ENVIRONMENTAL MANAGEMENT PLAN FOR THE CONSTRUCTION AND OPERATIONAL MAINTANANCE OF A 400KV TRANSMISSION LINE BETWEEN ARIES AND NEUWEHOOP SUBSTATIONS

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CONTENTS

1. INTRODUCTION

Eskom Transmission is proposing to construct a 400kV transmission power line extending for approximately 75km between the existing Aries and Neuwehoop substations in the Northern Cape Province. The construction of the power line was approved (Reference number 12/12/20/740) in August of 2007. (The copy of the Record of decision has been attached in Appendix 1). A comprehensive Environmental Management Plan is being proposed to ensure that all undesirable impacts are minimised whilst, at the same time, enhancing the project's positive attributes.

Details of person preparing the EMP

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Expertise of the EAP to carry out the preparation of the EMP	Mr. Klagsbrun has the following educational qualifications. • Ntech: Nature Conservation, Technicon Pretoria 2004 • Bcom: economics, UNISA 2007 • BA: Politics, Philosophy and economics, UCT 2003 He has been employed at the following organisations. • Technicon Pretoria • Uhuru environmental consultants He has 3 years working experience as a consultant and 2 years work experience

	as a student lecturer at the Technicon Pretoria. Has been involved in E.I.A's for JPC as well as developments in the NW Province. Currently working on the Taung development strategy for NWPB, as well as Basic assessments for Water for Africa's Eesterust water scheme.

1.1 Scope of the EMP

The aim of this Environmental Management Plan (EMP) is to ensure that proper controls are in place to address the environmental impacts during construction related to the development of the Eskom transmission line, 400kv line between Aries and Neiwehoop substations. The same environmental mitigation measures shall apply to the operational maintenance of the transmission line. The EMP should be read in conjunction with the EIA Reports and the associated ROD herewith attached.

The provisions of the EMP are binding on the contractor during the life-cycle of the contract (ROD Section 7). They are to be read in conjunction with all the documents that comprise the suite of documents for this contract. In the event that any conflict occurs between the terms of the EMP and the project specifications or Record of Decision, the terms herein shall be subordinate.

The EMP is a dynamic document subject to similar influences and changes as are wrought by variations to the provisions of the project specification. Any substantial changes shall be submitted to DEAT in writing for approval.

The scope of this EMP is limited to the 400kv power line which extends for 75 km from Aries to Neiwehoop Substation as depicted in Appendix 2. The substations themselves are not included in this EMP.

1.2 Objectives of the EMP

The ultimate aim of this EMP is to prevent or minimise the impact that the construction of the Aries - Neuwehoop transmission power line will have on the receiving environment.

The EMP also serves to highlight specific environmental requirements that will be monitored during the project and the document should therefore be seen as a guideline to assist in minimising the potential environmental impacts of activities. The EMP has the following goals:

- Identification of construction activities that could impact on the environment;
- Detailing the mitigation measures and specifications with which the contractor shall comply in order to minimise the extent of environmental impacts during construction by providing procedures for their implementation;
- Defines corrective actions that shall be taken in the event of non-compliance;
- Prevent long-term environmental degradation;
- Mitigate issues raised during the EIA process;
- Compliance to specific conditions laid down in the ROD and
- Identifies Responsibilities and Accountability

The following table indicates the team of specialists based on their involvement in the EIA.

Contact name	**Contact details**
David Morris (archaeologist)	082 222 4777
David Hoare (ecologist)	082 806 38383
Jon Smallie (Avifauna)	082 444 8919
Mark Thornton (Tourism)	021 447 2614

1.4 Definitions

Alien Vegetation

Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act, 1983 (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area.

Construction Activity

A Construction Activity is any action undertaken by the Contractor/s, his subcontractors, suppliers or personnel during the construction process.

Contractor:

A person or company appointed by Eskom to carry out predetermined activities.

Environment

"Environment" means the surroundings within which humans exist and that could be made up of:

- The land, water and atmosphere of the earth;

- Micro-organisms, plant and animal life;
- any part or combination of (i) and (ii) and the interrelationships among and between them; and
- The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being (National Environment Management Act (NEMA) Act No107 of 1998).

Environmental Impact

An Impact or Environmental Impact is the degree of change to the environment, whether desirable or undesirable, that will result from the effect of a Construction Activity within the limits that define the construction site. An Impact may be the direct or indirect consequence of a Construction Activity.

EMP:

An Environmental Management Plan is a detailed set of actions compiled to guarantee that recommendations for enhancing positive impacts and reducing or preventing harmful environmental impacts are implemented during the life-cycle of a development.

Eskom Project Manager (PM):

The resource person selected by Eskom Transmission to operate in the capacity and notified, by name and in writing by Eskom Transmission to the contractor, to act as required in the contract.

Environmental Control Officer (ECO):

An individual nominated through the Project Manager to be present on site to act on behalf of the Project Manager in matters concerning the implementation and day to day monitoring of the EMP. The ECO is assumed to be the Environmental Practitioner appointed by Eskom Transmission.

Incident

An undesired event which may result in a significant environmental impact but can be managed through internal response measures.

Emergency

An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body, such as a local authority.

2 OVERVIEW OF THE PROJECT

If Eskom Holdings Limited is to honour its commitment to meet the increasing needs of end users, it has to establish and expand its infrastructure of transmission network and substations on an ongoing basis. Due to normal load growth as well as possible new Railway loads in the Northern Cape area, additional transmission power line infrastructure will be required in the future to meet customer load demands. Eskom has a mandate to satisfy potential customer needs, which implies certain responsibilities. Of these, one of the most significant responsibilities is to find and maintain the balances between satisfying the needs of society and remaining within the capabilities of the environment. In order to achieve this Eskom must continually re-assess its present infrastructure and take into account new developments to ensure that there is a continued supply of electricity, without negatively impacting on the environment. The existing transmission power lines are becoming heavily loaded and are predicted to reach their full capacity around 2009/2010. These transmission power lines cannot sustain the increased normal load demand in the long-term. New transmission power line extensions and substation upgrades are currently under consideration and are tabled for construction in the near future.

2.1 Location

The proposed 400kV transmission power line would be constructed between the existing Aries and Neiwehoop substations in the Northern Cape Province. The Aries substation is situated approximately 43.5 km south-west of the town of Kenhardt while the Neiwehoop substation lies approximately 18.5 km north of the town of Groblershoop. The geographical coordinates of the two substations are as follows:

• Aries substation: 29º 29' 38.68"S; 20º 47' 40.59"E

• Neiwehoop substation: 28º 44' 20.0"S; 21º 59' 44.998"E

This route alignment travels around the north-western section of Neus se Berg in order to mitigate the impact of the transmission power line on the Thuru Game Lodge. The central section of the route alignment is located as close as possible to the railway line and shares the existing service road. The alignment is designed from then on to travel directly to the Aries substation in a southerly direction with respect to

Aasvoëlkop and Driekop se Poort ranges, just north of the quiver tree forest scenic area and the town of Kenhardt. Appendix 2 shows a map of the approved route alignment.

2.2 Transmission Power Line Technology and Technical specifications

2.2.1 Transmission power lines

Length

The power line will be approximately 75 km in length.

Construction Footprint

The negotiated servitude which is to accommodate the towers and upon which the 400kV line is to be strung will be limited to the width of the servitude in which the line will be constructed. The total footprint area required for each tower is 80 m x 50 m.

Where 400 kV Transmission power lines are constructed in parallel, a minimum separation distance of 60 m (Centre line to Centre line) is required in order to ensure the reliable operation of both lines.

Tower Specifications

Tower spacing : 400 m (Average)

Tower height : 50 m (Average)

Minimum ground clearance: 10.4 m.

Tower Design

Tower positions: 2, 3,28,60,72,76,81,99 and 141 are self supporting T-tower designs, the rest being v-tower designs (Appendix 3).

Project Activities

The project will entail various activities of which 2 are already complete. These are:

1. The Environmental Impact Assessment Study.
2. Negotiations for the servitude.

The following activities are still to be performed:

- Detailed and exact routing of the power line and pylon positioning.
- Detailed and exact spacing of pylons.
- Detailed construction working drawings.
- Erection of camp sites for the Contractors' workforce.

- Vegetation clearing to facilitate access, construction and the safe operation of the line.
- Access road establishment as design parameters.
- Transportation of equipment, materials and personnel to site and stores.
- Installation of foundations for the towers.
- Tower assembly and erection.
- Conductor stringing and regulation.
- Taking over the line from the contractor for commissioning.
- Final inspection of the line, commissioning and hand over to the Grid Line and Servitude Manager for operation.
- Rehabilitation of disturbed areas.
- Signing off of all Landowners upon completion of the construction and rehabilitation.
- Servitude grid handover by the Grid Environmental Manager.
- Operation and maintenance of power line.

2.2.2 Responsibility matrix

KEY	FUNCTION	NAME/CONTACT	RESPONSIBILITY
PM	Project Manager ESKOM	Mr. Vulendzani	Overall management of project and EMP implementation.
CM	Site supervisor/ Construction Manager	To be appointed	Oversees site works, liaison with Contractor, PM and ECO. The CM must be able to fill in as liaison to landowners should the ECO not be available.
ECO	Environmental Control officer	To be appointed	The ECO shall be appointed one month before the start of construction and the authorities must be notified of such an appointment for communication purposes The ECO must be contracted on a full - time basis and shall remain employed until all rehabilitation measures as required by the EIA and this EMP are

			completed and the site is hander over to Eskom by the contractor for operation. Other than Eskom, the ECO must be the liaison between the contractor and landowners. He/she must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. The ECO must attend relevant project meetings, conduct regular inspections to monitor compliance with the EMP, and be responsible for providing feedback on potential environmental problems associated with the development. The ECO will undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors. The Environmental Control Officer must make contact with the local Extension Officer of the Dept. of Agriculture, as this person has valuable information about the area and the local farming community. The Environmental Control Officer must convey the contents of this document to the Contractor site staff and discuss the contents in detail with the Project Manager and Contractor. The ECO must submit bi-monthly reports to Eskom and the Director of environmental impact evaluation, DEAT detailing the level of compliance to the EMP as well as Letter of Environmental authorization.
IM	Independent Monitor	To be appointed	Regular Environmental Audit reports must be submitted to DEAT by an independent ECO which includes a reconciliation of the monthly ECO reports and quarterly site inspections to determine the project's compliance with the recommendations of the EIA, EMP and conditions of the EA

C	Contractor	To be appointed	Eskom Implementation and compliance with recommendations and Conditions of the EMP. The contractor shall ensure that sufficient resources (financial, expertise, etc.) are made available for the implementation and compliance of the requirements of the EMP.

2.3 Brief Description of Affected Environment

2.3.1 Avifaunal

The proposed "cross rope suspension tower" can be seen in Appendix 3 of this EMP. The most significant anticipated impact of this power line on birds is that of collision with the earth wire. The most sensitive areas in this respect are the Hartbees rivier crossing, the "wetland" or pan areas, the arable lands adjacent to the Orange River. The Orange River is by far the most significant river in the study area, and possibly the only significant water source. It represents important habitat for many bird species associated with water. River courses in general represent important flight paths for many bird species, therefore posing a collision risk. The proposed crossing of the Orange River by this alignment is in a relatively good position as it is adjacent to an existing railway bridge, and is also situated at a relatively narrow section of the river and associated floodplain. The ROD set specific conditions for the management of the avifaunal environment in all the sensitive areas mentioned above. Details of the management actions that the contractor should undertake are detailed later in this report.

2.3.2 Visual Impact

It is highly probable that the proposed 400kv transmission power line will have at least a medium negative impact on the local visual environment in the short term during the construction phase. During the operational phase, the significance of impact is predicted to be medium in the long term i.e. the impact will only cease after the

operational life span of the project. The approved routing of the transmission line has taken into account to reduce the negative perception of visual intrusion to be associated with the power line.

2.3.4 Social

It was recommended that a Community Management and Monitoring Committee (CMMC) be established. This committee would serve as a communication channel between the community and Eskom. Members of the committee should include representatives from environmental groups, civil society, ward councillors, government departments, construction teams and Eskom. Such a committee will play an important role in executing the proposed mitigation measures. It is anticipated that most social impacts pertaining to the power line will be experienced in the pre-construction and construction phases, with minimal impacts in the operational and decommissioning phases.

2.3.5 Ecological

A variety of plant and animal species of special concern were identified during the EIA investigation and corridor site visits undertaken under the terms of reference. Yet no plants of value have been found directly on the pylon sites. Plants which have been identified under the line route have been recorded and are provided on the map and spread sheet.

The veld has been somewhat transformed through different farm management practises, yet some plant species of concern have been identified and will need to be moved in order to best protect them, fauna wise, not many species of concern fall within the study area, yet habitats are scare in this arid vegetation type and the utmost care needs to be taken when removing any plant thicket from the chosen route. Aloe dichotoma and Hoodias sp are the main plants of interest on the chosen route. Aloe dichotoma is a relatively large plant and should easily be avoided by construction vehicles while traversing the line. Smaller plants of concern such as the Hoodia sp, as well as some of the Mesembs, are more difficult to find and therefore have been GPS

co-ordinated so as to be avoided as best as possible. These small succulents are rather area specific, due to the specialization and adaptations. Areas were these plants occur will need to be re-walked by the site environmental officer as the construction takes place, in order to safe guard against any unnecessary damage, as well as mark any plants which may have been missed.

2.3.6 Heritage perspective

The ROD makes provision for the specific actions to be taken should any cultural, historical, or archaeological remains be found the construction of the power line. No archaeological or other heritage sites were observed that would require specific mitigation measures on the route of the transmission line between towers positions 1 and 146. A relatively higher density of artifacts was seen in the areas covered by Dwyka tillite at the southern-most end of the line, with densities dropping sharply northwards of there to become fairly uniformly dispersed with densities less than 1 per 10x10 m. Appendix 6 gives the details of the heritage specialist inspection of the pylon positions that was undertaken.

From a heritage perspective, therefore, the proposed transmission power line is not expected to have a high negative impact since the pylon positions have been inspected by a qualified archaeologist prior to final sitting and construction taking place. The contractor is to implement the management actions recommended herein.

2.3.7 Tourism perspective

From a tourism perspective visual impacts and potential disruption from construction activities are the greatest possible issues. Tourism is a sensitive industry based primarily on subjective perspectives of visitors to an area. In destinations where tourism is focused on outdoors or based on natural elements, such as wilderness, sky, rivers, veld and wildlife, the tourism value rests largely on the visual experience which can be provided. The study area is one such area, where there is a potential for negative visual impacts on tourism from the erection of a transmission line. This can potentially be an issue during the day as well as during the night. During the day, the

line can potentially obscure views, degrade scenery and decrease the scenic value of the area or part of the area. Additionally, any lighting that may potentially be used may extend the visual impact into the night in a part of the country renowned for its night skies and stargazing. There is also the potential that construction activities carried out in close proximity to tourism enterprises or to places where tourists visit will negatively impact on and detract from the tourist experience. Such impacts could include noise, site disturbance during the construction phase, dust from vehicles and visual and aesthetic impacts from such construction and crew camps on the feeling of tourists having a serene and secluded nature experience. The location of work camps in close proximity to tourism enterprises can also be a potential issue in terms of noise, light, and feelings of solitude that tourists are seeking out. There are reports in the area of problems with the reliability and quality the power supply. If developments such as transmission lines can lead to better services for local people and for tourism enterprises seeking to provide a high standard of service, then there is potential for a positive impact, or spin off, from the development. By better servicing areas with electricity, this can create an environment where tourism can emerge or improve. The management measures instituted herein, are designed to minimise these impacts.

2.3.8 Environmental Management and Legal and Planning Context

Construction will be according to the best industry practices, as identified in the project documents. This EMP, which forms an integral part of the contract documents, informs the Contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project. The Contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation and in terms of amendments to the Particular Conditions of Contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter shall prevail.

Statutory and other applicable legislation

It is expected that the Contractor is conversant with all environmental legislation and standards pertaining to the project. In addition the Contractor shall also take cognisance of Provincial and Local Government Ordinances, which may be applicable to the contract. Relevant environmental legislation pertaining to the project is listed within Appendix 5.

Protected Plants

In terms of the National Forest Act (No 84 of 1998) and Government Notice 1339 of 6 August 1976 (promulgated under the Forest Act (No 122 of 1984) for protected tree species), the removal, relocation or pruning of any protected plants will require a permit.

Protected indigenous plants in general are controlled under the relevant Provincial Ordinances or Acts dealing with nature conservation, i.e. Transvaal Nature Conservation Ordinance (No 12 of 1983). Included within the provincial Ordinance is the legislation regarding the plant species on the Red Data list. Due to the fact that no protected plants were identified on site during the impact assessment, the above regulation will only be applicable in the event that a protected plant is identified during the final survey.

Abstraction of Water

If water is to be abstracted from a public stream during construction (for construction activities), a permit is required from the Department of Water Affairs and Forestry. If water is to be abstracted from water of which the rights of use belong to private landowners, it will be necessary to establish whether their water use rights are still valid in terms of the provisions of the National Water Act, negotiate with the relevant landowners and then to obtain a water use permit from DWAF in terms of Section 21, 40 and 41 of the National Water Act (No 36 of 1998).

The Aries-Neiwehoop power line crosses over the Hartbeesrivier at points 84, 85 and 86: as shown in appendix 8. No tower construction is to take place with in the river bed

or within 50m of the river flood line unless a full impact assessment is first carried out and permission from the relative authorities has been granted.

2.3.9 Administration of Environmental Obligations

Appointment of the Environmental Control officer (ECO)

For the purposes of implementing the conditions contained herein, Eskom shall appoint an Environmental Control Officer and submit her/his name to the Department of Environmental Affairs and Tourism. The request shall be given, in writing, at least fourteen days before the start of any work. The Environmental Control Officer shall be the responsible person for ensuring that the provisions of the EMP are complied with during the life of the contract. The Eskom ECO and Contractors will be responsible to see that environmental considerations are in place throughout the construction process. The Environmental Control Officer must be available at all times for consultation.

Administration

Before the Contractor commences with each Construction Activity, the Contractor shall give to the ECO a written statement setting out the following:

- The type of Construction Activity and the associated method statements
- Locality where the Activity will take place.
- Identification of Impacts that might result from the Activity.
- Identification of activities or aspects that may cause an Impact.
- Methodology for Impact prevention for each activity or aspect.
- Methodology for Impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures (needs to be demonstrated)
- Treatment and continued maintenance of impacted environment.

The Contractor may provide such information in advance of any or all Construction Activities provided that new submissions shall be given to the ECO whenever there is a change or variation to the original.

For major constructions, the ECO may provide comment on the methodology and procedures proposed by the ECO, but he shall not be responsible for the Contractor's chosen measures of Impact mitigation. This will be very important for all underground installations for sewage and sanitation.

2.3.10 Good Housekeeping

The Contractor shall undertake "good housekeeping" practices during construction as stated in. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

2.3.11Training

The designated environmental officer (ECO) must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

Eskom and his Contractor should ensure that adequate environmental training takes place. All employees should have an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

- The importance of conformance with all environmental policies, and procedures as stipulated in the Scoping Report and ROD.

- The significant environmental impacts, actual or potential, of their work activities;

- The environmental benefits of improved personal performance;

- Their roles and responsibilities in achieving conformance with the environmental policy and procedures Corridor Consortium, including emergency preparedness and response requirements;

- The potential consequences of departure from specified operating procedures;

- The mitigation measures required to be implemented when carrying out their work activities.

2.3.12Environmental Aspects

Environmental aspects could be defined as “those components of the company’s activities, products and services that are likely to interact with the environment”. Examples of what might be considered environmental aspects could include:

- Contractor selection;
- Camp establishment;
- Legal and policy requirements;
- Social interaction;
- Labour;
- Safety and security;
- Site establishment;
- Waste generation;
- Workshop and equipment storage;
- Storage area for hazardous substances;
- Terrain modulation;
- Creation of access roads;

- Rubble and refuse disposal;
- Vegetation clearing;
- Material storage;
- Batching plants;
- String operations;
- Transport of equipment;
- Pylon siting and erection;
- Rehabilitation;
- Storm water discharge;
- Social issues;
- Biological issues; and
- Cultural issues.

An environmental impact could be defined as “any change to the environment resulting from an environmental aspect”.

Listed below are some environmental impacts that could adversely alter the environment:

► **Impacts on ecology**

Destruction or removal of fauna and flora
Impacts on biological diversity
Deformation of the landscape

► Impacts on natural resources

Impacts on wetlands
Impacts on agricultural land
Destruction of historical/heritage sites
Effect on natural habitats

► **Impacts as a result of Pollution**

Pollution of atmosphere, soil or water
Soil erosion

Primarily, the aim is to recognise each environmental aspect or cause and effect and plan the activity in such a way that impacts are prevented from happening. In the event that prevention is not practicable, or is not achieved because of misapplication, the contractor shall immediately apply approved measures that will limit and contain the magnitude, duration and intensity of the Impact. The contractor shall demonstrate that he is capable of carrying out any repair and reinstatement of the damaged environment.

General good construction practice will play an important role in avoiding the occurrence of an Impact. The Contractor's attention is drawn, in this regard to section 9 regarding the Environmental Management of construction activities.

2.8.1 Activities/Aspects causing Impacts

A list of possible causes of environmental impacts that occur during Construction Activities is given in Table 1: Aspects or Activities that Cause environmental impacts during Construction Activities. This list is not exhaustive, and shall be used for guideline purposes only.

Table 1: Environmental Aspects to be associated with the construction of the power line

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
SITE ESTABLISHMENT			
Set up living quarters			
Obtain campsite	Negotiate with landowner	NEMA & Env Cons Act	Contractor/ECO
Clear and level area	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Damage to topsoil / waste concrete	Soil Conservation Act	Contractor/ECO
Erect temporary houses and tents	Waste material / littering	NEMA & Env Cons Act	Contractor/ECO
Set up ablution facilities			
Install drainage system for toilets	Health risk / spreading of measless and pollution of soil and ground water	Health Act	Contractor/ECO
Install drain for waste water	Ground water pollution	Water Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Install water supply	Disturbance of topsoil and vegetation	Soil Conservation Act	Contractor/ECO
Install drainage system for waste water	Pollution of ground water	Water Act	Contractor/ECO
Install collection system for waste oil	Soil pollution	NEMA & Env Cons Act	Contractor/ECO
Set up waste collection system			
Install waste collection bins	Waste foodstuff and food containers	NEMA & Env Cons Act	Contractor/ECO
SITE ESTABLISHMENT			
Store area			
Install fencing:			
Dig holes	Disturbance of topsoil	Soil Conservation Act	Contractor/ECO
Insert poles and concrete	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Erect fence	Wire offcuts	NEMA & Env Cons Act	Contractor/ECO
Grading / clearing area	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
Install site office	Waste concrete if slab is	NEMA & Env Cons Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	required		
Create fire break	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
SITE ESTABLISHMENT			
Workshop area			
Install workshop area			
Cast concrete slabs for buildings	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Concrete bunded area for servicing vehicles	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Erect store for oil, lubricants and parts	Waste packaging	NEMA & Env Cons Act	Contractor/ECO
SITE ESTABLISHMENT			
Assembly area			
Levelling and clearing of area	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
Install concrete floor for work area	Damage to topsoil / waste concrete	Soil Conservation Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Install waste collection area	Rubble and waste material	NEMA & Env Cons Act	Contractor/ECO
MATERIAL DELIVERY			
Store area			
Trucks delivering material	Oil spills	Water Act	Contractor/ECO
	Waste material containers / packaging	NEMA & Env Cons Act	Contractor/ECO
SERVICING OF VEHICLES			
Workshop area			
Draining oil and removing filters	Oil spills	Water Act	Contractor/ECO
On site			
Emergency repairs due to breakages	Oil spills and lubricant or fuel spills	Water Act	Contractor/ECO
TOWER PEGGING			
On site			
Vehicle driving in veld	Damage to protected /	Biodiversity Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	endangered vegetation		
	Damage to heritage sites	Heritage Act	Contractor/ECO
	Oil spills	Water Act	Contractor/ECO
Surveyor pegging towers	Littering of packaging & pegging materials	NEMA & Env Cons Act	Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging & pegging materials	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Site clearing for pegging purposes	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
BUSH CLEARING FOR CONSTRUCTION			
On servitude			
People cutting vegetation by hand	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	Fuel spills	Water Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Bulldozer clearing vegetation	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
	Disturbance of topsoil	Soil Conservation Act	Contractor/ECO
Emergency repairs due to breakages	Oil spills and lubricant or fuel spills	Water Act	Contractor/ECO
Excessive clearing of servitude	Erosion and invader plants	Soil Conservation Act	Contractor/ECO
	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
GATE INSTALLATION			
On servitude			

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Flattening of fences to gain access	Damage to fences	Fencing Act	Contractor/ECO
Dig holes	Disturbance of topsoil	Soil Conservation Act	Contractor/ECO
Insert gate and pour concrete	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Tying off fence and straining fence wires	Wire off cuts and broken fences	Fencing Act	Contractor/ECO
Tying off fence and straining fence wires	Damage to electrical fencing	Fencing Act	Contractor/ECO
Installation of concrete sill in Vermin proof fence	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
ACCESS ROAD CONSTRUCTION			
On servitude			
Negotiate access with landowners	Agreed access used		Contractor / Eskom

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Mark access roads	Agreed access used		Contractor / Eskom
	Speed limits adhered to		Contractor/ECO
Vehicles driving off servitude road	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Illegal use of private roads		Contractor
	Damage to drifts and bridges		Contractor
	Damage to irrigation lines		Contractor
Bulldozer blading access roads	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
	Damage to private roads		Contractor/ECO
	Causing erodable areas	Soil Conservation Act	Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of	Health Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	measles		
Blading of access roads through dongas	Erosion and loss of topsoil	Soil Conservation Act	Contractor/ECO
Construction of drifts / donga crossings	Erosion / impedance of water flow	Water Act	Contractor/ECO
Road construction on slopes	Erosion and loss of topsoil	Soil Conservation Act	Contractor/ECO
Installation of diversion berms	Prevention of erosion	Water Act / Soil Cons Act	Contractor/ECO
FOUNDATION EXCAVATION			
On servitude			
Transport of personnel to site	Trucks breaking and spilling oil	Water Act	Contractor/ECO
Driving off servitude roads	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
Excavation of foundation	Disturbance of topsoil and	Soil Conservation Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	vegetation		
	Loss of topsoil with seedbank	Soil Conservation Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
Drilling of foundation	Noise and dust pollution	NEMA & Env Cons Act	Contractor/ECO
Installation of steel re-enforcing	Waste material	NEMA & Env Cons Act	Contractor/ECO
Casting of concrete	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Washing of concrete truck on site	Waste concrete	NEMA & Env Cons Act	Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Leaving gates open / unlocked	Stock losses		Contractor/ECO
TOWER ASSEMBLY AND ERECTION			

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
On servitude			
Transport of personnel and material to site	Trucks breaking and spilling oil	Water Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
Making fires in winter due to cold weather	Veld fires		Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Assembling of towers	Waste bolts and nuts	NEMA & Env Cons Act	Contractor/ECO
Punching and painting of nuts	Paint spillages	Water Act	Contractor/ECO
Erection of towers with crane	Trucks / crane breaking	Water Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
	and spilling oil / lubricants		
Erection of towers with helicopter	Noise and dust pollution	NEMA & Env Cons Act	Contractor/ECO
	Fuel spillages during re-fuelling	Water Act	Contractor/ECO
Emergency repairs due to breakages	Oil spills and lubricant or fuel spills	Water Act	Contractor/ECO
	Waste parts and packaging	NEMA & Env Cons Act	Contractor/ECO
Dressing of towers with hardware and insulators	Insulator breakage littering glass shards in veld	NEMA & Env Cons Act	Contractor/ECO
Discarding packaging material on site	Waste material littering in veld	NEMA & Env Cons Act	Contractor/ECO
Leaving gates open / unlocked	Stock losses		Contractor/ECO
STRINGING OPERATIONS			
On servitude			

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Clearing of drum, tension and winch stations	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
Making fires in winter due to cold weather	Veld fires		Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Transport of personnel and material to site	Trucks breaking and spilling oil	Water Act	Contractor/ECO
Using bulldozer for tension purposes	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Disturbance of topsoil and vegetation	Soil Conservation Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Creating fire breaks around drum stations	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Disturbance of topsoil and vegetation	Soil Conservation Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
Jointing and crimping of conductors	Waste material littering in veld	NEMA & Env Cons Act	Contractor/ECO
Discarding wooden cable drum material on site	Waste material littering in veld	NEMA & Env Cons Act	Contractor/ECO
No protection for fences during stringing	Damage to fences	Fencing Act	Contractor/ECO
Tractor pulling out pilot wire	Damage to protected / endangered vegetation	Biodiversity Act	Contractor/ECO
	Damage to heritage sites	Heritage Act	Contractor/ECO
Leaving gates open / unlocked	Stock losses		Contractor
REHABILITATION OF SERVITUDE			
On servitude			

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Transport of personnel and material to site	Trucks breaking and spilling oil	Water Act	Contractor/ECO
Making fires in winter due to cold weather	Veld fires		Contractor/ECO
Cooking food on site / smoking	Veld fires		Contractor/ECO
	Littering of food packaging	NEMA & Env Cons Act	Contractor/ECO
Use veld for toilet	Health risk / spreading of measles	Health Act	Contractor/ECO
Installation of diversion berms	Prevention of erosion	Soil Conservation Act	Contractor/ECO
Fixing of fences	Waste material littering in veld	NEMA & Env Cons Act	Contractor/ECO
Re-seeding of barren areas	Wrong seed used	Biodiversity Act	Contractor/ECO
Leaving gates open / unlocked	Stock losses		Contractor/ECO
Picking up all rubble and litter	Servitude left clean and neat	NEMA & Env Cons Act	Contractor/ECO
Installing locks on all servitude gates	Unauthorised access prevented		Contractor

ACTIVITY	ASPECT	RELEVANT LEGISLATION	RESPONSIBILITY
Settling of all outstanding claims	Landowners happy		Contractor / Eskom
Signing off all landowners	Servitude ready for handover to Grid		Contractor / Eskom

ENVIRONMENTAL MANAGEMENT OF CONSTRUCTION ACTIVITIES

3.1 Contractor Appointment

Eskom is to ensure that any contractual agreements with sub-contractors for the implementation of the proposed project, includes this EMP. Furthermore the contractor will be expected to monitor the performance of the construction team to ensure compliance with the provisions of this EMP. An awareness raising program for environmental management requirements of this EMP, by workers at all relevant levels, should be conducted prior to construction.

3.2 Construction Site Establishment

3.2.1 Site Plan

The Contractor shall establish his construction camps, offices, workshops, staff accommodation. However, before construction can begin, the Contractor shall submit to the ECO for his approval, plans of the exact location, extent and construction details of these facilities and the Impact mitigation measures the Contractor proposes to put in place.

The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents. The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. Construction sites should not be close to water courses, streams and rivers. It is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible. Regardless of the chosen site, the Contractor's intended mitigation measures shall be indicated on the plan. Workers movements must be limited to the construction area only and should be enforced by the contractor/s. The Contractor must construct and maintain adequate fencing around the camp and ensure that materials used for construction on the site do not blow on or move outside the site and environs.

3.2.2 Vegetation

The study area falls within three major vegetation types namely: (1) Nama-Karoo, Lower Gariep Broken Veld (2) Eastern Kalahari bushveld (Kalahari Duneveld), Gordonia duneveld (3) Nama-Karoo, Bushmanland Arid Grassland. These plant communities are of low conservation importance and have been conserved to a large extent in the Augrabies Falls National Park. This been said, certain key species still naturally occur along the chosen route and need to be avoided during construction phase.

Species to be protected:

- Rushchia pungens
- Aloe dichotoma var dichotoma
- Orbea lutea subsp. Lutea
- Stapelia flavopurpurea
- Tridentea dwequensis
- Dinteranthus pole-evansii
- Larryleachia dinteri
- Larryleachia marlothii
- Ruschia kenhardtensis
- Lotononis oligocephala
- Helichrysum arenicola
- Kohautia ramosissima
- Neuradopsis austro-africana
- Hoodia sp.

The contractor with guidance from the ECO has a responsibility to inform his staff of the need to be vigilant against any practice that will have a harmful effect on vegetation. To this the end client should ensure that all resources partaking work on

the project undertake an awareness rising training session on management actions related to

The natural vegetation encountered on the site corridor is to be conserved and left as intact as possible. Vegetation planted at the site shall be indigenous and in accordance with instructions issued by the ECO. Only trees and shrubs directly affected by the works, and such others as may be indicated by the ECO in writing, may be felled or cleared. In wooded areas where natural vegetation has been cleared out of necessity, same specie indigenous trees occurring shall be re-established.

The project specification for the rehabilitation of the grass cover should be strictly adhered to. Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.) Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites.

3.2.3 Rehabilitation

Removal of materials from site

The area where the site offices were erected will require rehabilitation at the end of the Contract. All construction material, including concrete slabs, gravel, stone,bricks,temporary fencing and braai areas are to be removed from the site upon completion of the work.

After construction any area cleared or disturbed within and outside the boundaries of Construction site shall be rehabilitated. Areas beyond the site boundary may only be used if appropriate permission has been granted by the relevant authority or owner(s).

3.2.4 Water for human consumption

Water for human consumption should be available at the site offices and at other convenient locations on site.

All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans dams etc). Only domestic type wastewater shall be allowed to enter this drain.

3.2.5 Cooking fuel

The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes. Adequate toilet facilities shall also be provided. Use of the veld for this purpose shall not, under any circumstances, be allowed. The Developer shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the ECO. Latrines shall be positioned within walking distance from wherever employees are employed on the works.

3.2.6 Sewage treatment

Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, and staff accommodation. Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements.

Safe and effective sewage treatment will require one of the following sewage handling methods: septic tanks and soak-always, dry composting toilets such as “enviro loos”, or the use of chemical toilets which are supplied and maintained by a subcontractor. The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets. Should a soak away system be used, it shall not be closer than 800 metres from any natural water course or water retention system. The waste material generated from these facilities is to be serviced on a regular basis. The positioning of

the chemical toilets is to be done in consultation with the ECO. Read with Toilets should be easily accessible and should be positioned within walking distance from wherever employees are employed on the works. Use of the veld for this purpose shall not, under any circumstances, be allowed. Outside toilets should be provided with locks and doors and should be secured to prevent them from blowing over. The toilets should also be placed outside areas susceptible to flooding. The Contractor should arrange for regular emptying of toilets and should be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the relevant local authorities.

3.2.7 Waste Management

The Contractor's intended methods for waste management and waste minimisation must be implemented at the outset of the contract. All personnel shall be instructed to dispose of all waste in the proper manner.

3.2.8 Solid Waste

Solid waste shall be stored in a pre-selected area in covered, tip proof metal drums for collection and disposal. A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the ECO. Disposal of solid waste shall be at a Department of Water Affairs and Forestry (DWAF) licensed landfill site or at a site approved by DWAF in the event that an existing operating landfill site is not within reasonable distance from the site offices and staff accommodation. No waste shall be burned at the site offices, or anywhere else on the site, including the approved solid waste disposal site.

3.2.9 Litter

No littering by construction workers must be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition and the site is to be kept free of litter. Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work the Contractor shall provide litter collection facilities for later safe disposal at approved sites.

3.2.10 Hazardous waste

Hazardous waste such as bitumen, tar, oils etc. should be disposed of in a Department of Water Affairs and Forestry approved landfill site. Special care should be taken to avoid spillage of tar products such as tar prime or pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be taken to the supplier's production plant. No spillage of bituminous products shall be allowed on site. Affected areas shall be promptly reinstated to the satisfaction of the ECO.

3.3 Access Control to Farms

The contractor shall ensure that are kept informed of about the progress and phases of the contract. (Refer to Special Conditions to Access to Farms in Appendix H)
No camping shall be allowed on any private property. If the Contractor wants to leave guards on site, it shall only be done with the written consent of the Landowners involved.

3.4 EMERGENCY PROCEDURES

3.4.1 General

The contractor shall ensure that emergency procedures are in place and communicated to the workers prior to commencement of work. Emergency procedures shall include, but not limited to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials. The contractor shall ensure that lists of all emergency telephone/contact persons are kept up to date and that all names and numbers are posted to the relevant locations throughout the duration of the construction period. It is important that all workers are instructed how to follow the emergency procedures.

3.4.2 Control at the workshop

The Contractor's management and maintenance of his plant and machinery will be strictly monitored according to the criteria given below, regardless whether it is serviced on the site (i.e. at the place of Construction Activity or at a formalised workshop).

3.4.3 Safety

The constructor shall ensure:

- Compliance with the **Occupational Health Act, No 85 of 1993.**
- That reasonable measure is taken to ensure safety of all staff on site.
- That all construction vehicles using public roads are in a roadworthy condition, that they adhere to speed limits and that their loads are secured; and the local, provincial and national regulations are adhered to.
- That all accidents are recorded and reported to the ECO.

All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by, the staff whose duty it is to manage and maintain the Contractor's and his subcontractor's and supplier's plant, machinery and equipment. Non-compliance with the Occupational Health and Safety Act (1993) by the contractor will constitute non-compliance.

3.4.4 Fire

The contractor shall take all reasonable measures to ensure that fires are not started as a result of construction activities on site. No large open fires shall be permitted on site. In the event that small fires existed during the day (for cooking) the contractor shall make sure that such fires are extinguished before 18h00.The contractor shall make sure that basic fire fighting equipment are available on site at all times. The contractor shall appoint a member of his staff to be responsible for installation and inspection of this equipment.

3.4.5 Safety after construction

This will involve the identification of possible hazards and where necessary fence off these hazards to prevent public access. Public safety concerns that fall within the jurisdiction of the local council must be identified and written notification sent to the relevant local council. An example cited in this regard is the provision of sidewalks, overpasses or underpasses for pedestrians, school children, in particular at places where it is considered necessary.

3.4.6 Hazardous Material Storage

Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. All hazardous materials i.e. bitumen binders will be stored in a secured, appointed area that is fenced and has restricted entry. Storage of bituminous products shall only take place using suitable containers to the approval of the ECO.

The Contractor shall provide proof to the ECO that relevant authorisation to store such substances have been obtained by the relevant authority. In addition, hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Before containment or storage facilities can be erected the Contractor shall furnish the ECO with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method shall be a concrete floor that is bunded. The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.

3.4.7 Fuel and Gas Storage

The contractor shall ensure that fuels and chemicals e.g. drums of fuel, grease, oil, brake fluid, hydraulic fluid) are stored and handled carefully so as to minimise the risk of spillage.

Fuel should be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel should be avoided. An adequate bund wall, 110% of volume, should be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall should be lined with an impervious lining to prevent infiltration of the fuel into the soil.

The contractor will be responsible for ensuring that any party delivering potentially dangerous chemicals or fuel to the site is aware of the appropriate storage and drop-off locations and procedures Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area.

3.4.8 Oil and Lubricant Waste

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and sent back to the supplier Water and oil should be separated in an oil trap. Oils collected in this manner, should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.

All used filter materials should be stored in a secure bin for disposal off site. Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

3.4.9 Equipment

The contractor shall stand any equipment that may leak, and does not have to be transported regularly on watertight drips trays to catch any pollutants. The drip trays shall be of a size that the equipment can be placed inside it. Drip trays shall not be allowed to overflow and they shall be cleaned regularly.

3.5 Clearing the Site

In all areas where the Contractor intends to, or is required to clear the natural vegetation and soil, either within the Road Reserve, or at designated or instructed areas outside the Road Reserve, a plan of action shall first be submitted to the ECO for his approval.

The plan shall contain a photographic record and chainage/land reference of the areas to be disturbed. This shall be submitted to the ECO for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.

The Contractor shall be held responsible for re-establishment of grass within the road reserve boundaries for all areas disturbed during construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for, or from, any construction has to be stored temporarily and disposed of later on registered landfill.

3.6. Soil Management

3.6.1 Topsoil

Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter.

The Contractor shall ensure that no, or minimal topsoil is lost due to erosion – either by wind or water. Areas to be top-soiled and planted with grass will be dealt with systematically so as to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the progress

plan approved by the ECO. The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the site that may have been affected by such negligence.

3.6.2 Subsoil

The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the ECO, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.

3.7 Drainage

The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all Construction Activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. Recognised water users / receivers shall not be adversely affected by the expansion or re-development. No water source shall be polluted in any way due to proposed changes.

Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products.

The Contractor shall submit to the ECO his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.

3.7.1 Discharge of construction water

The contractor shall make sure that polluted runoffs, such as runoffs from the construction camp where equipment is cleaned or serviced, is not discharged over land. Such runoffs may be discharged into the local sewer main Silt-laden water may be drained over land provided care is taken not to cause erosion or underground water pollution. Water from washing large concrete-mixing trucks shall not be disposed off overland. Such water shall be contained in a conservatory tank and disposed of in the correct manner.

3.8 Stockpiles

The contractor shall plan his activities so that materials excavated, in so far as possible can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the ECO for his approval, together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damages.

The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and
- Kept free from all alien / undesirable vegetation.

After the stockpiled material has been removed, the site shall be re-instated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped; top soiled,

grassed and maintained at the contractor's cost until clearance from the ECO is received.

In all cases, the ECO shall approve the areas for stockpiling and disposal of construction rubble before any operation commences.

The contractor shall keep the necessary materials and equipment on site to deal with spills should they occur. The contractor shall set up a procedure for dealing with spills. The procedure should include notifying the ECO and the relevant authorities prior to commencing with the procedure.

Streams, rivers and dams should be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage, the Contractor would be liable to arrange for competent instances to clear the affected area.

Responsibility for spill treatment lies with the Contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her ECO. The ECO will assess the situation in consultation with the ECO and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the Contractor in consultation with the ECO. Areas cleared of hazardous waste shall be re-vegetated according to the ECO's instructions

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the ECO. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input.

Vehicles Site vehicles are only permitted within demarcated construction camp as required completing their specific tasks. As mentioned under noise control all vehicles must be in good working condition to minimise on noise generated.

3.9 Use of Herbicides

Herbicide use shall only be utilised with the approval of Eskom. The use of herbicides shall be in compliance with the terms of the Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947). In terms of this Act, a registered pest control operator shall apply herbicides, or shall supervise the application of herbicides. The application of herbicides shall be according to set specifications and under supervision of a qualified technician.

3.10 Artefacts

If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the ECO of such discovery. Work may only resume once clearance is given in writing by the archaeologist.

An awareness program for recognition of artifacts, by workers at all relevant levels, of resources potentially or accidentally disturbed should be conducted prior to construction. Any finds/disturbances (e.g. burials, etc) should be reported immediately to the SA Heritage Resources Agency (SAHRA) at national level, which currently manages archaeological resources in the Northern Cape on an agency basis on behalf of the Provincial Heritage Resources Authority.

3.11 Graves

No graves have been discovered during site visits, yet, if a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the gravesite shall be stopped and the ECO informed of the discovery. The National Monuments Council should be contacted and arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with

the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.

3.12 Light Pollution

Records of complaints must be filed and if necessary light specialists must assess the impacts on nearby tourist resort and mitigated accordingly.

3.12 Alien Vegetation

The Contractor shall be held responsible for the removal of alien vegetation within the Road Reserve disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily or otherwise within the Road Reserve. This responsibility shall extend for the duration of the defects liability period.

The Contractor shall act immediately when such a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.

4 MANAGEMENT AND MONITORING

This section focuses on the systems and procedures required to ensure that the environmental specifications contained in the EMP are effectively implemented, monitored, recorded and if need be measures improved with time.

4.1 Location of the Environmental Management Plan (EMP), and other relevant documents

The contractor shall at all times have a copy of the EMP as well as

1. Written records of all the access agreements and physical address plan.
2. Complaints register
3. Site daily diary
4. Records of all rehabilitation activities
5. Environmental incident log

Eskom transmission contract method statements:

1. Transmission line towers and line construction
2. Access to farms
3. Erosion guideline
4. Fire protection association guideline
5. Eskoms safety, health and environmental policy
6. Standards for bush clearing and maintenance with power line servitude.
7. Transmission bird perch
8. Transmission environmental policy.

4.2 General Monitoring and Reporting

An audit protocol will be drawn up whereby compliance with aspects of the EMP could be measured against. The contractor shall keep a record of all complaints received from the community and communicate them to the Environmental Officer.

4.3 Infrastructure

No infrastructure occurring along the intended route must be tampered with. Phone lines, railway lines need to be respected and kept out of harms way. Any damages incurred due to construction activities are to be reported to the contractor and mitigated with the relevant authorities. All gates which are to be traversed need to be closed once used. Any damaged gates need to be repaired and reported to the relevant land owner.

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