EMP FOR THE CONSTRUCTION OF THE PROPOSED NORMANDIE-KEMP POWERLINE PROJECT AND THE DECOMMISSIONING OF AN EXISTING 88KV POWERLINE, MKHONDO LOCAL MUNICIPALITY, MPUMALANGA PROVINCE

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TERMS AND DEFINITIONS

Audit: Regular inspection and verification of construction activities for implementation of the approved EMP

Contractor
Construction companies are appointed on behalf of the client to undertake the construction activities, as well as their subcontractors and suppliers.

Development site: Boundary and extent of development works and infrastructure.

Emergency situation – An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entail amongst others the:-

- Spill of petroleum products and lubricants into the aquatic system;
- Potential damage, erosion and slumping of unstable river embankments or drainage channels;
- Potential event of impeding the continuous flow of water to downstream water users dependant on the flow.

EMP: Environmental Management Plan

Project/Site Manager - A person who represents Eskom and is responsible for enforcing the technical and contractual requirements of the project.

Environment
The environment means the surroundings within which humans exist and that could be made up of water, air, soil, sand, plants and animals.

Environmental Aspect
An environmental aspect is any component of a contractor's construction activity that is likely to interact with and on the environment.

Environmental Impact
An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Control Officer
A qualified person nominated by the appointed contractor and/or client who will ensure the day-to-day implementation of the EMP by contractors during construction and operation of the project.

General Waste

Domestic waste, commercial waste, non-hazardous industrial waste and builders rubble e.g. paper, plastics, food, tins, wood, etc.

Topsoil
The layer of soil covering the earth which provides a sustainable environment for the germination of seeds, allows water penetration, and is a source of micro-organisms and plant nutrients.

Watercourse
A natural channel in which water flows regularly or intermittently

Waste
An unusable or unwanted substance or material, such as a waste product

1.1 OBJECTIVES

This section outlines the environmental management guideline measures that will be undertaken to avoid or minimize impacts on the environment throughout all phases of the proposed development.

The main objectives of this EIMP are to:

- Outline environmental management measures related to project activities and provide project contractors with guidelines for carrying out construction activities in such a way as to minimize environmental impacts,
- Be used as a foundation for the specific environmental management instructions contained in construction contract documents, where compliance will be a contractual obligation for contractor (s)
- Be used as an educational tool, for orientation and training of project personnel and contractors.

Environmental management guidelines for construction activities

A set of environmental management measures for each phase of the project construction has been prepared. The phases to be discussed are:

- Pre-construction phase
- Construction phase
- Operational phase
- Decommissioning phase

A set of environmental management measures for each phase of the project construction has been prepared to meet the following overall environmental Management objectives:

- To minimize disturbance to indigenous plant species
- To minimise risks arising from the presence of alien plant species
- To minimise disturbance to animal species
- To minimize soil erosion potential
- To minimise disturbance to the local farmers (social disruption)
- To reduce the problem of bad visual impression during construction and decommissioning
- To minimise the problem of noise
- To minimise damage to archaeological objects (if found during construction decommissioning)

1.2 PRE-CONSTRUCTION ACTIVITIES

The “front-end” work of surveying, environmental flagging of preservation sites, access planning, and other pre-construction activities can result in localized environmental impacts. The following environmental management measures have been identified to avoid potential environmental concerns:

Surveyors will endeavour to locate and mark all construction points and other underground (if any) facilities including gas, water, sewer, communication, irrigation and septic system prior to construction activities. Work specifications will clearly define equipment limitation and procedures for working in the vicinity of these facilities.

The contractor will endeavour to record any property that might be affected by the power line.
Livestock will not be harassed or unduly disturbed.
Typically, pre-construction activities will not include any earthmoving. Should earthmoving be required, appropriate erosion and sediment control measures will be developed and implemented.
The contractor should follow ECSA standards of putting up a standard board reflecting all the parties involved on the project and the details of the Emergence number.

1.2.1 CAMPSITES AND STORAGE FACILITIES

Mobilization of construction activities is the first known source of environmental hazard during construction period and must be properly monitored and maintained throughout the process to limit the impacts. Proper sitting of the construction camp and storage facilities i.e. on already disturbed areas would limit the generation of impacts on the environment. The following must be taken into consideration when proposing a campsite.

- Locate the Construction camp within or in close proximity of the proposed power line corridor and substation area.
- Record and take the photo of the area prior to, and during, erection of the campsite to exonerate or make sure that the area is free of contamination and that it will be restored to the original condition on completion of the works.
- Ensure that the campsite is well fenced and is not on the vegetated area.
- Ensure proper storage of the oils, grease, fuels, chemicals and hazardous materials. Appropriate warning signage should be placed on all storage facility.
- An oil spill kit, first aid kit and fire extinguisher should be kept on site throughout the duration of the project.
- Ensure that these facilities are stored on an impermeable surface, surrounded by a bunded wall not to allow any accidental spillages off site.
- Create an area on an impermeable surface for storage and mixing of cement.

1.2.2 BUSH CLEARANCE AND VEGETATION CONTROL

Clearing of the camp site area may involve the removal of trees, shrubs, and other obstacles. Disturbance to vegetation outside the existing substations and the power line corridor should be avoided or minimized to the greatest extent practicable. As indicated earlier, it is highly preferable to locate the camp site in an already disturbed area in order to avoid damaging new areas.
If the campsite requires vegetation clearance, through the use of herbicides, these should only be allowed with the approval of Eskom. The application should also be according to the set specifications. Herbicides may only be applied by a qualified Herbicides Applicator who is in possession of an Herbicides Applicator’s Licence. The possibility of leaching into surrounding environmentally friendly herbicides should be used. It is also recommended that a register be kept of all herbicides and pesticides that are administered by the Eskom Environmental Officer. If ever there is any doubt to the use of a specific chemical, an expert should be consulted. Application herbicides should cover very small portion (targeted) to avoid unnecessary impact on the natural environment.

1.3 CONSTRUCTION AND DECOMMISSIONING PHASES

This stage involves many activities some of which are listed below:

- Finalising the erection of camp sites for the Contractors' workforce and bringing in of the construction equipment and material.
- Establishing construction/decommissioning access roads to the servitude.
- Servitude gate installation to facilitate access to the servitude.
- Bush clearing to facilitate access, construction, decommissioning and the safe operation of the line.
- Transportation of equipment and materials.
- Rehabilitation of disturbed areas will be done after construction and decommissioning.
- The final inspection for the release of the Contractors' guarantee takes place one year after completion of the project. The line will be in operation immediately after completion of the project and will stay operational.
- The contractor should follow ECSA standards of putting up a standard board reflecting all the parties involved on the project and the details of the Emergence numbers.

1.3.1 REPORTING STRUCTURES

ECO : Environmental Control Officer (Can be the Eskom Site Supervisor)
C : Contractor
CM : Contract Manager (Eskom)
CELO : Contractor Environmental Liaison Officer (Dedicated person)
PM : Project Manager (Eskom)

Table 12

FUNCTION	**RESPONSIBILITY**
1. Project Manager (PM) Eskom	Overall management of project and EMP implementation
2. Site Supervisor/ Contract Manager (CM) Eskom	Oversees site works, liaison with Contractor, PM and ECO
3. Environmental Control Officer (ECO) Eskom	Implementation of EMP and liaison between Eskom, Contractor and Landowners
4. Contractor	Implementation and compliance with recommendations and conditions of the EMP, Appoints dedicated person (CELO) to work with ECO
5. Contractor Environmental Liaison	Implementation of EMP, landowner

Officer (CELO)	interaction, environmental control of site actions, re-mediation and rehabilitation work.
Environmental Advisor (Eskom)	Environmental advice and auditing

1.3.2 BUSH CLEARANCE AND VEGETATION CONTROL

The Normandie- Kemp project route is mainly in tree plantations *(Eucalyptus* sp or *Pinus* sp plantations). Clearing of the construction route involves the removal of trees, shrubs, and other obstacles. Disturbance to vegetation outside the project area will be avoided or minimized to the greatest extent practicable. Alternative 3 consist of sensitive southern Undulating Grassland which are very vital to the biodiversity of the area. Trucks should therefore restrict their movement either within the servitude corridor and/or existing access roads.

Cleared vegetation will be stockpiled separately in a manner that;

- Facilitates re-spreading or salvaging,
- does not impede vehicles, stock or livestock and
- avoids damage to adjacent live vegetation.

Stumps that are removed will be distributed along the edges of the cleared areas. The contractor should avoid forming a hedge along the servitude. These stumps should therefore be placed so as not to unduly impede livestock passage (leave gap every 15m) and to avoid watercourses and drainage blockages.

If alien plant species are identified during clearing, they should be cleared in a manner that does not facilitate re-growth during the construction and operational phase of the development. Vegetation clearance and trimming should be undertaken with care.

The use of herbicides should only be allowed with the approval of Eskom. The application should also be according to the set specifications. Herbicides may only be applied by a qualified Herbicides Applicator who is in possession of an Herbicides Applicator's Licence. The possibility of leaching into surrounding environmentally friendly herbicides should be used. It is also recommended that a register be kept of all herbicides and pesticides that are administered by the Eskom Environmental Officer. If ever there is any doubt to the use of a specific chemical, an expert should be consulted. Application herbicides should cover very small portion (targeted) to avoid unnecessary impact on the natural environment.

Vegetation clearance and trimming should be undertaken with care. The table below summarises steps to be followed in clearing vegetation.

Table 13: Requirements for vegetation clearance for the construction of a new distribution line and the decommissioning.

Item	Requirement	Follow up
Centre line of the proposed line	Clear to a maximum (depending on the tower type) of an 8m wide strip of all vegetation along the centre line. Vegetation to be cut within 100mm of the ground. Treat stumps with	Re-growth shall be cut within 100mm of the ground and treated with herbicide, as

	herbicides after consultation with Eskom. The vegetation will be cleared 4m on each side of the centre line.	necessary
Inaccessible drainage channels	Clear a 1m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing-vegetation to be allowed to re-grow.
Access/service roads	Clear a maximum (depending on the tower type) 5m wide strip for vehicle access within the maximum 8m width, including de-stumping/cutting stumps to ground level, treating with herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support/stay wire position	Clear all vegetation within proposed tower position and within a maximum (depending on the tower type) radius of 5m around the position, including de-stumping/cutting stumps to ground level, treating with herbicide and re-compaction of soil. Allow controlled agricultural practices, where feasible.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of the maximum 8m strip)	Area outside of the maximum 8m strip and within the servitude area, selective trimming or cutting down of those identified plants that might pose a threat to the integrity of the proposed distribution line.	Selective trimming.
Alien species within servitude area (outside of the maximum 8m strip)	Area outside of the maximum 8m strip and within the servitude area, remove all vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

1.3.3 FIRE PREVENTION

Alternatives 1, 2, and 3 are susceptible to fire because of the plantations and the grassland. Consequently no open fires shall be allowed on site in the form of bush clearance, cooking or any circumstance. The Contractor and employees shall have fire-fighting training and fire extinguisher equipment should be available on all vehicles working on site. Smoking should be done in controlled areas. Risks of veld fire on site should be minimised.

1.3.4 TECHNICAL SPECIFICATIONS OF THE POWERLINE

1.3.4.1 LENGTH:

The length of the power line will be approximately 30km.

1.3.4.2 SERVITUDE WIDTH:

A 4m strip on both sides shall be cleared bush with the ground to facilitate access and construction, except where tower erection and stringing requires more space. Any extra space outside the servitude shall be negotiated with the relevant Landowner and approved by Eskom.

1.3.5 SANITATION AND SEWAGE

The Contractor shall install mobile chemical toilets on site. The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. The Contractor will be responsible for the provision of and proper utilisation, maintenance and management of toilet, wash and waste facilities. Toilet facilities supplied by the contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers. All temporary / portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause. Staff shall be sensitized to the fact that they should use these toilets at all times. No latrines will be allowed. Chemical toilets shall not be located within 100m from any watercourse and will be managed properly.

1.3.6 ANIMAL LIFE

The impact that construction activities may have on animals includes restricted movement, construction-related animal mortalities, and human harassment. Environmental management measures to avoid or mitigate these impacts are outlined below:

- No animal shall be harassed or captured without the consent of the owners.
- Project personnel will not be permitted to intentionally harass, injure, and or kill animals or livestock on the worksite or surrounding areas.
- Nesting sites not to be affected during the construction phase of the development. It is therefore recommended that flappers be installed across the river.

1.3.7 SOIL RESOURCES

Soil resources should be protected. The extent of topsoil removal from the construction area will be determined on the basis of soil characteristics. In some instances, this will involve the removal of topsoil from the entire construction area to protect it from degradation due to erosion.

Generally, where topsoil removal is required (for foundations), the entire topsoil layer will be removed to the sub-soil level. The extent of topsoil removal from construction and decommissioning area (e.g. full stripping or partial stripping) will be determined on the basis of best environmental practice. Topsoil stripping is required where

construction is likely to unduly damage topsoil and inhabit regeneration or primary production activities.
In order to protect the soil resources and to facilitate the success of the rehabilitation plan, the following environmental management measures will be undertaken:

- Remove the topsoil and stockpile adjacent to the site at the area to protect it from degradation due to erosion. Topsoil should not be compacted.
- Topsoil must be stockpiled in separate loose heaps as tipped from the trucks unless otherwise advised.
- Topsoil must not be stockpiled in natural drainage channels or in areas where it will be exposed to wind, especially when the soil is stock pilled close to settlements.
- Single handling of topsoil is recommended.
- Stockpile must not be left for too long as soil might be leached.

Only holes for the planting of the structure should be dug. After the poles have been planted the soil that was generated during the digging process will be used to fill the hole, and will be compacted. Furthermore the holes from the removed structures during the decommissioning phase must be filled back by soil and compacted. The remaining soil will be levelled around the area. This will help in minimising the loss of soil resources.
Natural occurring erosion on the servitudes should be monitored by Eskom and further erosion prevented through the use of sand bags or gabions. Erosion outside the servitudes that was not caused by construction and decommissioning activities is the responsibility of the landowners. If, however construction and decommissioning activities have caused erosion outside the servitudes, it is the responsibility of Eskom to repair it and prevent further erosion damage.

1.3.8 WORKSHOP AND EQUIPMENT STORAGE AREAS

For prevention of water and soil contamination where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills into the soil, especially where emergency repairs are affected outside the workshop area. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. All potentially hazardous and non-degradable waste shall be collected and removed to a registered landfill site. Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and Re-mediated. All contaminated soil shall be removed and be placed in containers and shall be taken to one central point where remediation can be done. Small spills can be treated on site.
An oil spill kit, first aid kit and fire extinguisher should be kept on site throughout the duration of construction and decommissioning.

1.3.9 SERVICING OF VEHICLES

Servicing of vehicles at the camp site is strictly prohibited. Only emergency repairs shall be allowed and a drip tray shall be used to prevent oil spills. In the event of a

breakdown at the site oil spills shall be cleaned up immediately and the area rehabilitated.

The following shall apply:

- All contaminated soil shall be removed and be placed in containers. Contaminated soil can be taken to one central point at the Contractors campsite where bio-remediation can be done.
- Smaller spills can be treated on site.
- All oil spills must be reported to Eskom Environmental Officer. Pollution on the environment should be prevented at all cost.

1.3.10 WATER SOURCES

Should water be required from sources other than Eskom supply, a written agreement shall be reached between the Contractor and the stakeholder involved. Should the Contractor be required to use water from a natural source, the Contractor shall supply a method statement to that effect and obtain the required permits. No construction or decommissioning activities shall take place in the wetland, streams and other river courses (Assegai River) without the necessary water license from the Department of Water Affairs. The preferred alternative and alternative 2 will cross the Assegai River. The pylons should be placed outside the 1:100 floodline. Strict control shall be maintained and the ECO shall regularly inspect the abstraction point and methods used. The connection must be kept in neat working order without leaks or spillages.

1.3.11WET AREAS AND RIDGES

No construction or decommissioning activities within designated wetland areas and ridges. Such areas shall be marked as no-go areas and no pollution or effluent is to come in contact with such areas. Avoid wet areas to prevent soil erosion and damage. No construction is to take place in wet areas and ridges including no vehicular traffic in wet areas / ridges.
The preferred alternative and alternative 2 will cross the Assegai River. The pylons should be placed outside the 1:100 floodline.

1.3.12 SOCIAL ENVIRONMENT

The success of any operation depends largely on good relations with the landowners and community. All negotiations for any reason shall be between Eskom and the landowner. Written agreement is highly recommended and should be done at any communication with the landowners. The landowner should also be informed about any change in operation and maintenance programmes, should it affect them. The Eskom contact numbers should be made available to the landowner to ensure open channels of communication and prompt response to any queries or claims. The affected farms belong to different stakeholders and hence the contractors should always work in consultation with the farm owners.

The contractor must ensure that no member of the work force to wander around because Normandie to Kemp project is within land that is privately owned.
The safety of staff and the community is of utmost importance, and under no circumstances should it be compromised in any way whatsoever. The Health Act, No. 63 of 1977, Occupational Health and Safety Act, No.85 of 1993 and the National Environmental Management Act, No 107 of 1998 are the key legislations that address safety during any construction activity. Eskom should ensure that the contractor complies with the above Acts and all the provincial laws. Eskom should also ensure the contractor creates a safe working environment for the staff, the community and the environment.
The contractor should also have an emergency plan in place at all times. Eskom should ensure that all employees are aware of their rights to refuse to work on the grounds that their job could result in the destruction of their well-being and/or the environment.

1.3.13 VISUAL IMPRESSION OF THE AREA

The aesthetic valuation of an area is usually based on the cultural significance, tourism potential and its unique physical characteristics. Any development that does not blend well with their surrounding environment result in the following:

- Poor visual integrity of the affected area
- Change to vegetation communities.

The contractor should use indigenous vegetation to improve disturbed areas. Damage to the natural environment must be minimised, clearing of vegetation should strictly be limited to the substation and power line corridor.
Constructing the substation and the powerline next to the existing power line will also improve the visual impression of the substation and the powerline. Other improvements would be to bring infrastructure on future projects around substation so as to merge the development. However visual impact during construction and operation phases will be more on the movement of people and vehicle around the area.

1.3.14 WASTE AND SPILLAGES

Leakages of oils, grease, chemicals and hazardous materials from the machinery in the project area should be avoided at all costs. Littering of used materials like plastics, cable wires, paper(s) cartons and food waste should also be avoided. Ensure proper storage of the oils, grease, fuels, chemicals and hazardous materials. An oil spill kit, first aid kit and fire extinguisher should be kept on site throughout the duration of the project. Appropriate warning signage should be placed on all storage facility. Ensure that all facilities are well maintained before gone to site. Ensure that the workers carry the municipal disposal bags to and from site.
The Contractor must collect all rubble and excess material on site and dispose off in an appropriate manner and at a designated place or landfill site. No hazardous material, e.g. oil or diesel fuel shall be disposed off in any unregistered waste site. It must be ensured that the oil spill contractor clean major spills and oil spill kit must be used for minor spills. The Contractor shall supply waste collection bins and all solid waste collected shall be disposed at the Potgietersrus landfill site. All packaging material shall be removed from site and disposed off and not burned on site.

No material shall be left on site that may harm people or animals. Any damaged, broken and unused materials shall be removed from site. The working station or camp site must be kept neat and clean at all times so as to minimise hazards.

1.3.15 NOISE

Heavy machinery is often required for general power line construction and decommissioning, this machinery contributes to noise generation during construction and decommissioning. Even when it is not perceived consciously, chronic exposure to noise can affect human welfare in varying degrees, both physiologically and psychologically. Noise exposure can be a source of annoyance, creating communication problems and leading to elevated stress levels as well as associated behavioural and health effects. The recommended noise level for rural settlements are 45 decibels (dB) from 06H00 to 18H00 .40 dB from 18H00 to 24H00 and 30dB from 00H00 to 06H00Noise Control Regulations (promulgated in terms of the ECA). It can cause auditory fatigue, temporary and permanent lessening of hearing ability, sleep disorders, and can even contribute to learning problems to children.

1.3.16 ARCHAEOLOGICAL, CULTURAL AND/OR HISTORICAL OBJECTS

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) protects;

- Burial sites (two grave sites were identified on alternatives 1 and 2 and need to be demarcated during construction and decommissioning).
- Buildings of more than 60 years

Special geological features (fossil prints, bushman rock art)
If discovered during the construction period, they should be protected and/or conserved. The following measures should be adhered to:

- The contractor must stop work immediately upon discovery of archaeological objects (hereby referred to as objects)
- The contractor must record the original location of object; photographs must be forwarded to the South African Heritage Resources Agency (SAHRA).
- In case of graves, the next of kin or relatives must be traced or informed, and the contractor must afford the relatives to make a decision on whether to rebury (e.g. memorial monument). However, relocation of graves should be done as a last resort. The first option would be to divert the power line away from the graves.
- Permission must be obtained before the demolishing of any structure and/or building of 60 years of age or more.
- All identified archaeological objects must be reported to Eskom Environmental Officer immediately within 24 hours, SAHRA will be informed. No heritage resources of significance were identified on the substation and power line study area.

1.3.17 ACCESS ROADS

Access/service roads will be required for the construction, maintenance and decommissioning phases of the power line. The existing access/service roads currently used for the existing power lines will be utilised as far as possible in order to minimise disturbances to the area. Where new construction roads are required, and it is feasible

to do so, this should be negotiated with the Mkhondo Local Municipality and this proposed EMP should be followed.
Where necessary for access to properties, gates should be built at points where the centre line crosses any existing fence. This should be undertaken in consultation with the landowners. Eskom locks should be installed on such gates, and should be closed at all times.
All conditions that the landowner may have should be noted and adhered to. All vehicle movement should be along existing roads and access tracks. Vehicles should be driven at moderate speeds and special care should be taken especially in wet weather to avoid eroding tracks. Multiple tracks should be avoided at all times.
If Eskom is the only users of the access roads the maintenance of the access roads should be the sole responsibility of Eskom. Damage to access roads due to the movement of vehicles must be reported to Eskom and the landowner. All repairs must be done immediately and to the written satisfaction of the landowner.

1.3.18 VEGETATION TRIMMING

Protected or endangered tree species occurring on Eskom servitudes must be identified especially during the implementation period of the project. This will help to come up with other alternatives for example trimming the trees instead of cutting them. Permit must be obtained from the relevant Department of Water Affairs and Forestry.
The servitude length for the proposed 88kV power line is 30km. A maximum 8m wide strip would be required to be cleared of all trees and shrubs down the centre for safety purposes. Any tree or shrub in other areas, which will interfere with the operation and/or reliability of the line, will be trimmed or completely cleared.

1.3.19 DISTANCE OF THE POWER LINE FROM OTHER INFRASTRUCTURE

Table 14: Minimum clearances as adopted and used for various operation voltages

Description of Service	**88kV**
Outdoor earth: minimum safety clearance	1.5
Phase to phase	1.7
Ground clearance inside and outside townships	6.7
Building structures not part of power line	3.8
Transnet walkways and foot bridges	6.0
Powerlines other than Transnet	2.0

Transnet electrification wires and track earth wires	3.3
Above roads in townships, proclaimed roads including Transnet	7.5
Telkom telephone lines	2.0
Transnet telephone lines	2.7
Spoornet tracks	10.9
Spoornet electrification structures	3.8
Transnet power lines	2.7
Natal & Transvaal (TVL): abnormal load routes and TVL freeways: minimum	7.5

As regards other clearances the following applies:

The distance at which a single tree or a row of trees may grow in the vicinity of a power line is set out in the servitude agreements signed by each landowner. This distance is dependent on the height of the tree, the extent of foliage and the manner in which the tree grows. The main purpose of the clause in the servitude agreement is to preclude danger to the power line. The vegetation below the conductor lines should be kept low enough not to interfere with the lines.

1.3.20 MONITORING AND CLEAN-UP OF WASTE ON SITE

This section details the standard environmental management considerations for both "rough" and "final" cleanup. The period between backfilling and clean up of the construction area will be minimized to prevent degradation and loss of exposed soils.
The construction area landscape will be left flat and stable; following clean up, and with appropriate surface drainage re-established. Where site-specific stabilisation measures are necessary to prevent slumping or erosion they will be carried out. All affected areas around the pylons will be flattened.
Benched surfaces immediately above potentially erodible or unstable terrain will be contoured so as to avoid overloading slopes or concentrating surface run-off.
Appropriate measures will be employed to ensure that there is minimal loss of topsoil during the process of returning the topsoil to the area where the soil was originally removed.
Surface erosion control measures such as water diversion terraces will be installed at appropriate intervals on all sloping ground to divert surface water quickly away from the disturbed area.
Measures will be implemented to avoid soil degradation during the clean-up procedures. Where soil degradation such as rutting or compaction occurs, appropriate procedures will be implemented to remediate the soil as close to pre-construction conditions, as practical.
All flagging tape, temporary fencing, survey stakes, etc., will be removed.

1.3.21 RUBBLE AND REFUSE DISPOSAL

The Contractor must collect all rubble and excess material on site and dispose off in an appropriate manner and at a designated place or landfill site. No hazardous material, e.g. oil or diesel fuel shall be disposed off in any unregistered waste site.

The Contractor shall supply waste collection bins and all solid waste collected shall be disposed at the Potgietersrus landfill site. All packaging material shall be removed from site and disposed off and not burned on site.

No material shall be left on site that may harm man or animals. Any damaged, broken and unused materials shall be removed from site. The working station or camp site must be kept neat and clean at all times so as to minimise hazards.

1.3.22BUILDING, CIVIL'S AND STRUCTURAL STEEL WORK

To ensure that all construction related activities including civils, building erection and structural steel work is undertaken in such a manner that it reduces unnecessary impact to the environment.

1.3.22.1Place Copper Earthing

All copper off-cuts must be collected for recycling purposes.

1.3.22.2Mixing concrete

No batching / mixing activities occur on the ground or any permeable surface; during the mixing of concrete, concrete dust is emanated. Workers mixing concrete must wear PPE; Cleaning of equipment and flushing of mixers occur in designated wash bays (with contaminated water collected, stored / contained

1.3.22.3Place steelwork on foundations

All steel off-cuts must be collected for recycling

1.3.23 REHABILITATION OF DISTURBED AREAS

1.3.23.1General Rehabilitation

Rehabilitation is the final stage in construction and decommissioning phases. This section outlines environmental management considerations for construction area restoration. These will be prescribed to meet site-specific objectives. Rehabilitation activities will be undertaken as soon as practical following final clean up.

- Erosion control measures will be taken as necessary to prevent soil erosion and slope instability prior to re-vegetation activities.
- Surveyors will undertake a rehabilitation process for all affected areas. .

1.3.23.2Access rehabilitation

Existing access roads utilised during construction will be left in a safe condition and these shall be equal to pre-construction state. Access roads would still be required for the maintenance and/or operational phase and also the decommissioning phase. Temporary access deviations developed for the project through forestry land will be rehabilitated and restored to pre-construction conditions. Temporary access rehabilitation and restoring procedures will typically include:

- Ripping and raking along the contours to relieve compaction and promote regeneration.
- Re-spreading any stockpiled topsoil over the access restoration area.
- Implementing appropriate regeneration/vegetation measures.
- Installation of erosion and sediment control measures (e.g. erosion berms) as required particularly on moderate to steep grades and near watercourses.

Measures that discourage access on rehabilitated trails such as signs, fences, earth mounts or ditches, or other physical barriers such as rocks or cleared vegetation, where they may be appropriate.

1.4 OPERATIONAL PHASE

Clearing of the servitude area involves the removal of trees, shrubs, and other obstacles. Disturbance to vegetation outside the power line corridor will be avoided or minimized to the greatest extent practicable. Trucks should therefore restrict their movement either within the servitude corridor and/or existing access roads.

Cleared vegetation will be stockpiled separately in a manner that;

- Facilitates re-spreading or salvaging,
- Does not impede vehicles, stock or livestock and
- Avoids damage to adjacent live vegetation.

Stumps that are removed will be distributed along the edges of the cleared areas. The contractor should avoid forming a hedge along the servitude. These stumps should therefore be placed so as not to unduly impede livestock passage (leave gap every 15m) and to avoid watercourses and drainage blockages.

If alien plant species are identified during clearing, they should be cleared in a manner that does not facilitate re-growth during the operational phase of the development. Vegetation clearance and trimming should be undertaken with care.

The use of herbicides should only be allowed with the approval of Eskom. The application should also be according to the set specifications. Herbicides may only be applied by a qualified Herbicides Applicator who is in possession of an Herbicides Applicator's Licence. The possibility of leaching into surrounding environmentally friendly herbicides should be used. It is also recommended that a register be kept of all herbicides and pesticides that are administered by the Eskom Environmental Officer. If ever there is any doubt to the use of a specific chemical, an expert should be consulted. Application herbicides should cover very small portion (targeted) to avoid unnecessary impact on the natural environment.

Vegetation clearance and trimming should be undertaken with care. The table below summarises steps to be followed in clearing vegetation.

Table 15: Requirements for vegetation clearance for the operation and Maintenance of a new distribution line

Item	Requirement	Follow up
Centre line of the proposed distribution line	Clear to a maximum (depending on the tower type) of an 8m wide strip of all vegetation along the centre line. Vegetation to be cut within 100mm of the ground.	Re-growth shall be cut within 100mm of the ground and treated with herbicide, as necessary
Access/service roads	Clear a maximum (depending on the tower type) 5m wide strip for vehicle access within the maximum 8m width, including de-stumping/cutting stumps to ground level, treating with herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of the maximum 8m strip)	Area outside of the maximum 8m strip and within the servitude area, selective trimming or cutting down of those identified plants that might pose a threat to the integrity of the distribution line.	Selective trimming.
Alien species within servitude area (outside of the maximum 8m strip)	Area outside of the maximum 8m strip and within the servitude area, remove all vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

1.4.1 NUISANCE

Local communities have a tendency of throwing metal objects onto the substation and power lines, this usually result in shock. Effective awareness campaigns should be implemented to inform community members about the dangers of electricity. Eskom have programmes of informing communities about these problems. Trees should be regularly trimmed, to prevent the trees from growing into the lines or then touching the line.

1.4.2 WASTE AND SPILLAGES

Leakages of oils, grease, chemicals and hazardous materials from operational and maintenance machinery in the project area should be avoided. Littering of used materials like plastics, cable wires, paper(s) cartons and food waste during operational phase is not allowed. Ensure that the workers carry municipal disposal bags while onsite. An Environmental Officer should form part of the inspection team for activities to be carried out during the operation and maintenance phase so as to ensure that the appropriate measures are being followed. The contractor should also be trained on the

environmental management measures to be taken during this period. It must be ensured that the oil spill contractor clean major spills and oil spill kit must be used for minor spills.

1.4.3 ANIMAL LIFE

The impact that operation activities may have on livestock includes electrocution, operational -related animal mortalities, and human harassment. Environmental management measures to avoid or mitigate these impacts are outlined below:

- No animal shall be harassed or captured without the consent of the owners during operational and maintenance.
- Operational and maintenance team will not be permitted to intentionally harass, injure, and or kill livestock on the operational or maintenance site.

1.4.4 ELECTROCUTION OF BIRDS

Power lines are known to have a detrimental impact on bird species, particularly large migratory birds species that are unable to take evasive manoeuvrability when coming into contact with the power lines. Some instances also result in electrocution of birds by power lines. Nesting sites should not be affected during the operational phase.

1.4.5 SOIL RESOURCES

Soil resources should be protected. If the maintenance of the powerline will be required the planting and uprooting of the mono-poles only holes for the mono-poles should be dug. After the poles have been planted the soil that was generated during the digging process will be used to fill the hole, and will be compacted the remaining soil will be levelled around the pole.

Natural occurring erosion on the servitudes should be monitored by Eskom and further erosion prevented through the use of sand bags or gabions. Erosion outside the servitudes that was not caused by operation or maintenance activities is the responsibility of the landowners. If, however operation and maintenance activities have caused erosion outside the servitudes, it is the responsibility of Eskom to repair it and prevent further erosion damage.

The access roads that were used during the construction will be used during the operation, maintenance, and decommissioning phases.

In order to protect the soil resources and to facilitate the success of the rehabilitation plan, the following environmental management measures will be undertaken:

- Erosion on the servitudes should be monitored by Eskom and further erosion prevented through the use of sand bags or gabions.
- Prohibit unnecessary off road driving
- Avoid using too heavy machinery since this encourages erosion, wheels spinning and getting stuck on the site.

1.4.6 SOCIAL ENVIRONMENT

The success of any operation depends largely on good relations with the landowners and community. All negotiations for any reason shall be between Eskom and the landowner. Written agreement is highly recommended and should be done at any communication with the landowners. The landowner should also be informed about any

change in operation and maintenance programmes, should it affect them. The Eskom contact numbers should be made available to the landowner to ensure open channels of communication and prompt response to any queries or claims.
The operational must ensure that no member of the work force to wander around private property.
The safety of staff and the community is of utmost importance, and under no circumstances should it be compromised in any way whatsoever. The Health Act, No. 63 of 1977, Occupational Health and Safety Act, No.85 of 1993 and the National Environmental Management Act, No 107 of 1998 are the key legislations that address safety during any operational/construction activity. Eskom should ensure that the operational team complies with the above Acts and all the provincial laws. Eskom should also ensure the contractor creates a safe working environment for the staff, the community and the environment.
The contractor should also have an emergency plan in place at all times. Eskom should ensure that all employees are aware of their rights to refuse to work on the grounds that their job could result in the destruction of their well-being and/or the environment.

1.4.7 VISUAL IMPRESSION OF THE AREA

The aesthetic valuation of an area is usually based on the cultural significance, tourism potential and its unique physical characteristics. The development that does not blend well with their surrounding environment result in the following:

- Poor visual integrity of the affected area
- Change to vegetation communities.

The contractor and Eskom in particular should use indigenous vegetation to improve disturbed areas. Damage to the natural environment must be minimised, clearing of vegetation should strictly be limited to the substation and power line corridor. Constructing the substation and the powerline next to the existing power line will also improve the visual impression of the substation and the powerline.

1.4.8 NOISE

Heavy machinery is often required for general power line maintenance and this machinery contributes to noise generation during operation. Even when it is not perceived consciously, chronic exposure to noise can affect human welfare in varying degrees, both physiologically and psychologically. Noise exposure can be a source of annoyance, creating communication problems and leading to elevated stress levels as well as associated behavioural and health effects. It can cause auditory fatigue, temporary and permanent lessening of hearing ability, sleep disorders, and can even contribute to learning problems to children. Mitigation of the noise pollution will include: Corona (a projecting part of cornice) is usually generated or created during all types of weather, due to air ionising near isolated irregularities on the conductor surface of operating transmission lines. The recommended noise level for rural settlements are 45 decibels (dB) from 06H00 to 18H00 .40 dB from 18H00 to 24H00 and 30dB from 00H00 to 06H00Noise Control Regulations (promulgated in terms of the ECA).Conductors and Sub-transmission lines should be protected from bad weather conditions by insulators

1.4.9 ARCHAEOLOGICAL, CULTURAL AND/OR HISTORICAL OBJECTS

The National Heritage Resources Act, 1999 (Act. No. 25 of 1999) protects;

- Burial sites
- Buildings of more than 60 years

Special geological features (fossil prints, bushman rock art)
If discovered during the operational phase, they should be protected and/or conserved. The following measures should be adhered to:

- The maintenance or operational team must report the discovery of archaeological objects (hereby referred to as objects)
- The operational team must record the original location of object; photographs must be forwarded to the South African Heritage Resources Agency (SAHRA).
- All identified archaeological objects must be reported to Eskom Environmental Officer immediately within 24 hours, SAHRA will be informed.

1.4.10 ACCESS ROADS

Access/service roads will be required for the operation and maintenance phase of the power line. The existing access/service roads currently used for the existing power lines will be utilised as far as possible in order to minimise disturbances to the area. If for some reason, the access roads that were used during the construction stage are no longer usable and new roads are required, and it is feasible to do so, this should be negotiated with the landowner concerned and this proposed EMP should be followed.
Where necessary for access to properties, gates should be used where the centre line crosses any existing fence. This should be undertaken in consultation with the landowner. Eskom locks should be installed on such gates, and should be closed at all times.
All conditions that the landowner may have should be noted and adhered to. All vehicle movement should be along existing roads and access tracks. Vehicles should be driven at moderate speeds and special care should be taken especially in wet weather to avoid eroding tracks. Multiple tracks should be avoided at all times.
If Eskom is the only users of the access roads the maintenance of the access roads should be the sole responsibility of Eskom. Damage to access roads due to the movement of vehicles must be reported to Eskom and the landowner. All repairs must be done immediately and to the written satisfaction of the landowner.

1.4.11 VEGETATION TRIMMING

The servitude length for the proposed 88kV power line is approximately 30km. A maximum 8m wide strip would be required to be cleared of all trees and shrubs down the centre of the distribution line for safety purposes. Any tree or shrub in other areas, which will interfere with the operation and/or reliability of the line, will be trimmed or completely cleared.

1.4.12 DISTANCE OF THE POWER LINE FROM OTHER INFRASTRUCTURE

Table 16: Minimum clearances as adopted and used for various operation voltages

Description of Service	**88kV**
Outdoor earth: minimum safety clearance	1.5
Phase to phase	1.7
Ground clearance inside and outside townships	6.7
Building structures not part of power line	3.8
Transnet walkways and foot bridges	6.0
Powerlines other than Transnet	2.0
Transnet electrification wires and track earth wires	3.3
Above roads in townships, proclaimed roads including Transnet	7.5
Telkom telephone lines	2.0
Transnet telephone lines	2.7
Spoornet tracks	10.9
Spoornet electrification structures	3.8
Transnet power lines	2.7
Natal & Transvaal (TVL): abnormal load routes and TVL freeways: minimum	7.5

With regards to other clearances the following applies:

The distance at which a single tree or a row of trees may grow in the vicinity of a power line is set out in the servitude agreements signed by each landowner. This distance is dependent on the height of the tree, the extent of foliage and the manner in which the tree grows. The main purpose of the clause in the servitude agreement is to preclude danger to the power line. The vegetation below the conductor lines should be kept low enough not to interfere with the lines.

1.5 GENERAL PROCEDURE AND MANAGEMENT ORGANISATION

The following environmental management measures will be applicable for the construction, operational, decommissioning and maintenance activities. Copies will be made available to the project engineer and be provided to appropriate key project personnel.

Where not specified by this document, contractors will contact Eskom Environmental Officer at all times to identify potential impacts and ways of minimizing them.

1.5.1Environmental Inspection and Monitoring

The environmental inspection programme will ensure environmental commitments are adhered to and will be used to evaluate the effectiveness of mitigation measures. The following measures will be undertaken:

- Any livestock harmed as a result of the project will be immediately reported to Eskom Environmental Officer as well as the site supervisor.
- Eskom Environmental Officer will form part of the inspection team during the construction, operation and maintenance phase so as to ensure that the appropriate measures are implemented.
- In the event of an environmental emergency the site supervisor will inform the contractor to stop work on the offending activity. The matter must also be reported to the Environmental Officer who will report further and then a decision will be made.

1.5.2Inspection

Eskom Environmental Officer will oversee each phase of the construction, operational, decommissioning and maintenance activities. The Eskom Environmental Officer will be responsible for all environmental inspection matters.
Regarding environmental issues, an Eskom Environmental Officer will:

- Ensure that project- related activities are in compliance with the Environmental Management Plan, contingency plans, tender specifications and approval conditions, contract provisions or specifications during construction, operational, decommissioning and maintenance
- Be responsible for all environmental field work, programme, and monitoring,
- In case of an environmental emergency, the site supervisor must report it to an Eskom Environmental Officer and then a decision will be made as to whether or not the project should be stopped.
- Ensure that any mitigation and environmental management measures required to protect the environment during work stoppage follows these environmental regulations,
- Be responsible for addressing on-site environmental issues as they emerge.
- Record instance of non-compliance, contingency response and work stoppage relating to environmental issues.
- Maintain records of all communication with Eskom Environmental Section.
- Maintaining a photographic record of prior to, and during, construction activities that have the potential to adversely affect resources (e.g. streams, water channels or rivers) or other environmental features.

1.5.3General conduct

- ❖ Each individual shall attend a project orientation prior to commencing work on the site. The orientation shall include discussion on environmental matter of concerns on this project.

- Only authorized personnel will be allowed onsite.
- General rubbish such as food wrapping, garbage, and sanitary waste, shall be confined to the work site and collected daily for appropriation disposal at an approved municipal location. Construction waste such as rubble shall be gathered up for disposal at an approved location. Waste shall not be disposed of onsite.
- Construction, operational, decommissioning and maintenance personnel and equipment shall be required to confine their activities within the approved work site.
- On those part of the work site where there is topsoil that has not been stripped, where rooting depths reach the bottom 50 mm of the topsoil layer, suspend traffic at specific location until the excess moisture drains from the soil after heavy rainfall. Topsoil will mainly be disturbed around the poles.

Management practice for the power line construction, operation decommissioning and maintenance phases:

It should be emphasised that the Eskom Environmental Officer shall be given the responsibility to inventory all the environmental aspects of the operation. These shall include the following;

- Documentation for specific environment-related activities, such as lists of spill response, incidence reporting.
- An environmental officer will form part of the inspection team.
- Shall make sure that all warning signs and notices are fitted appropriately where necessary.
- Ensure that project-related activities are in compliance with contingency plans, regulatory permits and approval conditions, contract provision or specifications.
- Be responsible for providing environmental information to staff, and for making sure that all personnel and contractors understand the terms and conditions in all regulatory permits and approvals and the environmental management plan and also incident contingency plans before commencement of the work.
- Be responsible for addressing on-site environmental issues, as they emerge
- Maintain required records for environmental monitoring programs.
- Maintain a photographic record of prior to, and during, construction activities that have the potential to adversely affect resources of other environmental features.

Mitigation recommendation for power line Construction, Operational, decommissioning and Maintenance phase.

Ensure that there is:

- Limited traffic during construction and decommissioning.
- Constant rehabilitation during construction.
- There is a maintenance strategy as part of EMPr.
- The use of the existing road (servitude) as access road is possible.
- Proper ablution facilities on site.

- Constant management during construction and decommissioning.
- Constant rehabilitation of erosion problems.
- An oil spill kit to contain small spills.
- Proper storage facilities of construction materials.
- Proper storage and removal strategy for waste from site.
- Ensure that all alien plants species on construction sites are removed. Must clear alien vegetation on a regular basis.
- Limited plants need to be removed when clearing the servitude for the new power line. A clear guideline and proper plans must be given to the contractor.
- Ensure public complains register and incidents register are on site.
- Access to site should only be given to trained and authorised personnel.