issues will form part of the duty of the construction team throughout the construction phase:

- To implement this EMPr for the benefit of all involved.
- To preserve the natural environment by limiting destructive actions on site.

Eskom Generation (the project proponent) is responsible for ensuring the proper implementation of the EMPr during the pre-construction, construction and operational phases of the project. The decommissioning phase has been omitted from the EMPr for this project as this component will fall within the general decommissioning of Grootvlei Power Station.

The most important members of the construction team for the proposed development, from an environmental perspective, are the Project Proponent, Eskom Project Manager (PM), the Main Contractor, the Main Contractor Environmental Control Officer and the Independent Environmental Control Officer. The Independent Environmental Control Officer will oversee the construction activities of the proponent and those that have been contracted to undertaken the construction of the bulk storage fuel oil tank and report back to the Project Proponent.

Basic Organogram:



### 1.2.1 Eskom Generation

Being the holder of the EA, Eskom being the Project Proponent (PP) will assume ultimate responsibility for the project and all activities related to the pre-construction and construction process (i.e. non compliance, penalties etc.).

### 1.2.2 Eskom Project manager

The Eskom Project Manager (PM) will be responsible for the overall management and overseeing of the contract, from initiation to completion of construction. The PM is therefore responsible for the implementation of the EMP on the site during the pre-construction and construction phases of the project. Ultimately, the PM is, *inter alia*, the custodian of all environmental management requirements and legal obligations for the proposed development. This includes all legal requirements of the Environmental Authorisation (EA). The PM will therefore be expected to:

- Be familiar with and ensure adherence to the conditions of the EMPr and EA, including any potential amendments or additions to the documents;
- Be responsible for monitoring the site activities, both directly and through appointed agents, in order to ensure compliance;
- Ensure that all the construction procedures and method statements comply with the environmental requirements in this EMPr;
- Manage scheduled site inspections on contractors performance on site;
- Ensure that all contractors on site abide by the requirements of the EMPr and that the infrastructure is constructed in such a manner that meets all specified contractual and legal environmental requirements;
- Ensure that sufficient resources are available to the other role players to efficiently perform their tasks in terms of the EMPr;
- Appoint the ECO on behalf of Eskom to ensure strict adherence to the EMPr;
- Be aware of the findings and conclusions of the Basic Assessment and the conditions stated within the environmental authorisation and ensure that these are adhered to in the approved method statements from the contractor;
- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Conduct internal audits of the construction site against the EMPr;
- Confine the construction site to the demarcated area;
- Liaison between the Contractor and the Landowners in terms of environmental issues;
- Rectify transgressions through the implementation of corrective action.

### 1.2.3 Main Contractor

The Main Contractor (MC) is responsible for compliance to the EMPr and EA throughout the execution of the project. The MC is responsible for the implementation of mitigation measures and compliance with the recommendations and conditions of the EMPr and EA. The Contractor will therefore have the following responsibilities:

- Ensure compliance with the EMPr and method statements at all times during construction;
- Establish and maintain an environmental site register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints
  - Health and safety incidents
  - Hazardous materials stored on site
  - Non-compliance incidents
  - Environmental incidents
  - All incidents resulting in injury or death
- Discuss implementation of and compliance with this document with staff at routine site meetings;
- Report progress towards implementation of and non-conformances with this document at site meetings;
- The MC will appoint an Environmental Officer (or Main Contractor Environmental Officer - MCEO) to implement the EMP and monitor activities on site on a daily basis. The MCEO will be the ECO's representative on the site and will report back on all monthly audits. The MCEO must report any reportable incidents immediately to the ECO. Responsibilities of the MCEO include:
  - Monitor the activities on the site against the EMPr conditions;
  - Liaise with the ECO on site and report back to the ECO on any significant occurrences during all site inspections and site meetings;
  - Keep the ECO informed of the Contractor(s) planned construction within areas of environmental concern;
  - Immediately report all reportable incidents or occurrences to the ECO to ensure immediate remedial action;
  - Be present on site whenever any construction activities are taking place in sensitive areas.
  - Maintains the complaints register that is kept on-site;
  - Keeps record of all environmental incidents and ensures that corrective action is taken;
  - Compliance with method statements from the project-specific EMPr;
  - Environmental awareness training of all staff.

The Contractor shall under no circumstances interfere with the property of landowners or nearby communities where no permitted.

#### 1.2.4 *Environmental Control Officer*

The Environmental Control Officer (ECO) may either be an independently appointed ECO or alternatively an Eskom appointed ECO for the project. The appointed ECO is responsible for monitoring the implementation of the EMPr during the design, **pre-construction** and **construction** phases of the project. The ECO will report to Eskom and will communicate with the Contractor, landowners and authorities. The following tasks will fall within the responsibilities of the ECO:

- Be aware of the findings and conclusions of the Basic Assessment and the conditions stated within the environmental authorisation;
- Be familiar with the recommendations and mitigation measures of this EMPr;
- Have a good working knowledge of all relevant environmental policies, legislation, guidelines and standards;
- Ensuring that the Contractors personnel/sub-Contractors/employees are fully aware of their environmental responsibilities;
- Conduct Monthly audits of the construction site according to the EMPr and EA;
- The environmental audit procedure should be carried out in such a way as to account for the compliance of all project elements (including construction activities against the EMPr and EA);
- Educate the construction team about the management and mitigation measures of the EMPr and EA before construction commences;
- Regular liaison with the construction team and the project leader;
- Work with Project Manager in approving method statements, and following up on compliance with these;
- Monitor the actions of the above parties to ensure that the Contractors are adhering to all stipulations of the EMPr;
- Investigate and report on any non-compliances to the EMPr and EA;
- Investigate and report on any environmental incidents as a result of construction activities;
- Recommend corrective action for any environmental non-compliances and incidents on the construction site;
- Compile a regular monthly report highlighting any non-compliance issues as well as good compliance with the EMPr;
- Make sure that an environmental site register containing any environmentally related landowner complaints, non-compliances or accidents in terms of the construction phase is maintained and kept updated on site;

- Make sure that a copy of the EMPr and EA is kept on file on site as well as copies of all audit reports conducted throughout the construction phase;
- All negotiations for any environmentally related reason shall be between the ECO, the affected parties, and the Contractor. No verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.
- The affected parties shall always be kept informed about any changes to the construction programme should they be involved. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

### **1.3 Layout of Environmental Management Programme**

#### *1.3.1 Introduction*

This draft EMPr addresses specific issues relating to the different phases of the project. The impact is identified and given a brief description. The phases of the development are then identified as below:

- Pre-construction
- Construction
- Operation Phase
- 

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

### **1.4 Objectives of an EMPr**

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimise beneficial impacts;
- To create management structures that address the concerns and complaints of I&APs with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;

- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon;
- Specify time periods within which the measures contemplated in the environmental management plan must be implemented, where appropriate;

The EMPr Seeks to highlight the following:

- Avoid impacts as a result of not performing certain actions;
- Minimise impacts by limiting aspects of an action;
- Rectify impacts through rehabilitation, restoration, etc of the affected environment
- Compensate for impacts by providing substitute resources or environments;
- Minimise impacts by optimising processes, structural elements and other design features;
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any transgressions /good performances;
- The EMPr is a legally binding document that all parties involved in the project must be made aware of.

#### *1.4.1 Environmental monitoring*

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Monthly audits which will be conducted by the ECO in accordance with the EMPr and conditions of the EA, once received. These audits can be conducted randomly and do not require prior arrangement with the project manager;
- Compilation of an audit report with a rating of the compliance towards the EMPr;
- An environmental close out report shall be compiled summarising issues, non-compliances and environmental incidents that were noted throughout the construction phase. During operation, aspects should be recorded and managed in line with the station's EMS. The environmental close out report will be submitted to the relevant authorities on completion of the construction phase.

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. All claims for compensation emanating from damage must be directed to the ECO for appraisal. A register shall be kept of all complaints from the landowner or community (Annexure



A). All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

A copy of the EMPr and EA must be kept on site during the construction phase as earlier mentioned. The EMPr is a binding document on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health as well as for the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

## **1.5 Compliance with the EMPr**

### *1.5.1 Method Statements*

It is Eskom standard practice that method statements for various construction-related activities be produced by the Contractor, prior to implementation. These method statements will outline in detail how various activities will be undertaken so as not to cause any environmental damage / impacts. It is very important that these method statements be signed off by the PM with the support of the ECO, prior to implementation. Any changes to the method statements that are made during the construction period must be approved prior to implementation. Method statements must be kept on site as part of the official environmental documentation.

### *1.5.2 Penalties for non-compliance*

Application of a penalty clause to the contractor will apply for incidents of non-compliance. The penalty imposed will be per incident and will be deducted from the contractor's monthly payment certificate. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be pre-determined and agreed upon between the Main Contractor and the ECO. These will vary in amount based upon the severity and/or regularity of the incidence occurring.

The ECO in consultation and with the approval of the Project Manager shall issue spot fines if the Contractor infringes specifications of the EMPr and EA. A preliminary list of infringements for which spot fines will be imposed is as follows:

- Using areas outside the working areas without permission/accessing "no-go areas";
- Clearing and/or levelling area outside of the working areas;
- Littering of the site and surrounds;

- Burying waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction

In this context the ECO shall retain records for all fines issued. Monies for the spot fines will be deducted from the Contractors monthly certificate.

The Project Manager, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. The PM may decide on extension of time for such delays and all costs will be borne by the Contractor.

## **1.6 Applicable Legislation, Development Strategies and Guidelines**

The applicable Legislation, Development Strategies and Guidelines have been discussed in detail in the Basic Assessment Report and the Risk Assessment that was undertaken. A summary of applicable legislation is below:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- EIA Regulations (promulgated June 2010).
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- SANS 10131: 2004 - Aboveground Storage Tanks for Petroleum Products
- Local Government: Municipal Systems (Act 32 of 2000)
- Development Facilitation Act 67 of 1995
- Minerals and Petroleum Resources Development Act (Act No 28 of 2002)
- National Veld and Forest Fire Act (Act No 101 of 1998)
- Mpumalanga Nature Conservation (Act 10 of 1998)
- Environment Conservation Act (Act No 73 of 1989)
- National Heritage Resources Act (Act No 25 of 1999)
- National Water Act (Act No 36 of 1998)
- Hazardous Substances Act (Act No. 15 of 1973)
- Conservation of Agricultural Resources Act (Act No 43 of 1983)
- Occupational Health and Safety Act (Act No 85 of 1993)

- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
- Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
- District By-Laws
- Local By-Laws

## **2 CHAPTER 2: MITIGATION GUIDELINES**

### **2.1 Environmental Management Programme**

Mitigation guidelines are addressed through three phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); and Operational Phase (Post-Construction). As previously stated, the decommissioning phase has been omitted as the decommissioning of the bulk storage fuel oil tank will fall within the ambit of Grootvlei Power Station's decommissioning plan.

Each phase has specific issues unique to that period of the development and operation of the proposed infrastructure. The impact is identified and given a brief description. The three phases of the development are then identified and addressed below:

Table 1: Environmental Management Plan and Mitigation Measures

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
<b>PRECONSTRUCTION</b>			
<b>Site Preparation Activities</b>	1. Appoint an Environmental Control Officer	<b>MC</b>	Once Off
	2. The Main Contractor must draw up method statements for relevant construction activities.	<b>MC</b>	Once Off
	3. The PM & ECO must approve all of the method statements before they become operational.	<b>PM &amp; ECO</b>	Once Off
	4. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.	<b>MC</b>	Throughout, Monitored monthly
	5. The Main Contractor must ensure compliance with conditions described in the EA.	<b>MC</b>	Throughout, Monitored monthly
	6. The ECO must ensure compliance with conditions described in the EA.	<b>ECO</b>	
	7. All no-go areas on site must be properly fenced off / demarcated and signage placed prior to the onset of construction.	<b>MC</b>	Throughout, Monitored monthly
	8. Records of compliance / non-compliance with the conditions of the environmental authorisation must be kept on-site and be available on request. A copy of these records must be made available to the	<b>MC</b>	Throughout, Monitored monthly

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	provincial department on request throughout the project execution.		
	9. All unskilled labourers must be drawn from the local market and where possible use must be made of local semiskilled and skilled personnel.		Once off
<b>Site and vegetation Clearing</b>	1. Areas which are not to be constructed on must not be cleared in order to reduce erosion risks.	<b>MC</b>	Monitored Monthly
	2. The area to be cleared must be clearly demarcated and this footprint strictly maintained. Footprint of clearance should not exceed the required footprint.		Monitored Monthly
	3. Spoil (including excavated sub-soils and topsoil) that is removed from the site must be removed to an approved spoil site.		Monitored Monthly
<b>Dust</b>	1. Damping down of the un-surfaced access roads must be implemented to reduce dust and nuisance.		Monitored Monthly
<b>Soil Erosion</b>	1. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.		Monitored Monthly
<b>CONSTRUCTION</b>			
<b>Development of Construction Laydown area Area</b>	1. Choice of site for the Contractor's laydown area requires the Project Manager and ECO's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones. A site plan must be submitted to the Project Manager for approval. The size of the Construction laydown area must be minimized	<b>MC</b>	Once Off
	2. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion.		Monitored Monthly

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	3. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented.		Monitored Monthly
	4. All laydown areas are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction laydown must be controlled by a guard or otherwise monitored, to prevent unlawful access.	MC	Monitored Monthly
	5. The Construction laydown must be set up in accordance with Eskom standards for the setting up of construction laydown areas. The ECO and Contractor must inspect this site to confirm and note any environmental sensitivity.		Once off
	6. The construction laydown area layout plan must be provided to the ECO for approval prior to the construction of the laydown area.		Once off
	7. Site establishment shall take place in an orderly manner and all required amenities shall be installed at the construction laydown areas before the main workforce move onto site.		Once off
	8. All construction equipment must be stored within the construction laydown area.		Monitored Monthly
	9. All associated oil changes etc (no servicing) must take place within this camp on a sealed surface such as a concrete slab.		Monitored Monthly
	10. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment		Monitored Monthly
	11. The Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and		Monitored Monthly

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	must be readily accessible.		
	12. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.		Monitored Monthly
	13. All imported materials (e.g. sand) must be stockpiled within the site boundary / Construction Zone. Sand and excavated material stockpiles should be protected against wind using temporary screens, and from water erosion using tarpaulins where necessary.		Monitored Monthly
	14. It is likely that most of the cement requirements are to be transported to site as "ready mix". To prevent spillage onto roads, "ready mix" trucks shall rinse off the delivery shoot into a suitable sump prior to leaving the Site. Cement / concrete shall not be mixed directly on the ground. Dagma boards, mixing trays and impermeable sumps shall be used at all mixing and supply points. Unused cement bags are to be stored so as not to be effected by rain or runoff events. Used cement bags shall be stored in weatherproof containers to prevent windblown cement dust and water contamination. Used cement bags shall be disposed of in accordance with Grootvlei Power Station's waste management procedures on a regular basis, and shall not be used for any other purpose.		Monitored Monthly
	15. All visible remains of excess concrete shall be physically removed on completion of the plaster or concrete pour section and disposed of. Washing the remains into the ground is not acceptable as groundwater contamination could occur. All excess aggregate shall also be removed. With respect to exposed aggregate finishes, the persons undertaking construction shall collect all contaminated water and store it in sumps for		Monitored Monthly

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	disposal at an approved waste site.		
	16. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.		Monitored Monthly
<b>Storage of materials (including hazardous materials)</b>	1. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. Storage areas must be designated, demarcated, sign posted and fenced if necessary.	<b>MC</b>	Monitored Monthly
	2. Storage areas must be secure so as to minimize the risk of crime. They must also be safe from access by unauthorised persons i.e. children / animals etc.	MC	Monitored Monthly
	3. Fire prevention facilities must be present at all storage facilities.	MC	Monitored Monthly
	4. Proper storage facilities for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage must include a bund wall high enough to contain at least 110% of any stored volume, and this must be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events.	MC	Monitored Monthly



IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	5. All necessary approvals with respect to fuel storage and dispensing (if required on site) shall be obtained from the appropriate authorities.	MC	Monitored Monthly
	6. All fuel storage areas must be roofed to avoid creation of dirty stormwater	MC	Monitored Monthly
	7. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.	MC	Monitored Monthly
	8. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	MC	Monitored Monthly
	9. The Waste Management Plan of Grootvlei Power Station must be implemented at all times	MC	Monitored Monthly
	10. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.	MC	Monitored Monthly
	11. All harmful materials must be properly stored in a dry, secure environment, with concrete or sealed flooring and a means of preventing unauthorised entry. Furthermore, it must be ensured that material storage facilities are cleaned/maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage onto the bare soil. The management of such storage facilities and means of securing them shall be agreed.	MC	Monitored Monthly
	12. The Environmental Control Officer shall further monitor that materials storage facilities are cleaned/maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage	ECO	

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	<p>onto the bare soil.</p> <p>13. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the ECO for information. Emergency response procedures to be followed and implemented.</p>	MC	Monitored Monthly
<b>Traffic</b>	<p>1. All equipment moved onto site or off site is subject to the legal requirements as well as Eskom specifications for the transport of such equipment.</p> <p>2. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled in terms of its potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.</p> <p>3. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident.</p> <p>4. Construction routes and required access roads must be clearly defined</p> <p>5. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities</p> <p>6. Damping down or proper dust suppression of the un-surfaced access roads must be implemented to reduce dust and nuisance.</p> <p>7. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. The servicing of vehicles and equipment are not allowed to take place on-site. This must be undertaken off-site.</p> <p>8. Servicing must be done in dedicated service areas on site or else off site</p>	<b>MC</b>	<p>Monthly Monitoring</p> <p>Monthly Monitoring</p> <p>Monthly Monitoring</p> <p>Monthly Monitoring</p> <p>Monthly Monitoring</p> <p>Monthly Monitoring</p> <p>Monthly Monitoring</p>

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	if no such area exists.		
	9. Oil changes must take place on a concrete platform and over a drip tray to avoid pollution.		Monthly Monitoring
	10. Any temporary access roads created for construction will need to follow due environmental processes and attain the necessary environmental approvals before being implemented (if required). Additionally, temporary roads are to be rehabilitated prior to contractors leaving the site.		Monthly Monitoring
<b>Soil and Geology</b>	1. Rehabilitate soil and vegetation	<b>MC</b>	Monthly Monitoring
	2. Implement effective erosion control measures	MC	Monthly Monitoring
	3. The full depth of topsoil must be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This must include the building footprints, working areas and storage areas.	MC	Monthly Monitoring
	4. Subsoil and overburden in all construction and lay down areas must be stockpiled separately to be returned for backfilling in the correct soil horizon order.	MC	Monthly Monitoring
	5. Stockpiles must not exceed 2m in height unless otherwise permitted by the Engineer. Similarly, the footprint of the resultant stockpiles are to be minimised to reasonably sized area.	MC	Monthly Monitoring
	6. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.	MC	Monthly Monitoring
	7. Should a batching plant be required, the concrete batching plant must be contained within a bunded area.	MC	Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	8. If a batching plant is necessary, run-off must be managed effectively to avoid contamination of other areas of the site. Run-off from the batch plant must not be allowed to enter the storm water system.	MC	Monthly Monitoring
	9. Soils compacted during construction must be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil must be re-spread over landscaped areas.	MC	Monthly Monitoring
	10. It is very important that the foundation excavations for the proposed structures be inspected by an engineering geologist or geotechnical engineer prior to the placing of steel reinforcement or concrete in order to determine that the structure is being founded upon the correct material, and also to detect whether any active layers have been exposed by the foundation excavation.	MC	Monthly Monitoring
	11. Ensure that the mixing /decanting of all chemicals and hazardous materials should take place on a tray or impermeable surface.	MC	Monthly Monitoring
	12. Waste generated from these should then be disposed of at a registered landfill site, and in line with the station's waste management procedures.	MC	Monthly Monitoring
	13. Ensure all storage tanks are designed, bunded and managed in order to prevent pollution of drains, groundwater and soils.	MC	Monthly Monitoring
	14. Construct separate storm water collection areas and interceptors at storage tanks, and other associated potential pollution activities.	MC	Monthly Monitoring
	15. Ensure that use and storage of fuels and chemicals that could potentially leach into the ground be controlled. Adequate spillage containment measures shall be implemented, such as cut off drains, etc. Fuel and chemical storage containers shall be set on a concrete plinth. The containment capacity shall be equal to the full amount of material stored, plus 10%.	MC	Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	16. Appoint appropriate contractors to remove any residue from spillages from site. Handling, storage and disposal of excess or containers of potentially hazardous materials shall be in accordance with the requirements of the above-mentioned Regulations and Acts.	MC	Monthly Monitoring
	17. Ensure that used oils/lubricants are not disposed of on/near the site, and that contractors purchasing these materials understand the liability under which they must operate.	MC	Monthly Monitoring
	18. The Environmental Control Officer will be responsible for reporting the storage/use of any other potentially harmful materials to the relevant authority.	ECO	
	19. Ensure that potentially harmful materials are properly stored in a dry, secure environment, with concrete or sealed flooring. The MC will ensure that materials storage facilities are cleaned / maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage onto the bare soil or surface water. The management of such storage facilities and means of securing them shall be agreed.	MC	Monthly Monitoring
	20. The ECO will monitor that materials storage facilities are cleaned / maintained on a regular basis, and that leaking containers are disposed of in a manner that allows no spillage onto the bare soil or surface water.	ECO	Monthly Monitoring
<b>Erosion Control</b>	1. It is recommended that construction only be undertaken during agreed working times and permitted weather conditions.	<b>MC</b>	Monthly Monitoring
	2. If heavy rains are expected activities should be put on hold to reduce the risk of erosion.		Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	3. If additional earthworks are required than any steep or large embankments that are expected to be exposed during the 'rainy' months should either be armoured with fascine like structures.		Monthly Monitoring
	4. If earth works are required then storm water control and wind screening should be undertaken to prevent soil loss from the site.		Monthly Monitoring
	5. Oil traps must be installed to remove the bulk of the oil from the stormwater, which water can then be used on haul roads for dust suppression or as wash down water in the wash bays.		Monthly Monitoring
<b>Water Use and Pollution</b>	1. Water must be reused, recycled or treated where possible in line with Grootvlei Power Station's water management procedures.	<b>MC</b>	Monthly Monitoring
	2. No water must be abstracted from a natural water body unless authorised under a General Authorisation under the National Water Act, or unless authorised by the Department of Water Affairs through a water use licence if such a licence is required.	<b>ECO</b>	Monthly Monitoring
	3. Efficient oil and grease traps or sumps must be installed and maintained at re-fuelling facilities, workshops, fuel storage depots, and containment areas and spill kits must be available with emergency response plans.	<b>MC</b>	Monthly Monitoring
	4. The construction site / areas must be managed in order to prevent pollution of downstream watercourses or groundwater due to fuel oil, suspended solids and silt or chemical pollutants.	<b>MC</b>	Monthly Monitoring
	5. Silt fences must be used to prevent any soil as a result of storm water run-off entering nearby watercourses and becoming silt that would pollute these.	<b>MC</b>	Monthly Monitoring
	6. Promote a water saving mind set with construction workers in order to ensure less water wastage.	<b>MC</b>	Monthly Monitoring
	7. New stormwater construction must be developed strictly according to the existing Stormwater Management Plan in Place at the Grootvlei power	<b>MC</b>	Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	Station.		
	8. Earth, stone and rubble is to be properly disposed of, or utilised on site so as not to obstruct natural water path ways over the site (i.e. these materials must not be placed in stormwater channels, drainage lines or rivers).	<b>MC</b>	Monthly Monitoring
	9. There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.	<b>MC</b>	Monthly Monitoring
	10. If a batching plant is necessary, run-off must be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.	<b>MC</b>	Monthly Monitoring
	11. Should new roads need to be constructed across any surface water features the necessary environmental processes will need to be followed and necessary environmental authorizations obtained. Existing road accesses across surface water features must be used, and if necessary the road crossing must be upgraded / improved to allow construction traffic to pass over it without impacting the surface water resource. Should road upgrading be required, the necessary environmental processes will need to be followed and environmental authorizations obtained.	<b>MC</b>	Monthly Monitoring
<b>Surface and Groundwater</b>	1. Particular care must be taken to prevent erosion and siltation into watercourses.	<b>MC</b>	Monthly Monitoring
	2. Site staff shall not be permitted to use any open water body or natural water resource adjacent to or within the construction areas for the purposes of bathing, washing of clothing or for any construction or related activities (unless the appropriate permit has been obtained from		Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	the Department of Water Affairs - DWA).		
	3. Municipal water (or another source approved by the PM and supported by the ECO) must be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.		Monthly Monitoring
	4. Disturbed surfaces must be kept to a minimum. All surfaces must be rehabilitated.		Monthly Monitoring
	5. Storm water management must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil.		Monthly Monitoring
<b>Waste</b>	1. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.	<b>MC</b>	Monthly Monitoring
	2. Where considerable quantities of waste are generated, this must be placed in 200 litre bins or skip containers and removed once full. Additionally, the generated waste will need to be disposed off in line with station's waste management procedures.		Monthly Monitoring
	3. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.	<b>MC</b>	Monthly Monitoring
	4. In general, any litter must be cleared immediately.	<b>MC</b>	Monthly Monitoring
	5. All waste generated on site must be separated into glass, plastic, paper, metal, wood and then be recycled in line with station's waste management procedures. An independent contractor can be appointed to conduct this recycling.	<b>MC</b>	Monthly Monitoring



IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	6. Littering by the employees of the Main Contractor shall not be allowed under any circumstances.	MC	Monthly Monitoring
	7. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.	ECO	
	8. It is important that the contractors (and sub-contractors by implication) and workers must be informed of the facilities and procedures available for the disposal of waste.	MC	Monthly Monitoring
	9. The construction of "Long Drop" toilets are forbidden, but rather toilets connected to a sewage treatment plant, portable toilets or chemical toilets are to be used.	MC	Monthly Monitoring
<b>Spills and Contamination</b>	1. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.	MC	Monthly Monitoring
	2. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.		As spill occurs
	3. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.		As spill occurs
	4. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. Alternatively, any spill must follow the station's dirty water channels.		As spill occurs
	5. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the		As spill occurs

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	environment, and stored in adequate containers until appropriate disposal.		
<b>Biodiversity</b>	1. Only vegetation within the construction footprint may be removed	<b>MC</b>	Once off
	2. Vegetation is to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.		Monthly Monitoring
	3. Vegetation clearing on the site must be kept to a minimum.		Monthly Monitoring
	4. Existing access roads must be utilised as much as possible.		Monthly Monitoring
	5. Permits from DAFF for removal of any protected tree species must be in place.		Monthly Monitoring
	6. Materials must not be delivered to the site prematurely which could result in additional areas being cleared or affected.		Monthly Monitoring
	7. No vegetation is to be used for firewood.	<b>MC</b>	Monthly Monitoring
	8. The construction areas must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.		Monthly Monitoring
	9. Alien vegetation on the site will need to be controlled.		Monthly Monitoring
	10. The contractor must be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.		Monthly Monitoring
	11. The use of pesticides and herbicides on the site must be discouraged.		Monthly Monitoring
<b>Dust Control</b>	1. The MC EO must monitor weather forecasts relating to periods of expected high winds; dust control methods such as damping down must be undertaken regularly when high winds are forecast for the study area.	<b>MC EO &amp; ECO</b>	Monthly Monitoring
	2. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to sensitive receptors such as the surrounding landowners and the neighbouring communities.	<b>MC</b>	Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	3. Dust generation must be kept to a minimum and suppressed on access roads and construction areas during dry periods. This can be accomplished by the regular application of water.	MC	Monthly Monitoring
	4. Speed limits on un-surfaced roads must not be exceeded.	MC	Monthly Monitoring
	5. Speed limits for construction vehicles must be clearly signposted and must be monitored by the MC EO and ECO. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the MC EO. The ECO monitors the implementation.	MC EO & ECO	Monthly Monitoring
Noise	1. The construction phase must aim to adhere to the relevant noise regulations (SANS 10328:2008) and limit noise to within standard working hours and acceptable industrial limits (61 dBA for an industrial noise) in order to reduce disturbance of dwellings in close proximity to the development.	MC	Monthly Monitoring
	2. Truck traffic must be routed away from noise sensitive areas, where possible.		Monthly Monitoring
	3. Construction activities are to be contained to reasonable hours during the day and early evening (week days from 06:00am to 18:00pm). Night-time activities near noise sensitive areas must not be allowed.		Monthly Monitoring
	4. Construction workers to wear necessary Personal Protection Equipment (PPE).		Monthly Monitoring
	5. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order		Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site		
	6. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.		Monthly Monitoring
	7. Should blasting be required, the contractor will need to obtain a blasting permit. Moreover, the contractor must make the public aware of when blasting is to take place as well as the specific times of blasting. Blasting activities must take place at reasonable times and during daily working hours		Monthly Monitoring
<b>Labour Impacts / concerns</b>	1. The use of labour intensive construction measures must be used where appropriate	<b>MC</b>	Throughout
	2. All unskilled labourers must be drawn from the local market i.e. and where possible use must be made of local semiskilled and skilled personnel.		Throughout
	3. When unskilled labour is required, the contractor must use Eskom employment procedures.		Throughout
	4. Local suppliers to be used where possible		Throughout
	5. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process		Throughout

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	6. Record of official complaints by employees to authorities i.e. Labour and Social Security (see Appendix A for complaints record sheet).		Throughout
<b>Occupational Health and Safety</b>	1. Safety measures for work procedures must be implemented.	<b>MC</b>	Throughout
	2. First aid kits must be available and accessible on site.		Monthly Monitoring
	3. A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up by the Contractor and approved by the ECO to ensure worker safety.		Monthly Monitoring
	4. Workers must be thoroughly trained in using potentially dangerous equipment		Monthly Monitoring
	5. Contractors must ensure that all equipment is maintained in a safe operating condition.		Monthly Monitoring
	6. A safety officer must be appointed.		Monthly Monitoring
	7. A record of health and safety incidents must be kept on site.		Monthly Monitoring
	8. Any health and safety incidents must be reported to the Project Manager immediately.		Monthly Monitoring
	9. First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures.		Monthly Monitoring
	10. Workers have the right to refuse work in unsafe conditions.		Monthly Monitoring
	11. The Contractor shall take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc.		Monthly Monitoring
	12. A record shall be kept of drugs administered to construction staff at the stations health facilities or precautions taken and the time and dates when this was done. This can then be used as evidence in court should		Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	any claims be instituted against Eskom or the Contractor.		
	13. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents.		Monthly Monitoring
	14. Working areas must be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels.		Monthly Monitoring
	15. Eye wash and emergency shower systems must be provided in areas where there exists the possibility of chemical containment of workers and the need for rapid treatment.		Monthly Monitoring
	16. Use of electrical safety devices on all final distribution circuits and appropriate testing schedules applied to such safety systems.		Monthly Monitoring
	17. All sources of hazardous energy or hazardous substances must have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe.		Monthly Monitoring
	18. Use of contrast colouring on equipment/machinery including the provision of reflective markings to enhance visibility		Monthly Monitoring
	19. Use of moving equipment/machinery equipped with improved operator sight lines		Monthly Monitoring
	20. Issuing workers with high visibility clothing		Monthly Monitoring
	21. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn were necessary i.e. dust		Monthly Monitoring

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	masks, ear plugs etc.		
	22. No person is to enter the site without the necessary PPE.		Monthly Monitoring
	23. Emergency numbers for local police and fire department etc must be placed in a prominent area		Monthly Monitoring
	24. All speed limits must be adhered to.		Monthly Monitoring
	25. All equipment used for construction must be in good working order with up to date maintenance records.		Monthly Monitoring
	26. From the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.		Monthly Monitoring
	27. All permanent staff must undergo safety training.		Monthly Monitoring
	28. The construction must fall within the stipulated and existing security measure that exist at Grootvlei Power Station		Monthly Monitoring
<b>Heritage and Palaeontology</b>	1. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.	<b>MC</b>	Should Findings occur
	2. The Construction Workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be appraised of the EMP's requirements.		Should Findings occur

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	3. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area.		Should Findings occur
	4. The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.		Should Findings occur
	5. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits shall be obtained from the South African Heritage Resources Association (SAHRA) should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered.		Once Off
	6. Should any archaeological sites / graves be uncovered during construction, their existence shall be reported to the necessary authorities immediately.		Should Findings occur
	7. Should any archaeological sites / graves be uncovered during construction, their existence shall be reported to the necessary authorities immediately.		Should Findings occur
<b>OPERATIONAL</b>			
<b>Decommissioning of Construction Site</b>	1. All structures comprising the construction camp are to be removed from site.	<b>Main contractor</b>	To take place at the end of the Construction Phase
	2. The area that previously housed the construction camp is to be checked for spills of substances such as oil etc, and these shall be cleaned up.		Inspection at end of Construction Phase
	3. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area shall be top soiled and		Inspection at end of Construction Phase



IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	regressed using the guidelines set out in the rehabilitation section that follows in this document.		
	4. Surfaces are to be checked for waste products from activities such as concreting and cleared in a manner approved by the Engineer.		Inspection at end of Construction Phase
	5. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.		Inspection at end of Construction Phase
	6. All rubble is to be removed from the site to in line with the stations waste management procedures. Burying of rubble on site is prohibited.		Inspection at end of Construction Phase
	7. The construction camp site is to be cleared of all litter.		Inspection at end of Construction Phase
	8. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. Any elements not removed, and to be used in operation, should be included in the station's EMS		Inspection at end of Construction Phase
	9. All residual spoil and topsoil stockpiles must be removed to spoil or spread on site as directed by the Engineer.		Inspection at end of Construction Phase
	10. All residual building materials must be returned to the depot or removed from the site.		Inspection at end of Construction Phase
<b>Soil Erosion</b>	1. All damaged areas shall be rehabilitated upon completion of the contract	<b>Eskom</b>	Inspection at end of Construction Phase
	2. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.		Inspection at end of Construction Phase
	3. Rehabilitation must take place in a phased approach as soon as possible.		Inspection at end of Construction Phase
	4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.		Inspection at end of Construction Phase

<b>IMPACT</b>	<b>MITIGATION ACTION REQUIRED</b>	<b>RESPONSIBLE PERSON</b>	<b>FREQUENCY</b>
	5. The site needs to be monitored on a monthly basis to identify the emergence of alien species and any erosion concerns.		Inspection at end of Construction Phase
<b>Waste</b>	1. The site must be kept clear of litter at all times	<b>Eskom</b>	Inspection at end of Construction Phase
	2. Solid waste separation and recycling must take place for the duration of the operational phase for the development in line with the station's waste management procedures.		As requested per EA
	3. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.		As requested per EA
	4. In house treatment procedures must be followed strictly.		As requested per EA
	5. Solid waste must be collected on a regular basis.		As requested per EA
<b>Health and Safety</b>	1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	<b>Eskom</b>	As requested per EA
	2. The site is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.		Continuous
	3. Fire fighting equipment in the form of fire hydrants or fire extinguishers must be available on the site. These must be regularly maintained by an appropriate company.		Continuous
	4. A spill kit needs to be kept on site to address any unforeseen spillages.		Continuous
	5. Transport of all hazardous substances must be in accordance with the relevant legislation.		Continuous
<b>Visual</b>	1. Lighting must be kept to a minimum and restricted to low level, downward facing lights to reduce light spill.	<b>Eskom</b>	Continuous
	2. Lighting must be inward and downward pointing to reduce glare in surrounding areas.		Continuous

IMPACT	MITIGATION ACTION REQUIRED	RESPONSIBLE PERSON	FREQUENCY
	3. The site and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts;		Continuous
	4. Surrounding roads must be well maintained;		Continuous
	5. Regular maintenance of the associated infrastructure must be undertaken.		Continuous

### **3 CHAPTER 3: CONCLUSION**

The environmental biophysical and social impacts of the project have been assessed to be spread through the three project phases. Both positive and negative project-related impacts were identified through the Basic Assessment (BA), but the BA concluded that all of the negative impacts could be ameliorated to acceptable levels or made negligible through the implementation of the mitigation measures contained within this EMP. The following section briefly describes some of the major impacts and proposed mitigation measures within each of the project phases.

#### **3.1 Pre-Construction Phase**

The first site activities, before mobilization of equipment, will be a survey for final development designs. There will be negative impacts on land associated with the construction of laydown areas (temporary loss) and storage of construction materials. Expectations of improvement in livelihood among locals must be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

#### **3.2 Construction Phase**

This phase of the project could result in both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide his/her services during the construction phase. The negative impacts would include wastes generated, accidents, health and safety, air, dust and noise pollution, soil erosion, contamination of geohydrology and soils. Most of the negative impacts are minor and temporary. However, on mitigating negative impacts, the contractor shall ensure that all staff have adequate protective clothing and are adequately trained. The whole range of mitigation measures are however, outlined in the EMP in this regard.

#### **3.3 Operational Phase**

The proposed project will have minimal negative effects which mainly relates to health and safety and contamination of geohydrology and soils. These negative impacts are highly unlikely to

occur. Mitigation measures stipulated in this EMP outline procedures should contamination occur.

### **3.4 Decommissioning Phase**

As with any project, the facilities used in this project will have a lifespan after which time they may no longer be cost effective to continue with operation, may degrade and/or become inoperable. At that time, the fuel oil tank would be decommissioned (removed) and most likely be replaced. The mitigation measures highlighted in the construction phase will once again become applicable, as the construction of new infrastructure would essentially be associated with similar activities and would likely result in similar impacts. However, it is anticipated that the decommissioning of these facilities will be done with that of the power station.

Based on the above information, it is unlikely that the Project will have significant adverse social and biophysical environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and will be able to be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the few adverse impacts. All the negative impacts will either be moderate or lesser in rating and will be able to be easily mitigated.







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