DRAFT CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

THE PROPOSED CONSTRUCTION OF A 20MVA SUBSTATION, 132KV LOOP IN LINE AND A 22KV OVERHEAD POWERLINE IN SCHMIDTSDRIFT, NORTHERN CAPE

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1. INTRODUCTION

1.1 BACKGROUND

This document serves as the Draft Construction Environmental Management Plan (CEMP) for the proposed construction of a 20MVA substation, 132kv loop in line and a 22kv overhead powerline in Schmidtsdrift, Northern Cape. This CEMP is being drafted prior to an Environmental Authorisation being received. Please note the EMP will be amended once the Environmental Authorisation has been granted.

The Schmidtsdrift area in the Northern Cape is a steadily growing area with its primary expansion in diamond mining and agricultural activities such as livestock farming, game farming and irrigated cropping. This continued growth in the Schmidtsdrift area has resulted in an increasing demand for additional electricity supply. In order to improve the current supply and distribution of electricity as well as accommodate future economic development that may occur in the area, additional infrastructure is required.

It is therefore the intention of Eskom Pty (Ltd), the proponent, to construct additional services which include a 20MVA substation and associated infrastructure in Schmidtsdrift. The proposed development will facilitate the future load growth and economic development within the area. It will assist in providing improved efficiency, reliability and quality of supply to current consumers and reduce the technical losses experienced due to short reticulation lines, thus reducing fault levels.

The development falls in the jurisdiction of the Siyancuma Local Municipality in the Northern Cape. The sites are predominantly situated in the Eastern Kalahari Bushveld Bioregion of the Savanna Biome.

The Environmental Partnership is commissioned by Eskom Pty (Ltd) to undertake the Environmental Impact Assessment, to ensure that decision-makers are properly informed and to comply with the necessary legislation. This Environmental Management Plan is compiled for the construction phase of the activity and will be implemented should the activity be approved. This Environmental Management Plan has been drafted taking into consideration Eskom's Generic Environmental Programmes for substations and line construction.

The proposed project includes the following activities:

- Construction of a 20MVA substation with an area of approximately 10 000m²
- Construction of a 132kV loop-in line, intended to connect the substation to the existing electricity network
- Construction of a 22kV overhead powerline.

The EIA is being undertaken as per Government Notice (GN) 386 and GN 387 of the National Environmental Management Act [NEMA] (107 of 1998), per GN 387 of 21 April 2006 as amended. The GN contains schedules of activities that may have a substantial detrimental effect on the environment and will require an EIA. The nature of this proposed development includes activities listed in both GNs. These activities are:

GN 387:

- The transmission and distribution of above ground electricity of 120 kilovolts or more.

1.2 TERMS OF REFERENCE

The purpose of an EMP is defined in the Integrated Environmental Management (IEM) Guideline Series (Department of Environmental Affairs, 1992) as: "A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of the proposal". The objectives of this EMP are thus:

- to prescribe the best practicable control methods to lessen the environmental impacts associated with the construction of the substation and powerlines;
- to monitor and audit the performance of construction personnel in applying such controls; and
- to ensure that appropriate environmental training is provided to responsible construction personnel.

The recommendations that emerged from the EIA for the development, which will also be documented in the Environmental Decision from the Department of Environmental Affairs (DEA), are the major informants in developing the necessary environmental control measures.

The Clerk of Works (CoW), under the supervision of the Environmental Practitioner (EP) is required on site during the construction phase to ensure that the requirements of the EMP are implemented.

1.3 KEY TERMS AND ABBREVIATIONS

Affected Environment:

	Those parts of the socio-economic and biophysical environment impacted on
	by the development.
DEA	Department of Environmental Affairs, The national environmental regulatory authority.
EIR	Environmental Impact Report
CoW	Clerk of Works, together with the Eskom Environmental Practitioner the
	CoW, will be responsible for ensuring that the requirements of the EMP are implemented.
EIA	Environmental Impact Assessment:
	A process of collecting, analysing, interpreting, evaluating and communicating data as it pertains to possible impacts (positive and negative) upon the environment due to a development.
EMP	Environmental Management Plan:
	A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of the proposed development.
Method State	ment:
	A method statement describes the scope of the intended work in a step-by- step description in order for the PM and ECO to understand the contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks.
PM	Project Manager:
	The person responsible for ensuring that on-site activities are undertaken in accordance with the requirements of the EMP.
SAHRA	South African Heritage Resource Agency

2. ENVIRONMENTAL POLICY AND LEGISLATION

2.1 CONTRACTUAL COMMITMENT

This EMP is included in the tender documents to obtain commitment from the contractors regarding all their activities and to make them aware of their environmental responsibilities prior to commencing work. Failure by any of the contractors' or sub-contractors' employees to adhere to the EMP will be considered cause for the offending employees to be removed from the site, penalties to be instated and/or that the damage be repaired at the cost of the contractor. The Project Manager (PM), under advisement of the CoW, must recommend the removal of equipment causing continual environmental damage.

The PM, under advisement of the CoW, must recommend that the contractors suspend part or all of the works if they fail to comply with the specifications set out in the EMP and method statements supplied by themselves or other responsible parties. The suspension must be enforced until such time as the offending procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the contractors.

A policy statement is now presented, together with a list of the most important pieces of legislation pertaining to this project.

2.2 ENVIRONMENTAL POLICY STATEMENT

The policy statement that follows is formulated specifically to support this construction phase EMP for the development. All construction personnel will be required to commit themselves to this policy.

- Adherence to the requirements of the construction EMP for the development
- Management of all construction and associated activities so as to minimise the risk of pollution of groundwater and surface water, the air and the soil.
- Management of all construction and associated activities so as to minimise the nuisance and disruption to people living, working in or commuting through the area.

- Adherence to the environmental legislation relevant to the location and nature of the work being conducted.
- Compliance with the monitoring and auditing programmes contained in the EMP, to ensure its accountable and transparent implementation.

2.3 ENVIRONMENTAL LEGISLATION

During the construction phase, cognisance will be taken of, but is not limited to, the following pieces of legislation:

- Atmospheric Pollution Prevention Act (#45 of 1965)
- Environment Conservation Act (#73 of 1989)
- Hazardous Substances Act (#15 of 1973)
- Health Act (#63 of 1977)
- National Environmental Management Act (#107 of 1998)
- National Environmental Management: Waste Act (#59 0f 2008)
- National Heritage Resources Act (#25 of 1999)
- National Water Act (#36 of 1998)
- Occupational Health and Safety Act (#85 of 1993)
- National Environmental Management: Biodiversity Act (#10 of 2004)
- National Environmental Management: Waste Act (#59 of 2008)

3. ORGANISATIONAL STRUCTURE

It is essential that an organisational structure is established early in the construction phase of the project and that all parties concerned accept the structure. This identifies the responsibilities and the authority of the proponent, design team, PM, consulting engineers and the numerous contractors and sub-contractors. The relationship between the PM, the engineers and the contractors' site agents are key links in the structure.

The organisational structure also clarifies the channels to direct instructions and provides the means of interaction between the various groups involved. Good communication is a prerequisite of maintaining the organisational structure and is vital to the smooth operation of the project.

3.1 RESPONSIBILITY LINKAGES

Essentially, the responsibility for the application of the construction phase EMP for the development of the project begins with the proponent. Contractual agreements are entered into to enable the implementation and adherence to this EMP by all parties undertaking construction. The proponent will devolve the responsibility to their designated PM to assume this task within his or her portfolio. The CoW will then ensure that the requirements of the EMP are implemented by monitoring and auditing the performance of the PM in achieving the requirements, while also providing strategic support and advice. In practice, on-site responsibility would typically lie with an engineer tasked with particular components of the project. The CoW must at times communicate directly with a nominated engineer, but always with recourse to the PM. With the PM and CoW roles being the most important, these are now described in more detail.

3.2 ROLE OF THE PROJECT MANAGER/S

The PM is responsible for ensuring that on-site activities are undertaken in accordance with the requirements of the EMP. The PM will thus need to ensure that:

- environmental requirements are adequately covered in tender and contract documents;
- method statements are requested in a timely fashion;
- appropriate corrective action is identified if non-compliance occurs or unforeseen environmental issues arise that require environmental management action;
- corrective action is implemented as required;
- appropriate records and information regarding compliance with the EMP requirements are maintained and made available to the CoW;
- all site instructions are copied to the CoW; and
- instructions as required by the CoW are issued to the relevant contractor.

3.3 ROLE OF THE ENVIRONMENTAL CLERK OF WORKS / PRACTITIONER

The CoW is responsible for ensuring that the requirements of the EMP are implemented as well as reporting on construction activities on related incidents on a bimonthly basis to THE PM. Whereas the PM has overall responsibility for the construction site, the CoW's focus is on the environmental aspects of the construction phase. The CoW will thus:

- undertake ongoing monitoring of the construction site and activities through regular site inspections;
- record important findings of the site inspections;
- keep written records of all activities on site, particularly documenting auditing and corrective action.
- advise the PM, engineers and contractors on environmental matters during construction;
- monitor the implementation of specific elements of the EMP by contractors;
- receive and review all site instructions issued by the PM and engineers;
- advise the PM and engineers on actions or issues impacting on the environment, provide appropriate recommendations to address these and confirm the issuing of subsequent site instructions;
- calling for and approving method statements for specific activities that could have an environmental impact; and
- ensure that contractors have copies of the EMP and all approved method statements.

3.4 ROLE OF THE CONTRACTOR

The role of the Contractor is as follows:

- The Contractor shall ensure that all employees, sub-contractors, suppliers, etc. are fully aware of the environmental issues and requirements detailed in this EMP.
- The Contractor shall liaise closely with the CoW and PM and will ensure that works on site are conducted in an environmentally sensitive manner in accordance with this EMP.
- The Contractor is to have a copy of the EMP on site and be familiar with its contents.
- In conjunction with the CoW, the Contractor must ensure that all employees (permanent and temporary) and all sub-contractors that work on the site for longer than two days, receive Environmental Awareness Training within one week of being on site.

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 PROPOSED ACTIVITIES

The proposed project comprises the following components:

- a 20MVA substation linked to the Ulco Herbert 132kV line,
- a 132kV loop-in line connecting the substation to the existing Ulco Herbert line and
- a 22 kV powerline intended to extend from the substation to connect to the existing Herbert-Vaal Farmers 22kV line.

4.2 20 MVA SUBSTATION

The proposed substation will occupy an area of approximately 100m x 100m (footprint). The substation is an outdoor type and will contain two 10MVA transformers and associated equipment [see Figure 4 of the Draft Environmental Impact Report (EIR)]. The purpose of the substation is to feed the electricity from the existing Ulco-Herbert 132kV line to the proposed 22kV powerline.

The proposed substation site will be enclosed with a small stock fence and a diamond mesh fence that will be installed around the substation yard (see Figure 4 of the EIR). The proposed development will be constructed according to the *Guideline for Servitude Widths and Building Restrictions,* see Annexure 9 of the EIR.

4.3 PROPOSED POWERLINES

4.3.1 132kV LOOP-IN LINE

In order to connect the proposed substation to the existing powerline network, a 132kV loopin line is required between the substation and the existing Ulco-Herbert line. The loop-in line consists of a new 132 kV powerline off the existing Ulco-Herbert powerline, carrying power to the proposed substation (see Figure 6 of the EIR). The loop is closed through a link back to the existing Ulco-Herbert line via a parallel 132 kV line, thus allowing the flow of electricity to continue.

The 132kV loop-in line will extend for approximately 125m between the existing 132kV Ulco-Herbert line and the proposed substation. The 132kV loop-in line specifications and component details are illustrated in Figure 6 of the EIR. The proposed structures will be erected and spaced according to the *Guideline for Servitude Widths and Building Restrictions,* see Annexure 9 of the EIR.

4.3.2 22kV OVERHEAD POWERLINE

A 22kV powerline is proposed to extend from the new substation, connecting to the existing Herbert-Vaal Farmers 22kV powerline. The structures to be utilised include 11m high, 180mm-199mm top diameter wooden pole structures on the 22kV line and where they cross public roads, 13m poles will be used to ensure sufficient clearance. The Hare conductor will be utilized and span lengths will be limited to 120m due to pole strength (see Figure 7 of the EIR). The proposed structures will be erected and spaced according to the *Guideline for Servitude Widths and Building Restrictions, see Annexure* 9.of the EIR

Route Alignment

This route alignment alternative will connect the substation to the existing Herbert-Vaal Farmer powerline. The proposed overhead powerline will exit the substation, running parallel to the southern side of a nearby dirt road in a southeasterly direction for approximately 3.2km until it reaches the intersection of the dirt road and the R370. The line will then run in a southerly direction for approximately 0.5 km. It will then continue running parallel to the dirt road for 5.5 km, crossing the disused SANDF landing strip until it reaches the existing Herbert-Vaal Farmers powerline at the Schmidtsdrift informal settlement. The total length of the proposed line will be approximately 9.2km.

4.4 THE "DO-NOTHING" OPTION

The "Do Nothing Option" (see Figure 2 of the EIR) implies that no substation and overhead powerline will be constructed. This scenario has implications for future growth in the area.

5. ENVIRONMENTAL SPECIFICATIONS

5.1 GENERAL CONTROLS

This section contains generic procedures that need to be adhered to regarding all construction activities.

5.1.1 Fauna

The Contractor shall under no circumstances interfere with livestock without the landowner or community members being present or consulted. This includes the moving of livestock where they interfere with construction activities. Should the contractor's workforce obtain any livestock for consumption, they must be in possession of a written note from the owner. No poaching shall be tolerated under any circumstances.

Management objectives

- Minimise disruption of farming activities
- Minimise disturbance of animals
- Minimise complaints and litigation

Measurable targets

- No stock losses where construction is underway
- No complaints from Landowners and Communities
- No litigation concerning stock losses and animal deaths

5.1.2 Flora

Protected or endangered botanical species may occur on the site. Special care should be taken not to damage or remove any such botanical species unless absolutely necessary. Permits for removal must be obtained should such species be affected. All flora not interfering with the operation of the substation shall be left undisturbed, clearly marked and indicated on the site plan. Collection of firewood outside is strictly prohibited.

Where protected shepherd's trees, *Boscia albitrunca* fall within an area to be cleared and have to be removed, permits are required from the Department of Water Affairs and Forestry (Upington) before construction proceeds.¹

Management objectives

- Minimal disturbance to vegetation where such vegetation does not interfere with construction and operation of the substation
- Prevention of litigation concerning removal of vegetation

Measurable targets

• No litigation due to removal of vegetation without the necessary permits

5.1.3 Herbicide use

Herbicide use shall only be allowed with the approval of Eskom and according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used

Management objectives

• Control over the use of herbicides by checking the toxicity and potential impact on water, fauna and flora resources.

Measurable targets

- No signs of vegetation dying due to leaching of herbicides one year after completion of the contract
- No Landowner complaints and litigation

5.1.4 Dust control

Contractors will be solely responsible for the control of dust and for any claims against the proponent for damages resulting from dust. Disturbance of the substrate must be avoided until such time as soil stripping is necessary and such exposed surfaces should be stabilised immediately. Excavation, handling and transport of erodible materials must be avoided under

¹ Anderson, T (2009).Vegetation Assessment for the Proposed 20MVA Substation, 132 kV Loop Line and 22KkV Overhead Transmission Line Near Schmidtsdrif, Northern Cape

high wind conditions or when a visible dust plume is present. During high wind conditions, the PM must evaluate the situation and make a recommendation as to whether dust-dampening measures are adequate, or whether work should cease altogether until wind speeds drop to acceptable levels. Excessive wind and dust conditions must be reported to the CoW in his/her absence.

Soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind and where it will cause minimal disturbance. The location of stockpiles must be identified and approved by the RE. Stockpiles must be managed so as to prevent the material from being spread over a wide surface, to prevent erosion and compaction of the stockpiles and prevent it from being washed away in the event of heavy rains.

Dust management planning must be implemented by the contractor. This could include, *inter alia*, spraying of water on unpaved roads and other exposed sandy surfaces, proper covering of construction materials during transportation, ensuring that vehicle speeds do not exceed 40km/h on demarcated construction roads on the site or 20km/h when traversing unconsolidated areas, the cleaning of public roads used by construction vehicles where necessary and construction vehicle wheel cleaning. Dustex (or similar) must be sprayed on exposed areas in high wind conditions where water spraying is not adequate.

Management objectives

• Site works does not cause a nuisance to other people in the area

Measurable targets

• No formal complaints or claims arising due to dust pollution

5.1.5 Noise control

Noise generation during construction could create disturbance and a nuisance for people working, resident in and commuting through the area. Contractors must thus restrict working hours for construction activities to:

- 06:30 18:30 on weekdays (excluding public holidays); and
- 07:00 14:00 on Saturdays & Sundays (excluding public holidays).

If contractors wish to work outside of these hours, this must be with the agreement of the PM, landowner and CoW. The CoW is, however, to be fully informed of any complaints received regarding noise levels during the construction period.

The contractors should be fully acquainted with the SANS 10103, *The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.*

In the event that noise control measures are not implemented to the satisfaction of the Project Manager and CoW, a penalty will be imposed on the Contractor according to the allocations set by Eskom.

Management objectives

- Prevention of noise pollution
- Minimise nuisance factor of construction activities

Measurable targets

- No complaints from landowner or community
- No litigation

5.1.6 Fuel and hazardous materials storage

Contractors must identify fuels and hazardous substances to be stored on the site and must ensure that they know the effects of these substances on their staff and the environment. A copy of a fuels and hazardous substance inventory must be supplied to the CoW by the contractors.

Contractors must ensure that the quantities of fuels and chemicals on site are appropriate to the requirements and are stored and handled so as to avoid the risk of spillage. Fuels stored on site, above ground, must not exceed the threshold volumes stipulated in GN No. R. 386 of April 2006 pertaining to the list of Basic Assessment Activities requiring environmental authorisation and that came into effect on 3 July 2007, i.e. fuel stored on site must not exceed a combined capacity of more than 30 cubic metres at any one location. Should the anticipated volumes exceed these specified thresholds, an application must be lodged with DEAT, in terms of GN No. R. 385 of April 2006 and approval obtained before such activities commence.

All fuels, oils and chemicals must be confined to specific and secured areas, approved by the CoW. These materials must be stored in an area with a concrete or other impervious base, which is adequately bunded. The volume of the bund must be two times the volume of the containers stored. Gas and fuel should not be stored in the same storage area, and any

generators used on the site should also be placed on a bunded surface. The hazardous fuel storage area needs to be located away from the gas and oil pipelines.

Any tank used regularly for re-fuelling vehicles must be located within a bund which has a concrete base and brick walls. The fuel dispenser must be suspended within the bunded area while not in use. Generators used on site must always be placed on drip trays.

Liquid fuel stores must be located on an area of existing hardstanding which will provide a barrier to the underlying ground in the event of spills. The tank should be located in an area which is easily accessible to vehicles. Re-fuelling of vehicles must only take place at these areas, unless otherwise agreed to by the PM and CoW. Contractors will be responsible for ensuring that any party delivering fuels or chemicals to the site is aware of the appropriate storage/drop-off locations. Contractors and any relevant personnel responsible for the delivery of fuels or chemicals to the site must also be aware of the correct procedures and environmental requirements with respect to storage and drop-off locations of fuels. A method statement will be requested by the CoW for the location and management of liquid fuel stores.

The contractor must notify the RE and CoW immediately of any pollution incidents on site. Polluted stormwater run-off from the concreted storage areas must be collected, stored and disposed of at an approved waste site. The discharge of contaminated water must be prevented by the contractor. Contamination may be due to pollutants such as concrete, cement, chemicals, solvents, paints and fuels.

In the event of soil contamination cause by spillage of fuel or other pollutants, the source of the spillage must be isolated and the spillage must be contained. Contaminated soil must also be removed or in the case of a larger spill, an absorbent material must be applied. Contaminated soils that have been removed must be stored in a skip and disposed of at an approved dumpsite. The treatment of the contaminated soil and the areas of contamination must be undertaken to the satisfaction of the RE and CoW.

Management objectives

- Safe handling and transport of hazardous substances
- Minimise environmental pollution and damage

Measurable targets

• No spillage of hazardous substances

• No litigation due to environmental pollution

5.1.7 Servicing and cleaning of equipment and machinery

Equipment and machinery must be maintained in good working order to minimise the risk of leakage and possible contamination of the soil, groundwater, surface water and/or storm water by fuels, oils and hydraulic fluids. Any equipment or machinery that is found to be leaking must not be further used until it is appropriately fixed.

Contractors must position any equipment that may leak on watertight drip trays to contain any pollutants or remove such equipment from site. The drip trays used for storage of leaking equipment must be of a size that the equipment can be positioned within its perimeter. The equipment must also be protected from rain, where practical, to ensure that rainwater is excluded form the drip trays. Vehicles are to be serviced and cleaned in either a designated area or off site. If vehicles are serviced and cleaned on site, wastewater must be channelled to a lined sump area so as to avoid wastewater seeping into the ground. The CoW and PM must be consulted to ensure that the sump is placed in an appropriate area and that the specifications of the sump area are adequate. The sump area must be emptied regularly.

Wastewater from washing facilities shall be discharged into the existing sewage system, or removed from the site by the contractor or by other means, should the existing services be unavailable. Such alternative means shall be submitted to the CoW for approval.

Drips trays are to be used during the servicing of vehicles and must be checked and cleaned daily and must not be allowed to overflow. Materials collected in these drip trays must be collected and disposed of off-site at an approved waste disposal site. As for the disposal of other hazardous substances, materials collected from drip trays must be disposed of at a hazardous waste disposal site approved by the RE and CoW. The storage of collected spill materials from drip trays must be undertaken.

Management objective

- Prevention of pollution of the environment
- Minimise chances of transgression of the acts controlling pollution

Measurable targets

• No pollution of the environment

- No litigation due to transgression of pollution control acts
- No complaints from landowners

5.1.8 Refuse storage and disposal

Contractors must ensure that their employees deposit all refuse in bins and these must be emptied on a daily basis to prevent overflowing. Refuse must be disposed of off-site at an approved landfill site as agreed with the PM and CoW. Refuse bins must be watertight, windproof and scavenger-proof, and must be placed at regular intervals throughout the site.

Refuse must be separated into suitable categories and re-cycled. Construction debris such as scrap metal must be collected in a skip container and disposed of at an approved dumpsite. Refuse must not be burnt or buried on the site, or in the vicinity. Contractors must identify a permitted refuse disposal site for various categories of waste and provide documentary proof to the PM and CoW of the type and volume of waste to be disposed of there.

The Contractors must provide workers to clean up the site on a daily basis and the general cleanliness of the site must form part of the site inspections undertaken by the CoW.

Management objectives

- To prevent pollution of the environment
- Prevention of litigation due to illegal dumping
- All solid waste collected shall be disposed of at a registered waste dump.

Measurable targets

- No complaints from Landowners / Communities
- No pollution of the environment
- No litigation due to illegal dumping

5.1.9 Site Camp Establishment

The Contractor's Camp and Materials Storage Area must be located in consultation with the CoW. The Contractor must submit a Method Statement for this site camp placement five working days before establishing the site camp. The contents of this Method Statement must include a layout plan showing any offices, stores, vehicle parking, equipment and fuel and oil storage areas, toilet placement, equipment and material stockpiles. The Contractor will be

required to fence off or visually screen the site camp. No site staff other than security personnel must be housed on site. The Contractor must provide water and/or washing facilities at the camp site for personnel. The Contractors Camp and Materials Storage Area must be kept neat and tidy and free of litter. The Contractor must ensure that the site camp complies with the Occupational Health and Safety Act. This includes the provision of first aid and fire fighting equipment and external display of emergency contact numbers. The name of the responsible person in terms of safety must be included in the above Method Statement.

Management objectives

• Aesthetically pleasing works area, campsite and storage areas

Measurable targets

• No complaints from affected parties

5.1.10 Demarcation of eating areas

Eating areas must be restricted to the site offices and contractors' camp. If employees are to eat elsewhere on the site, the contractors must, in consultation with the CoW, designate places for eating in the working areas, and must provide adequate water for washing, toilets and refuse bins at all these places, which should be cleaned on a daily basis.

Management objectives

- Consolidate specific areas of work
- Litter/waste control
- Ensure that labours are located within the development foot print at all times

Measurable targets

No complaints from landowners or affected parties

5.1.11 Environmental Education

Please refer to section 6 of this document.

5.1.12 Defining no-go and working areas

It is important that activities are conducted within a limited area to facilitate control and to avoid impacts. The site shall thus be divided into working areas and `no-go' areas. Working areas are defined as those areas required by the Contractor to undertake the development.

The Contractor must ensure that all labour and materials remain within the boundaries of the working areas. Access must be restricted to development footprints only, with no disturbance of areas outside the development footprints allowed. Lay down and rest areas must also form part of the working area and must be indicated by the CoW.

The Contractor must ensure that no dumping, stockpiling, storage of equipment or spillage of construction material occurs in the no-go areas. No-go areas will be demarcated with danger tape attached to wooden pegs. The danger tape and wooden pegs (or similar) must be maintained by the contractor for the duration of the construction phase.

While no-go areas have not been specified, during construction thee landowners may request that certain areas outside the developable areas are delineated

Management objectives

- Defining the working areas
- Prevention of unnecessary damage to natural vegetation

Measurable targets

• Defining working areas

5.1.13 Clearing and Stabilisation

Any vegetation clearance requirements must be fully discussed with the CoW and the RE prior to any clearing taking place. Clearing must only be undertaken in areas earmarked for development. Areas which will be left cleared for longer than one month must be stabilised with straw. No burning or burying of any plant material is permitted on site.

Care should be taken not to impact on indigenous vegetation during the clearing operation, please consult the botanist report with regard to indigenous vegetation (see Annexure 12 of the EIR).

Management objectives

- Minimise unnecessary damage to vegetation
- Keep site as natural looking as possible
- Minimise possibility of erosion due to removal of vegetation
- Minimise removal of plant material on river and stream embankments
- Minimise damage to natural features

Measurable targets

- Only vegetation cleared as required for site construction purposes
- No vegetation interfering with structures and statutory requirements upon completion of the contract
- No visible erosion scars three months after completion of the contract due to vegetation removal
- No visible damage to the vegetation outside the site one year after completion of the contract due to herbicide leaching
- No litigation due to unauthorised removal of vegetation

5.1.14 Soil Erosion

Soil erosion should be avoided by not exposing large areas of the substrate simultaneously. Areas that are not to be developed and which are particularly sensitive to erosion should be demarcated with droppers and/or danger tape and be considered as no-go areas. All construction vehicles should only use designated routes on site. Should erosion occur as a result of non-adherence to the above recommendations, or where it impacts on the surroundings, appropriate rehabilitation will be required. Rehabilitation requirements must be determined in consultation with the RE and CoW. This could be in the form of a method statement.

Management objective

- Minimise damage to topsoil and environment
- Successful rehabilitation of all damaged areas
- Prevention of erosion

Measurable targets

- No loss of topsoil due to construction activities
- All disturbed areas successfully rehabilitated within one year of completion of the contract
- No visible erosion scars one year after completion of the contract

5.1.15 Batching and mixing areas

Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage

could have serious detrimental effects on the surrounding environment. The following mitigation measures are to be implemented in order to minimise environmental impact:

- Responsibly used ready-mix concrete and cement is preferred to site batched mixes.
- Cement contaminated equipment is to be washed so that contaminated water does not enter stormwater, groundwater, drainage lines, streams/rivers or dams. Contaminated water must either be removed from site or, with the approval of the CoW and the Local Authority, be disposed of into the local sewage system. Where possible, contaminated water should be recycled back into the batching process.
- Cement must be mixed on mixing trays that prevent runoff and spillage. No mixing will be allowed directly on the ground's surface.
- Locations for mixing areas in the site camp are to be approved by the Project Manager/Engineer and the CoW.
- Used cement bags are to be stored in a wind and rainproof container for disposal. Used bags are to be removed from site on a regular basis and under no circumstances burned as a method of disposal.
- Excess or spilled cement and concrete are to be removed to an approved municipal waste site.
- Contaminated soil resulting from a cement or concrete spill is to be removed or rehabilitated at the cost of the Contractor and to the satisfaction of the Project Manager/Engineer and the CoW.

Management objective

• Prevention of soil and water contamination

Measurable targets

• No unnecessary spillage of cement

5.1.16 Solid Waste Management

The Contractor is responsible for the establishment of an integrated waste management system that is acceptable to the Project Manager/Engineer and the CoW. The integrated waste management system must be based on waste minimisation and should incorporate reduction, recycling, re-use and disposal where appropriate. This system is to be presented to the CoW in the form of a Method Statement prior to the commencement of works. For the purposes of this EMP, waste includes all debris, refuse, hazardous waste (petroleum, chemicals and others to be determined on site), construction litter and asphalt (tar) waste. Refuse collected from the working areas must be stored in a water, wind- and animal- proof

enclosure at the designated site camp. Refuse is to be removed from the site camp at least once a week by the Contractor or an appointed refuse removal agent (or approved local waste removal system). Refuse must be disposed of at an approved waste disposal site. Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and bunded area. The location of such bund sites is to be approved by the Project Manager/Engineer and the CoW. This waste will be disposed of at a hazardous waste disposal site as approved by the Local Authority. Storage and disposal of solid waste is also controlled through other relevant legislation that must be complied with e.g. the Occupational Health & Safety Act. The Contractor will ensure that waste and surplus food, food packaging and other waste is not deposited by employees anywhere on the site except in refuse bins for removal on a daily basis by the Contractor to the central point in the site camp.

Refuse bins must be watertight, wind-proof and scavenger-proof, and must be placed at regular intervals throughout the site. The CoW will approve the design of the bins. Refuse collected from the site must be stored in an appropriate closed and weatherproof container and removed once a week. Refuse must be separated into suitable categories and re-cycled. Construction debris such as scrap metal must be collected in a skip container and disposed of at an approved dumpsite. Refuse must be removed from the site at least once a week or as soon as it is required. Refuse must not be burnt or buried on the site, or in the vicinity. Contractors must identify a permitted refuse disposal site for various categories of waste and provide documentary proof to the PM and CoW of the type and volume of waste to be disposed of there. The Contractors must ensure that workers clean up the site on a daily basis and the general cleanliness of the site will form part of the site inspections undertaken by the CoW.

Management objectives

- To keep the servitude neat and clean
- Disposal of rubble and refuse in an appropriate manner
- Minimise litigation
- Minimise landowner complaints

Measurable targets

- No rubble or refuse lying around on site
- No incidents of litigation
- No complaints from landowners
- No visible concrete spillage on the servitude

5.1.17 Ablution facilities

The Contractor must provide the necessary ablution facilities for all his personnel. Chemical toilets must be used in all other areas of the site where necessary. A minimum of one toilet per 15 persons must be provided. Toilets must be strategically positioned to cater for the specific operations on site. Toilets must be easily accessible and must be transportable. The toilets must be secured to prevent them from blowing over, and must be provided with an external closing mechanism to prevent toilet paper from being blown out. Toilet paper must be provided in all toilets. Toilets must be cleaned at least twice per week and must be serviced regularly by a reputable toilet-servicing company appointed by the Contractor. Toilets must be emptied before long weekends and builders' holidays. Toilets must be locked after working hours.

The Contractor must ensure that chemicals and/or waste from toilet-cleaning operations are not spilled on the ground at any time. All spills must be cleared up immediately by the Contractor who hired the toilet. Contaminated soils due to spills must be removed and stored in a skip and disposed of at an approved dumpsite. The treatment of the contaminated soil and the areas of contamination must be undertaken to the satisfaction of the RE.

Abluting anywhere other than in the toilets will not be permitted. Use of other areas within the site for ablution purposes and/or disposal of chemicals and/or waste, will result in the Contractor being given a spot fine (by the CoW). The Contractor will also be responsible for cleaning up any waste deposited by his personnel. Pit latrines must not be used.

The removal of toilets off site as they become less required must be done in manner that does not result in pollution of the substrate. Should any soil be contaminated, the service provider will be required to remove the soils as well. Collected waste must be secured before being transported to an appropriate waste facility. This will be the responsibility of the service provider.

Management objectives

- Ensure that proper sanitation is achieved
- Prevent spreading of disease

Measurable targets

- No complaints received from Landowners or Regional staff regarding sanitation
- No litigation or compensation claims

5.1.18 Provision of water

Contractors will be responsible for providing construction water, water required for dust control, drinking and washing water. Contractors will also be responsible for providing washing facilities for all staff.

Wastewater from washing facilities must be removed from the site by the contractors should a sewer system be unavailable.

Management objectives

• Ensure that water demands are met

Measurable targets

• Provision of water

5.1.19 Stormwater control

Contractors must take reasonable measures to prevent erosion resulting from a diversion, restriction or increase in the flow of stormwater caused by the presence of their works, operations and activities, all to the satisfaction of the CoW. Any stormwater collected in bunded areas containing oils, fuels, chemicals or other potentially polluting substances must be pumped out of the bund, collected in a suitable container and removed from the site for appropriate disposal.

Contractors must provide adequate control measures to prevent stormwater damage and erosion during construction. Control measures should include the control by sumps and adequate pumping of water ingress into trenches below the water table. Stormwater should also be directed into attenuation ponds wherever possible. Stormwater that has been spoiled with silt and or suspended solids may not be released back into the natural stormwater system. Portable pools may be used as settling ponds on site. All methods of stormwater control during the construction phase are to be agreed and approved by the PM and CoW.

Berms and existing stormwater drainage systems must be used to prevent surface run-off from entering site excavations.

Management objectives

• Ensure that water demands are met

Measurable targets

Provision of water

5.1.20 Cleanliness of public roads

Contractors must ensure that construction vehicles are not overloaded so as not to spill construction or excavated material onto public roads. Contractors must provide a washing system for cleaning the wheels of vehicles moving off-site, and must ensure that this is utilised as required. This must be done in a manner which does not contaminate soil and must be done in consultation with the CoW. Thus, the wheels of vehicles that are driven in any hazardous substances may not be washed directly onto the ground.

5.1.21 Traffic control and safety

Traffic control and safety must be done in accordance with the South African Traffic Safety Manual, with the relevant signs, flagmen and barriers being provided where relevant and at the various access points. Traffic control must be done in co-operation with local traffic officials. All laws and regulations applicable on the public road system are enforceable on the construction site.

5.1.22 Emergency procedures

a) First aid procedures:

Contractors must provide and maintain a suitable first aid kit on the site and must ensure that a qualified first aid practitioner is present during working hours, in accordance with the Occupational Health and Safety Act (85 of 1993). They must also ensure that their staff know and can carry out the procedures for dealing with accidents and must clearly define the emergency procedures to be followed for obtaining medical treatment and assistance in the event of serious injury.

b) Spills of fuels and hazardous substances:

Contractors must keep the necessary materials and equipment on site to deal with ground spills of any hazardous materials present. They must set up a procedure for dealing with such spills, which must be approved by the PM and CoW and must include a provision to notify the PM of any spills.

In the event of soil contamination cause by spillage of hazardous substances onto the ground, the source of the spillage must be isolated and the spillage must be contained. Contaminated soil must also be removed or in the case of a larger spill, an absorbent material must be applied. Contaminated soils that have been removed must be stored in a skip and disposed of at an approved dumpsite. The treatment of the contaminated soil and the areas of contamination must be undertaken to the satisfaction of the CoW and RE.

The clean up of spills and any damage caused by a spill will be for the relevant contractors' account.

c) Emergency advisory procedure:

Contractors must ensure that there is an emergency advisory procedure on site before commencing any operations that may endanger the lives of any personnel on site, or cause damage to the environment.

Contractors must also ensure that all personnel are familiar with all emergency procedures to be followed. It must be ensured that lists of all emergency numbers and contact people are regularly updated, and that numbers and names are posted at relevant locations at all times.

d) Fire precautions:

Cookers and heaters used on site should be devices which have been specifically designed for those purposes. Smoking should be permitted on the site at the discretion of the PM and ECO and the contractors must ensure that all personnel are aware of the fire risk and the need to extinguish cigarettes before disposal.

Wherever work involves welding, gas cutting or cutting of metal, fire-fighting equipment must be immediately available. A suitably qualified firewatch should also be in attendance.

Contractors must appoint a member of their staff to be responsible for the installation and inspection of fire extinguishers. The PM and CoW must receive copies of the inspection

reports. A map should be drawn up to indicate the locations of fire extinguishers and they should be clearly visible and demarcated in accordance with legislation. Contractors must also supply site offices, kitchen areas, workshop areas, stores of fuel and hazardous materials, and any other areas identified by the CoW, with fire extinguishers.

No smoking will be permitted on the site except for within designated areas. Suitable fire fighting equipment must be readily available in this area. The contractor will be requested to remove any person from the site who is found lighting a fire or smoking outside of the designated smoking area. Cigarettes must be properly extinguished before disposal. Cigarettes must be disposed of in bins provided on site and must not be thrown onto the ground. Fires for heating, cooking or disposal of any material will not be permitted. Heating and cooking will only be allowed on a gas cooker within a designated area of the site camp. Purpose built "braai"areas may be permitted within the site camp and must be well maintained. Suitable fire fighting equipment must be readily available. Welding, gas cutting, cutting of metal and heat curing will be permitted within specifically designated and adequately marked areas on the site. These areas, as well as any other areas where on site welding, gas cutting of metal is unavoidable, "must have" the sites are to be approved by the RE and the CoW.

All "hot" work areas must have an operational fire extinguisher readily at hand. The Contractor must ensure that all staff undergo training on the use of a fire extinguisher when needed. All fire extinguishers must be inspected on a monthly basis to insure that the devices will work properly if needed. The inspection procedure is detailed below:

Procedure:

The Contractor must ensure that a responsible person is appointed to do the monthly inspection of the fire extinguisher. A monthly inspection spreadsheet must be available to conduct the inspection. This sheet must be submitted to the RE once completed.

Management objective

- Minimise risk of veld fires
- Minimise damage to grazing

Measurable targets

- No veld fires started by the Contractor's work force
- No claims from Landowners for damages due to veld fires

How to inspect the fire extinguisher:

- Insure access to the extinguisher is not blocked and that it is readily available for use.
- The pressure should be within the recommended level on extinguishers equipped with a gauge. The needle should be in the green zone. If the needle is not in the green zone, the extinguisher requires professional maintenance and this should be noted on the inspection report.
- Verify the locking pin is intact and the tamper seal is not broken.
- Visually inspect the hose and nozzle to ensure they are in good condition.
- Visually inspect the extinguisher for dents, leaks, rust, chemical deposits or other signs of abuse/wear and note any findings on the inspection report. If the extinguisher is damaged or needs recharging, remove it from service and note this on the inspection report.
- Fire extinguishers must be pressure tested (a process called hydrostatic testing) every six years to ensure the cylinder is safe to use. The inspection sheet has all hydrostatic testing dates noted. If an extinguisher requires this service, this should be noted in the comments. The RE will arrange for testing.

The Contractor will be liable for all costs incurred by organisations called to extinguish any fires started by any person(s) under their control. In such an event, the Contractor will be liable for all costs incurred to remediate burnt areas on the site and areas to which the fire has spread. The Contractor must ensure that the contact details of the nearest Fire Department are displayed on site (together with other emergency services) and that all persons involved with the project know the location of these numbers on site.

5.1.23 Safety on site

Contractors must follow the guidelines of the Occupational Health and Safety Act (85 of 1993). These include:

The wearing of hard hats by -

• All persons entering the site;

- All persons within 10m of any situation where any form of lifting or hoisting equipment is being used; and
- Any personnel working in any other situation where the possibility of head injury is present, e.g. an area where overhead work is taking place.

The wearing of gloves by personnel -

- Handling heavy materials;
- Carrying out maintenance activities within a crusher;
- Engaged in welding or gas cutting activities; and
- Handling materials/equipment with unfinished steel edges.

The wearing of approved safety shoes or safety boots by -

• All persons entering the construction site or workshop, storage and depot areas.

The wearing of safety goggles by -

- Persons operating equipment under dusty conditions;
- Persons engaged in cutting or welding activities; and
- Persons engaged in grinding activities.

The wearing of hearing protection by -

- All persons engaged in rock drilling activities (>85 decibel):
- All crushing operators; and
- Any persons entering into high noise areas (>85 decibel).

These areas should be appropriately marked using a standard National Occupational Safety Association (NOSA) pictogram.

The wearing of safety belts by -

- Any person carrying out work 2m above ground level, unless it is being carried out from a safe and protected work platform; and
- All heavy equipment operators.

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5.2 SITE-SPECIFIC CONTROLS

The specific environmental mitigation required as a result of the EIA's undertaken within the site is dealt with below. The recommended mitigation will translate into environmental controls where appropriate and form part of this EMP:

5.2.1 Security

Although largely an operational issue, security of the site will need to be maintained during construction. Contractors will be responsible for the security of their personnel, construction camps and equipment. No personnel will be permitted to live on the site. Security personnel present after hours must be provided with the necessary cooking, heating and ablution facilities. Security lighting should not result in a nuisance for neighbouring properties.

5.2.2 Traffic

Access roads and routes to the site during construction will be demarcated with appropriate signage and pegs (if necessary). Contractors must ensure that their vehicles are road-worthy and that loads are properly secured. Access to the site must be restricted to construction vehicles and personnel only. The construction site must be off limits to the general public at all times.

See also Section 5.1.21 (Traffic control and safety) and Section 5.1.20 (Cleanliness of public roads) above.

5.2.3 Archaeology

In the event of that any archaeological material is discovered during earth moving activities all works should be stopped and it will be reported to the PM, CoW and SAHRA immediately. Work must then also be stopped until such time as the necessary assessment has been undertaken and the required authorisation to continue has been received from SAHRA. Two weeks must be allowed in the construction programme to attend to the possibility of dealing with archaeological or palaeontological material. A contingency budget should also be

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considered, since the cost of such investigations will not be for the contractor's account.

Management objectives

- Protection of archaeological sites and land considered to be of cultural value
- Protection of known sites against vandalism, destruction and theft
- The preservation and appropriate management of new archaeological finds should these be discovered during construction

Measurable targets

- No destruction of or damage to known archaeological sites
- Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologist

5.2.4 Noise impact

Construction work is only permitted during prescribed times and particular activities such as blasting and piling will only be undertaken with the necessary controls in place, as stipulated by the Noise Control Regulations. Prior to any blasting occurring on site, the adjacent neighbours must be notified. The imploding method of blasting must be used wherever possible.

See also Section 5.1.2 (Noise control) above.

Management objectives

- Prevention of noise pollution
- Minimise nuisance factor of construction activities

Measurable targets

- No complaints from landowner or community
- No litigation

5.2.5 Geotechnical impacts

Of specific importance in this regard is the management of ground water during excavation, to ensure that the substrate is not contaminated. In the event of contamination, immediate

remedial actions appropriate to the situation will be necessary. These must include *in situ* chemical or biological treatment, or the removal of polluted material for off-site treatment.

Depending of the level of the impact, a Method Statement will be requested on the cleanup methodology to be used in the event of groundwater contamination. This must be approved by the CoW. See also Section 5.1.18 (Stormwater control) above.

5.2.6 Surrounding Landuse

Cognisance must be taken of the proximity to the surrounding landuses and thus general disturbance should be kept to a minimum.

5.3 METHOD STATEMENTS

Specified contractors must provide method statements for approval by the PM and CoW prior to work commencing on aspects of the project deemed or identified to be of greater risk to the environment, when called upon to do so by the PM. Statements from contractors will be required by the CoW for specific sensitive actions. Construction activities which will need a method statement includes, but is not limited to:

- contractor's camp establishment including bulk fuel storage, toilet facilities and waste management;
- vegetation management
- works around identified archaeological sites;
- pumping and/or dewatering;
- stormwater management and pollution prevention;
- traffic disruptions and alternative routes;
- blasting;
- stockpiling of excavated material prior to removal from site;
- windblown sand and dust control measures;
- batching plant activities; and
- disposal of contaminated groundwater or surface water.

A method statement is a living document that allows for modifications to be negotiated between the contractors and the PM, as circumstances dictate. All method statements will form part of the EMP documentation and are subject to all terms and conditions contained in the EMP.

Note that a method statement is a point of departure for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment. Changes to, and adaptations of, method statements can be implemented with the prior consent of all parties.

A method statement describes the scope of the intended work in a step-by-step description in order for the PM and CoW to understand the contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks. For each instance where it is requested that a contractor submit a method statement to the satisfaction of the PM and CoW, the format should clearly indicate the following:

- What a brief description of the work to be undertaken;
- How a detailed description of the process of work, methods and materials;
- Where a description/sketch map of the locality of work (if applicable); and
- When the sequencing of actions with due commencement dates and completion date estimates.

All method statements are to be to the satisfaction of the PM and CoW.

5.4 SITE REHABILITATION

The contractor must ensure that all temporary structures, equipment, materials, waste and facilities used for construction purposes are removed upon completion of the project. The site clean up must be to the satisfaction of the PM and CoW.

Where appropriate, contractors must employ suitably qualified persons to rehabilitate areas damaged by construction activities within and surrounding the contractors' camps. Contractors will be responsible for rehabilitating areas identified by the PM and CoW.

Management objective

- Minimise damage to topsoil and environment
- Successful rehabilitation of all damaged areas
- Prevention of erosion

Measurable targets

- No loss of topsoil due to construction activities
- All disturbed areas successfully rehabilitated within one year of completion of the contract
- No visible erosion scars one year after completion of the contract

5.5 MEASUREMENT AND PAYMENT

The environmental control measures stipulated in this EMP are deemed to be included in the rates tendered in the schedule of quantities provided with the tender documentation for the development of the substation and powerlines.

6. ENVIRONMENTAL AWARENESS TRAINING

Due to the implication of the National Environmental Management Act (107 of 1998), that any costs incurred to remedy environmental damage will be borne by the person responsible for that damage, it is critical that the contractors read and understand the requirements of this document and any succeeding documents pertaining to environmental requirements before construction commences. It is a requirement of the act that everyone takes reasonable measures to ensure that they do not pollute the environment.

Reasonable measures include informing and educating employees about the environmental risks of their work and training them to operate in an environmentally acceptable manner. Training is fundamental to the successful implementation of the EMP. All personnel whose work may result in an impact on the environment must receive appropriate training in the environmental procedures to be followed. In this regard, the following must be fulfilled:

- All personnel working on the construction site must attend environmental awareness training workshops conducted by the CoW. The purpose of these workshops is to provide staff with the information that they require to enable them to meet the requirements of the EMP. The CoW must call upon the services of a specialist environmental education translator should this be required. Contractors and all their staff must attend and failure to do so will not exempt them and/or their employees from environmental compliance.
- Contractors must make allowance for site staff to attend an initial environmental awareness training workshop of approximately one hour. In addition, contractors must ensure that all new staff and sub-contractors attend environmental awareness training workshops within five working days of commencement of work on site.
- All personnel involved in day-to-day activities that could have an impact on the environment must be given on-the-job training in the procedures to be followed. Contractors must ensure that this is done and seek the support of the CoW where the contractor and his or her staff are not familiar with the procedures to be followed.
- Contractors must keep a register of all personnel attending the environmental awareness training workshops and the on-the-job training detailed above and copy this to the CoW.

- All new staff and sub-contractors that start work during the course of the contract must attend the training workshops conducted by the CoW.
- All staff must be trained in emergency response procedures through the conducting of dry runs of emergency situations. Records of emergency response training must be maintained and must include an attendance list for each training session. These records must be made available for audit purposes.

Failure to attend environmental awareness training will not exempt any contractor and/or employees from compliance with the EMP.

It is recommended that environmental awareness posters be developed and the contractors must ensure that these are displayed at the construction camp and site to visually depict environmental 'do's and don'ts'. The posters must use pictures to convey the intended message and any explanatory text will be in isiXhosa, English and Afrikaans.

7. RECORD OF AUDITING & CORRECTIVE ACTION

Measuring the performance of those personnel responsible for implementing the environmental controls stipulated in this EMP is essential to demonstrate compliance with specified controls to identify non-conformance and ensure that appropriate corrective action is taken to minimise the impact that may result from non-compliance. The CoW must keep written records of all activities on site, particularly documenting auditing and corrective action.

7.1 AUDITING

An auditing programme will be implemented and will comprise:

- Visual inspections of the site activities by the PM on a bi-weekly basis;
- Visual inspections of the site activities by the CoW, weekly. Where a particular aspect requires more detailed monitoring, more frequent inspections will be undertaken; and
- Review of records and documentation to reconcile these with the construction programme.

Records must be maintained during the construction phase to enable compliance with the EMP specifications to be demonstrated. These will typically comprise a daily log of activities that record waste management (documentary proof of type, volume, disposal and transport), fuels and chemicals management (deliveries, storage and spills) and other environmental issues such as adverse weather (wind, rain) and surface water run-off.

7.2 CORRECTIVE ACTION

Issues of non-conformance noted by the ECO must be communicated to the PM, who will be responsible for seeing that the relevant parties are informed of the non-conformance so that appropriate corrective action can be taken by them. The CoW must advise on the

appropriate corrective actions (penalties and transgressions) and where necessary these must be agreed upon collectively.

Environmental issues must be addressed at regular site meetings between the CoW and the PM. The CoW must present a written report of any environmental concerns or issues that have arisen, and of corrective actions that have been taken. This must occur at monthly construction site meetings. Outstanding corrective actions will be discussed and agreed at these meetings. This report back with corrective actions must be minuted at this meeting. All written accounts of incidents and meetings must be appropriately filed for record purposes and be available upon request with respect to compliance visits by DEAT.

Issues relating to complaints or comments received from the public must also be discussed at these meetings. Minutes of the meetings will be prepared by the CoW and copied to all attendees before the next meeting. The frequency of the site meetings will be agreed by the PM, CoW, the contractors and other relevant parties prior to the commencement of the project.

Issues of non-compliance noted by the CoW must be communicated to the PM immediately and action taken immediately to rectify the situation.

8. PENALTIES & BONUSES

Non-compliance with the conditions of this EMP, which forms part of the contract agreement, will constitute a breach of contract. Penalties will be issued in instances of non-compliance by contractors or any employee, sub-contractor or supplier. The penalty will be issued to the principle contractor where applicable in the following manner:

- The Contractor will be informed in writing of any infringement of the environmental control measure(s) stipulated in this EMP and be provided with a time frame in which corrective action must be taken;
- Should corrective action not be undertaken within the given time frame, a written warning will be issued along with a time frame in which the issue needs resolution;
- Should the warning be ignored, a penalty will be imposed on the Contractor.

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In addition to penalties, the Project Manager has the power to remove from site any person who is in contravention of the EMP, and if necessary, the Project Manager can suspend the relevant part or all of the works, as required.

Note that penalties can be issued over and above costs that are incurred for the repair or rehabilitation of any environmental damage caused by the Contractor and all the parties over which they have responsibility. In this regard costs incurred by the Contractor in repairing or rehabilitating any environmental damage caused by non-compliance with the EMP cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works.

Penalty amounts should be deducted from Certificate payments made to the Contractor. These funds must be kept separately and donated to a non-profit organisation that works in the environmental or conservation field. The Project Management Team must nominate such an organisation collectively. This must be approved by the CoW.

The PM and CoW may consider a bonus system and/or environmental certificate award for teams or individuals that perform works in an environmentally responsible manner.

9. REVIEW OF ENVIRONMENTAL MANAGEMENT PLAN

This EMP should be reviewed on a yearly basis in order to ensure its relevance to the nature of the activities during the construction phase.

10. DECLARATION OF ADHERENCE TO THE ENVIRONMENTAL MANAGEMENT PLAN

The Proponent, Project Manager / Engineer and the Environmental Control Officer must sign declarations of adherence to the EMP, stating the following:

- that the conditions of the authorisation were brought under their attention and that they have read and understood the contents of the Environmental Management Plan and agree to adhere to all the specified requirements.
- that they understand their responsibilities in terms of enforcing and implementing the Environmental Specifications as set out in the various documents for the aforementioned site.
- that they also undertake to inform all persons under my supervision of such specifications and contents of the documents.

11. SUMMARY WORKSHEET

A summary of environmental specifications has been tabulated (see table below), highlighting the EMP specification, mitigations measures, the person responsible for implementing the mitigations and time periods / frames in which the impact must be mitigated.

Construction Environmental Management Plan : Work Sheet Construction of 20MVA Substation, 132kV Loop-in Line and 22kV Powerline, Schmidtsdrift				
CONTRACTOR:		Environmental Practitioner / Clerk of Works:		
EMP requirement/specification		Person Responsible	Corrective measure/ Implementation time period	
	Preliminaries			
Site camp establishment	 The Contractor's Camp and Materials Storage Area must be located in consultation with the ECO. A Method Statement is required, outlining the erection of structures 	Contractor	A method statement must be submitted to the CoW/EP one week prior to the commencement of work.	
Environmental awareness induction training	 All personnel whose work may result in an impact on the environment must receive appropriate training in the environmental procedures. 	Contractor	This must occur when new labourers or staff are brought on to site	
Provision for workers on site: eating/resting areas.	Workers are restricted to the site camp / offices.	Contractor	This must be allocated within the site camp erection, prior to work commencing	
Defining no-go and working areas	 Access must be restricted to development footprints only, with no disturbance of areas outside the development footprints allowed. 	Contractor	This must be established prior to the commencement of construction activities.	
Clearing and Stabilisation	 Any vegetation clearance requirements must be fully discussed with the EP/CoW prior to any clearing taking place. Clearing must only be undertaken in areas earmarked for development. 	Contractor	This must be established prior to the commencement of construction activities.	
	Roads, Traffic Control and	d Safety		
Emergency procedures: 1 st aid, fuel/hazardous substance spillage, fire, contact numbers:	All emergency information must be clearly displayed for all labourers to see.	Contractor	This will require on-going monitoring for the duration of construction activities.	

Safety: eg hardhats, gloves, boots,	/	Contractor	This will require on-going monitoring for the
goggles, hearing protection, site			duration of construction activities.
security (refer to Health & Safety			
Plan)			
Traffic control, access and safety:	1	Contractor	This will require on-going monitoring for the
Traffic signage and flags men are must			duration of construction activities.
be visible to motorists.			
Cleanliness of public roads:	The wheels of vehicles that are	Contractor	This will require on-going monitoring for the
Contractors must ensure that	driven in any hazardous substances		duration of construction activities.
construction vehicles are not	may not be washed directly onto the		
overloaded so as not to spill	ground.		
construction or excavated material			
onto public roads.			
	Waste Managemen	t	
Ablution facilities	• The Contractor must ensure that chemicals	Contractor	This must be established prior to the
	and/or waste from toilet-cleaning operations		commencement of construction activities. In
	are not spilled on the ground at any time.		addition, this will require on-going monitoring for
	• All spills must be cleared up immediately by		the duration of construction activities.
	the Contractor who hired the toilet.		
	• Contaminated soils due to spills must be		
	removed and stored in a skip and disposed of		
	at an approved dumpsite.		
	• The treatment of the contaminated soil and		
	the areas of contamination must be		
	undertaken to the satisfaction of the PM		
Refuse storage and disposal	• Litter bins must be provided and must be	Contractor	I his must be established prior to the
	emptied regularly.		commencement of construction activities. In
	• Litter bins must be watertight, wind-proof and		addition, this will require on-going monitoring for
	Scavenger-proof and must be placed at		the duration of construction activities.

	 regular intervals throughout the site. Refuse must not be burnt or buried on site. Waste bins must be fully assessable to all workers on site, therefore must be placed at regular intervals through out the site. 		
	Water Management	t	
Water pollution prevention and management	• Wastewater from washing facilities must be removed from the site by the contractors should a sewer system be unavailable.	Contractor	This will require on-going monitoring for the duration of construction activities.
Provision of water: Contractors will be responsible for providing construction water, water required for dust control, drinking and washing water. Contractors will also be responsible for providing washing facilities for all staff.		Contractor	This will require on-going monitoring for the duration of construction activities.
Stormwater control: Contractors must take reasonable measures to prevent erosion resulting from a diversion, restriction or increase in the flow of stormwater caused by the presence of their works, operations and activities, all to the satisfaction of the ECO.	 Any stormwater collected in bunded areas containing oils, fuels, chemicals or other potentially polluting substances must be pumped out of the bund, collected in a suitable container and removed from the site for appropriate disposal. 	Contractor	This will require on-going monitoring for the duration of construction activities.
	Pollution Manageme	nt	
Dust control	 Dust management planning must be implemented by the contractor. This could include spraying of water on unpaved roads and other exposed sandy surfaces, proper 	Contractor	This will require on-going monitoring for the duration of construction activities.

Noise control	 covering of construction material during transportation, ensuring that vehicle speeds do not exceed 40km/h when traversing unconsolidated areas. Excess wind and dust conditions must be reported to the EP/CoW in his/her absence. Activities such as blasting and piling can only be undertaken with the necessary controls in place. Prior to any blasting occurring on site, the adjacent neighbours must be notified. The imploding method of blasting must be used wherever possible. 	Contractor	This will require on-going monitoring for the duration of construction activities.
Batching and mixing areas	 Cement contaminated equipment is to be washed so that contaminated water does not enter stormwater, groundwater, drainage lines, streams/rivers or dams. Cement must be mixed on mixing trays that prevent runoff and spillage. No mixing will be allowed directly on the ground's surface. Contaminated soil resulting from a cement or concrete spill is to be removed or rehabilitated. 	Contractor	This must be established prior to the commencement of construction activities. In addition, this will require on-going monitoring for the duration of construction activities.
Servicing and cleaning of equipment and machinery	 Servicing and cleaning of equipment must be done off site. Drip trays must be provided should any machinery be found to be leaking. 	Contractor	This will require on-going monitoring for the duration of construction activities.
Fuel and hazardous materials storage	 All fuels, oils and chemicals must be confined to specific and secured areas, approved by the ECO. These materials must be stored in an area 	Contractor	This must be established prior to the commencement of construction activities. In addition, this will require on-going monitoring for the duration of construction activities.

	with a concrete or other impervious base.		
	which is adequately bunded. The volume of		
	the bund must be two times the volume of the		
	containers stored. Gas and fuel should not be		
	stored in the same storage area, and any		
	generators used on the site should also be		
	placed on a bunded surface		
	 In the event of soil contamination cause by 		
	spillage of fuel or other pollutants, the source		
	of the spillage must be isolated and the		
	spillage must be contained.		
	 Contaminated soil must also be removed or 		
	in the case of a larger spill, an absorbent		
	material must be applied.		
Herbicide use	The use of herbicides must be approved be	Contractor	This must be established prior to the
	approved by the EP/CoW.		commencement of construction activities. In
			addition, this will require on-going monitoring for
			the duration of construction activities.
	Sensitive Environmental F	eatures	
Botanical (Flora)	All flora not interfering with the operation of	Contractor	This must be established prior to the
	the substation shall be left undisturbed,		commencement of construction activities. In
	clearly marked and indicated on the site plan.		addition, this will require on-going monitoring for
	• Special Care should be taken not to damage		the duration of construction activities.
	or remove any indigenous botanical species,		
	i.e. Shepard tree (see figure 1).		
Fauna	The Contractor shall under no circumstances	Contractor	This must be established prior to the
	interfere with livestock without the landowner		commencement of construction activities. In
	or community members being present or their		addition, this will require on-going monitoring for
	permission. This includes the moving of		the duration of construction activities.
	livestock where they interfere with		
	construction activities.		
	Civil Works		

Soil Erosion	Soil erosion should be avoided by not	Contractor	This will require on-going monitoring for the
	exposing large areas of the substrate		duration of construction activities.
	simultaneously.		
	• Areas that are not to be developed and which		
	are particularly sensitive to erosion should be		
	demarcated with droppers and/or danger		
	tape and be considered as no-go areas. All		
	construction vehicles should only use		
	designated routes on site.		
	• Should erosion occur as a result of non-		
	adherence to the above recommendations, or		
	where it impacts on the surroundings,		
	appropriate rehabilitation will be required.		
	Rehabilitation requirements must be		
	determined in consultation with the RE and		
	ECO. This could be in the form of a method		
	statement.		
Surrounding Landuse	Cognisance must be taken of the proximity to	Contractor	This will require on-going monitoring for the
	the surrounding landuses and thus general		duration of construction activities.
	disturbance should be kept to a minimum.		
	Site-Specific Control	ls	
Heritage issues: discovery of	In the event of that any archaeological	Contractor	This will require on-going monitoring for the
artifacts	material is discovered during earth moving		duration of construction activities.
	activities all works should be stopped and it		
	will be reported to the PM, EP/CoW and		
	SAHRA immediately.		
Method Statements (MS)	Specified contractors must provide	Contractor	
	method statements for approval by the		
	PM and CoW prior to work commencing		

C	on aspects of the project deemed or		
i	dentified to be of greater risk to the		
e	environment, when called upon to do so		
t	by the PM. Statements from contractors		
v	vill be required by the CoW for specific		
s	sensitive actions.		

12. BIBLIOGRAPHY

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