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GUIDELINE

GENERIC ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Part 1: Distribution Powerlines

**Preferred requirements for applications in the Electricity Supply
Industry in East and Southern Africa**

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FOREWORD

The Power Institute for East and Southern Africa (PIESA) is a regional power utility association established in 1998 to co-ordinate information, technology and resource sharing in the specialized areas of:

- Technology and engineering support;
- Applied research;
- Standardization;
- Incident investigations and technical audit; and
- Technical resource development and training.
- Environment

The PIEESA primarily aims to develop technological capacity in the region's distribution network by promoting a spirit of resource sharing. Membership of the PIEESA is open to national electric power utilities in East and Southern Africa that wish to participate in the sustainable development of power systems in these areas.

This part of PIEESA 001 has been prepared on behalf of the Environmental Working Group of the PIEESA and approved by the Board of the PIEESA for use by supply authorities in the East and Southern African region.

At the time of approval the working group comprised the following members:

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APPROVAL

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Annex A is a normative document.

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1. INTRODUCTION

The construction, operation and maintenance of powerlines pose a potential threat/risk to the environment. Actions relating to the construction, operation and maintenance of distribution power lines should be carried out in such a way that the extent of the damage to the environment is avoided or minimised.

2. SCOPE

This generic Environmental Management Plan (EMP) proposes to be a master plan for all projects to which specific environmental requirements may be added.

It provides general guidelines to assist staff and contractors in their compliance with PIESA Environmental standards for the construction, operation and maintenance of all new and existing distribution powerlines.

3. REFERENCES

National Environmental Management Act. No. 107 of 1998 (South Africa)

SABS ISO 14001: 1996 (South Africa)

Eskom Environmental Management Programme Guideline, EPC32-248. September 2007.

Eskom Standard for bush clearance and maintenance within overhead power line servitudes. EPC32-247, Rev. 0, September 2007.

4. DEFINITIONS AND ABBREVIATIONS:

4.1 *Definitions:*

Bird Interactions: collisions, electrocutions, nesting, perching, roosting, excretion, etc. of birds with electrical infrastructure (lines, substations, etc.)

Environment means the surroundings within which humans exist and that are made up of:

- (i) the land, water and atmosphere of the earth;
- (ii) micro-organisms, plant and animal life;
- (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and
- (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being;

Environmental aspect (issue): Elements of an organisation's activities, products or services which can interact with the environment.

Environmental audit: A systematic, documented verification process of objectively obtaining and evaluating audit evidence to determine whether specified environmental activities, events, conditions, management systems or information about these matters conform to audit criteria, and communicating the results of this process to the client.

Environmental impact: Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services. (SABS ISO 14001:1996)

Environmental Impact Assessment (EIA): An EIA is the process of identifying, evaluating and mitigating all the relevant effects of development proposals including biophysical, social and others. It is an investigation and evaluation of the impacts of activities on the natural environment, socio-economic conditions and cultural heritage.

Environmental Management Plan (EMP): A Plan that seeks to achieve a required end state of the environment and describes how activities, that could have a negative impact, will be managed and monitored and how impacted areas will be rehabilitated.

Mitigate: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

Monitoring: An activity in the EMP process that checks that the requirements of the EMP are met.

Site: office and grounds (owned or leased), substation, power station, radio repeater site, power line servitude and any other area obtained through an agreement and including utility decommissioned sites.

Sensitive sites: areas which are fragile

4.2 *Abbreviations:*

BU	:	Business Unit
CAPCO	:	Chief Air Pollution Control Officer
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EMS	:	Environmental Management System
GIS	:	Geographical Information Systems
KPI	:	Key Performance Indicator

5. PROCEDURE FOR IDENTIFICATION AND CLASSIFICATION OF ENVIRONMENTAL IMPACTS

5.1 *General*

PIESA utility members should:

- Compile an EMP for new and existing sensitive sites as well as for every project for which an EIA was compiled;
- Establish key performance indicators (KPIs)/ action plans for the development and implementation of EMPs.

All significant environmental issues and conditions of any environmental authorisations shall be included in an EMP. In the development and implementation of an EMP for an existing member utility site or proposed project, the procedures in 5.2 to 5.11 (change numbering) shall be followed to ensure compliance with PIESA Member Utility's Environmental Policies and with national environmental legislation.

The relevant resource in the respective Business Units shall be accountable to ensure EMP guidelines are in place. Environmental Management resources will be responsible for the co-ordinated development and implementation of the EMP in their respective areas in line with the set Key Performance Indicators or Action Plans.

5.2 *Collect background environmental data*

Background environmental information should be collected on the following:

- The existing route (technical and operational practices); and
- The immediate and surrounding environment of the route.

Existing information on the environment can be obtained from:

- Past EIAs for the route/site
- Maintenance records(including inspection reports)
- Incident investigation reports
- Geographical Information Systems(GIS) that may exist at the Utility or other regional centres; and
- Landowners and/or government departments
- Public complaints

Background information may have to be supplemented by specialist studies and field sampling. This may include specialist information on vegetation, rainfall patterns, hydrology, and wildlife interactions with powerlines, soil types, archaeological sites, etc. (See Annexure B (X) for a generic list of background information required for powerlines).

Background information on the environment shall include issues that are applicable to the route/site. It shall cover the physical, biological, socio-economic and cultural environments that could be/are affected by the construction, operation and maintenance activities of the power line.

This information shall be collated in a format that will allow it to be stored and utilised in a convenient manner.

Background information will be used to monitor environmental change that occurred as a result of the operation and maintenance activities on the power line route. It will provide the “control” against which all change can be monitored. It will also be used in the development of the EMP

5.3 *Identify and/or predict environmental aspects*

Identify the environmental issues (waste, oil spills, soil erosion, air and water pollution, vegetation control, landowner requirements etc.) that need to be addressed, managed, controlled or avoided through the undertaking of some form of assessment.

The assessment to identify environmental issues may be taken from:

- a life-cycle assessment (LCA);
- an EIA;
- routine maintenance inspections/audits;
- an Environmental Risk Assessment (ERA) and
- an audit of the route.

All the identified issues shall be recorded on a checklist (See Annex B).

The process of public participation shall be undertaken to ensure that the concerns of all interested and affected parties are taken into account when compiling and implementing the EMP

5.4 *Determine environmental impacts and their significance*

The significance of each identified/predicted impact shall be quantified. For those activities for which an EIA was not compiled, significance is graded with regard to the:

- nature of the activity with regard to the causes of the effect;
- extent of the activity regarding whether the impact will be local or regional;
- duration of the impact(short, medium, long or permanent);
- significance of the impact:
 - low – natural or social functions and processes are not affected
 - medium – the environment is altered, but the natural and social functions are able to continue in a modified way
 - high – natural or social functions or processes are altered, to such an extent that they will temporarily or permanently stop.
- probability that the impact will occur in terms of:
 - improbability – due to design or historical experience the chances of the impact occurring is very low
 - probable – where there is the possibility that the impact could occur
 - highly probable – in the case where it is more than likely that the impact will occur
 - definite – the impact will occur regardless of any preventative measures that can be taken.

5.5 *Identify the root cause of significant impacts*

Once all the significant issues and their associated impacts have been identified, the activity that causes them shall be identified. These root causes are what have to be managed and controlled to ensure that corrective and preventative measures are implemented through the EMP.

An impact is the result of a failure of the plant/procedures/personnel to perform as expected.

Example:

ACTIVITY	ASPECT	IMPACTS
Planning and design of infrastructure	Infrastructure planning and design (route and site selection; design type)	Reduction in aesthetic properties Wildlife interactions and loss of biodiversity (electrocutions/collisions/excretions/ nesting) Restriction of Land use Pollution (soil and water) Social (effecting cultural issues)
Construction	Bush clearing (chemical and mechanical) Earthworks (excavations) Tower erection and conductor stringing (vehicle movement) Construction waste (metal, porcelain, wood, packaging material) Construction camps Sewage	Erosion Habitat degradation and loss of biodiversity Pollution (soil, air and water) Alien invasion Reduction in aesthetic properties Noise (nuisance) Damage to property Noise (nuisance) Land, air and water pollution due to spillages; dust. Damage to natural heritage resources Erosion Damage to property, vegetation destruction Noise Pollution Social Pollution Pollution Nuisance

5.6 *Compile management objectives*

After identifying, determining and quantifying the environmental activities and their associated impacts (the root causes) that need to be addressed in the EMP, translate them into specific management objectives and specific measurable targets. These shall conform to legislation requirements, guidelines and policies.

Objectives and targets shall be linked to measurable environmental KPIs for measuring, monitoring and auditing purposes.

5.7 *Determine how management objectives shall be reached* (to reach the required end state):

The actions required to achieve the set objectives and targets and to address the root cause shall be established.

Solutions to problem areas shall be obtained from, but not limited to, reliable sources such as PIESA and Member Utility's environmental management documentation centre, specialist reports and recommendations and successful solutions from past experience.

The project actions could be one of the following:

- (a) Plant: the use of environment-friendly designs or construction to avoid/prevent oil pollution, e.g. bund walls around transformers.
- (b) Procedures: the development of specific operational procedures for the carrying out of certain activities: to preserve archaeological sites, bush clearing, herbicide application, waste minimisation, water conservation, dust suppression, noise minimisation etc. (This shall include responsibilities, reporting, monitoring and conformance to permit requirements.)
- (c) Personnel: training and skills development, awareness, incentives, penalties etc.

The project actions are the key aspect of the EMP in that it is the actions that will achieve the required end-state.

Consultation with regard to the proposed actions to be taken in terms of the EMP with those interested and affected parties shall take place before the EMP is implemented.

5.8 *Integrate into operation and management systems*

The actions in 5.7 shall be integrated into all existing processes, systems and documentation that are part of the project for the existing operation and should form part of tender/bid and contract documents.

5.9 *Set Key Performance Indicators (KPIs)*

Based on the set objectives and targets and the way they are integrated into existing systems and documentation, KPIs shall be established. These KPIs shall become a formally accepted set of project or operational business performance indicators.

All KPIs that are set shall be measurable and quantified. They shall be able to withstand a data integrity audit to justify that the systems, processes and instrumentation that are used for recording and reporting, are acceptable.

5.10 *Implementation of the EMP*

Once the EMP has been formulated, accountabilities set and resources made available, the EMP shall be implemented. These may be undertaken by the responsible BU or individuals. It may also be in the awarding of contracts to undertake a specific project.

5.11 *Monitoring*

Monitoring: The EMP will only be effective if there are mechanisms in place to measure and report on the KPIs. There shall also be a monitoring Plan in place to measure compliance to the EMP. This is also to manage environmental issues and impacts that could arise during construction, operations and maintenance activities, which were not predicted earlier.

Monitoring shall include evaluation of compliance with statutory and other legal (contract) requirements. The results of monitoring shall be analysed and used to identify areas of good performance as well as those requiring corrective and preventative action.

Linked to measurement and monitoring shall be mechanisms to deal with both incentives for good performances and penalties for non-conformances.

5.12 *Auditing*

To ensure the conformance to the EMP requirements, an audit shall be undertaken to close the EMP cycle. The audit can be used to identify non-conformances for which corrective action should be taken. The audit can also be used to identify findings that can be used to improve other EMPs.

Audit findings shall result in updating background information and the assessment techniques used in the identification of environmental issues and impacts.

5.13 *Financial Implications of EMPs*

A budget should be set aside for compilation and implementation of EMPs for all new projects. For existing infrastructure, EMP budget should be integrated into maintenance budget.

6. GENERAL ENVIRONMENTAL ASPECTS TO BE ADDRESSED IN THE EMP

6.1 Physical Environment

6.1.1 Air Quality: Dust and Fire Breaks

Burning of waste material such as vegetation and materials resulting from construction, operations and maintenance activities at the site is strictly prohibited.

Where fire breaks are necessary, they should be planned in conjunction with relevant landowners and performed in accordance with the conditions of the fire management plans of the region. Erosion in fire breaks should be prevented.

No fires are to be made on private property or within the line servitude.

6.1.2 Airfields

Appropriate aircraft warning balls should be attached to all lines in the area surrounding an airfield or landing strip, in accordance with local civil aviation requirements.

6.1.3 Erosion

Erosion on the servitude should be repaired and further erosion prevented. The utility is responsible for managing erosion caused by construction, operation and maintenance activities that cause erosion outside the servitude/wayleave.

6.1.4 Littering

No littering shall take place.

6.1.5 Maintenance of access roads

All conditions that the landowner may have shall be noted and adhered to. All vehicle movement shall 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 are to be avoided at all times.

If the utility is the only user of these access roads, then the maintenance of the access road shall be the sole responsibility of the utility. Damage to access roads due to the movement of vehicles must be reported to the utility and the landowner. All repairs must be done immediately and to the satisfaction of the landowner.

Where required, sign boards for new projects and major maintenance, should be erected at all times.

6.1.6 Maintenance of vehicles

Servicing of vehicles in the field is strictly prohibited. Only emergency repairs shall be allowed in the line servitude/wayleave. In the event of a breakdown in the field, any oil spills shall be cleaned up immediately. The following shall apply:

All contaminated soil shall be removed and placed in containers. Contaminated soil to be taken to one central point where bio-remediation can be done.

Bigger spills can be treated on site.

A specialist contractor shall be used for the bio-remediation of severely contaminated soil.

6.1.7 Oil spills

All oil/fluid spills from transformers and associated infrastructure should be treated as PCB contaminated spills where there is an absence of the appropriate PCB label, as is required. The necessary precautions as specified in the PIESA PCB Guideline should be taken into account.

All oil spills (including those from transformers and associated infrastructure) shall be reported to the responsible authorities and the utility management.

Underground/marine cables should be inspected regularly for oil leakages, especially when there is significant drop in oil pressure in the cables.

6.1.8 Water Quality

In accordance with the requirements of the relevant legislation, surface and ground water shall not be polluted (oil, petrol, herbicides, ash, dust etc.) under any circumstances.

Storm water shall be managed to ensure that it does not become polluted. All water contaminated by oil/fluid spills is to be reported to the relevant authorities.

Structures or waste materials should not be within riparian areas to obstruct the flow of water and should be in line with relevant legislation.

6.1.9 Stormwater

Storm water run-off must be managed in areas where it may negatively impact on the structures of power lines. Measures should be implemented to ensure that run-off water on the servitude does not run into gullies and cause an erosion hazard.

6.1.10 Hazardous Substances

All hazardous substances at the site shall be adequately stored and accurately identified, recorded and labelled (e.g. PCBs, herbicides, etc.). All hazardous substances shall be disposed of at a licensed, approved disposal site. This applies to the oil spills from transformers and associated infrastructure.

6.1.11 Wetlands

Rivers: No roads shall cut through river and stream banks as this may lead to erosion causing siltation of streams and dams. Existing drifts and bridges may be used with the consent of the landowner. Such structures shall then be thoroughly examined for strength and durability before they are used. New drifts and bridges shall only be constructed with the approval of utility and the landowner.

No traffic shall be allowed in such areas. Only existing roads through such areas may be used with the approval of the utility and the landowner. No equipment that can cause irreparable damage to wetlands shall be used.

6.2 Biological Environment

6.2.1 Fauna

Birds: Interactions of birds with power lines should be prevented by the application of, for example, bird flappers in sensitive areas.

For new lines, routing in areas with potential for bird interactions should be avoided.

All bird-power line interactions of rare or endangered birds or for repeat incidents must be reported, recorded and investigated. After action has been implemented to solve the problem, it must be followed-up to assess the effectiveness of the remedial measures taken.

Other: Protected or endangered animal species occurring on servitudes must be identified and protected from construction, operation and maintenance activities. No animals may be killed or poached.

In areas where giraffes occur, the height of power lines should be adjusted accordingly to prevent an electrocution hazard to the giraffes.

6.2.2 Flora

Indigenous trees: Protected or endangered trees occurring within wayleaves and servitude must be identified. Permits must be obtained from the relevant Government Departments where they are required.

Bush clearing: The objective of bush clearing is to trim, cut or clear the minimum number of trees and bush, necessary for the safe electrical operation of the power line. Bush clearing shall be done in accordance with the PIESA Wayleave/Servitude Guidelines / Utility Standard e.g. Eskom EPC32-247 Procedure, Rev. 0 (Standard for bush clearance and maintenance within overhead power line servitudes). Only a 4m strip may be cleared flush with the ground to allow vehicular passage.

All trees and bush cleared from the servitude shall be cut into manageable length (1m), and neatly stacked at regular intervals along the line or as requested by the landowner. This wood is available to the landowner and/or local community for their personal use, should they make such a request.

No bush clearing shall be allowed on river-and stream banks. No bush clearing shall take place outside of the servitude.

No bulldozer shall be allowed for bush clearing.

Economically valuable trees: The removal of any economically valuable trees or bush shall be negotiated with the landowner before such plants are removed.

Herbicide usage: Only government approved or registered 'environment-friendly' herbicides may used and according to set specifications. A herbicide applicator must demonstrate competence either through training or in possession of a Herbicide Applicators' Licence or working under the supervision of a registered herbicide applicator.

Any potential impacts (.e.g. leaching into the surrounding environment) shall be properly investigated and necessary mitigating actions put in place.

A register shall be kept of all herbicides and pesticides that are used. For further advice or information of a specific chemical, an expert should be consulted.

6.3 Social Environment

6.3.1 Interaction with landowners

The success of any operation depends largely on good relations with the landowners and the community.

All negotiations shall be between the Utility and the landowner. No verbal agreements shall be made and all agreements shall be recorded properly. All parties shall co-sign the agreement.

The landowners shall be informed of any changes in construction, operation and maintenance plans, should it affect them. The Utility contact numbers shall be made available to the landowner to ensure open channels of communication and prompt response to any queries or claims.

All contact with the landowners shall be courteous. The rights of the landowners shall be respected at all times.

Staff must be made aware that they are working on private property and the approach required.

6.3.2 Rights of access to roads

All the conditions that the landowner may have, should be noted and adhered to. Access roads should be properly marked, showing the direction of travel. Roads marked with a "No Entry" sign are not to be used. Access will only be allowed to Utility personnel with gate keys.

6.3.3 Rights and conditions of access to private property

Fences and Gates: Fences or gates of landowners shall not be damaged when gaining access to the servitude. The condition of Utility gates and locks shall be regularly monitored to ensure that they are secure (i.e. to prevent livestock getting in or out as well to prevent unauthorised access). Gates shall be kept as found i.e. either open or closed.

Permission of the landowner must be obtained prior to any work on the property.

Agricultural goods: Pilfering (removal) of agricultural goods (crops, livestock, firewood etc.) and poaching is prohibited. Receipts shall be given for any merchandise purchased or received from landowners.

6.4 Cultural Environment

6.4.1 Archaeology

A Heritage Impact Assessment (HIA) must be an integral part of the EIA. Areas of significant heritage (archaeological, palaeontological) areas shall be avoided during construction, operation and maintenance activities. No artefacts shall be removed under any circumstances.

6.4.2 Graveyards

Graveyards, cemeteries, burial sites, human remains may not be intruded upon during construction, operation and maintenance activities.

6.4.3 Monuments

Sites of historical interest in close proximity to the Utility's servitude shall be protected and treated with respect.

6.4.4 Farmhouses and other buildings

Utility personnel shall not intrude upon the private property of landowners. If and where the line crosses an inhabited area, the necessary precautions shall be taken to safeguard the lives and property of the inhabitants during operation and maintenance activities.

6.4.5 Infrastructure

The integrity of existing structures shall be protected during construction, operation and maintenance activities.

Annex A

(normative)

Utility controlled documentation for reference purposes only

A.1 Policies, directives and strategies

No	Doc. No.	Title	Document Type	Doc. Applicability
1		Environmental Management Policy	Policy	PIESA / Utility
2		Environmental Management System	Directive	PIESA / Utility
3		Waste Management Policy and Strategy	Policy	PIESA / Utility
4		Water Management	Policy	PIESA / Utility
5		Air Quality Management Policy	Policy	PIESA / Utility
6		Corporate Directive for the Management of PCBs	Corp. Directive	PIESA / Utility
7		Environmental Impact Assessment	Directive	PIESA / Utility
8		Ozone depleting compounds management and phase-out	Policy	PIESA / Utility
9		Herbicide management	Policy	PIESA / Utility
10		Policy on power frequency electric and magnetic fields	Policy	PIESA / Utility
11		Emergency planning directive	Policy	PIESA / Utility
12		Emergency planning evaluation system	Policy	PIESA / Utility
13		Coal utilisation	Policy	PIESA / Utility
14		Decommissioning of nuclear power stations	Policy	PIESA / Utility
15		Land Management Policy	Policy	PIESA / Utility
16		Decommissioning of non-nuclear	Policy	PIESA / Utility

		power stations		
17		Particulate stack emissions policy	Policy	PIESA / Utility
18		Investigation of major incidents	Policy	PIESA / Utility
19		Nuclear Sites Management Policy	Policy	PIESA / Utility
20		The control of dust exposure within PIESEA / Utility	Policy	PIESA / Utility
21		Environmental education	Policy	PIESA / Utility

A.2 Standards and procedures

No	Document No.	Title	Document Type	Document applicability
1		Environmental Impact Assessment	Procedure	PIESA / Utility
2		Management of PCB	Standard	PIESA / Utility
3		Route inspection and maintenance of distribution and reticulation lines	Standard	Distribution and Marketing
4		Safe handling of SF ₆ gas and its by products	Standard	PIESA / Utility
5		Passive fire protection for oil filled equipment in high voltage yards	Standard	PIESA / Utility
6		Nuclear safety, seismic, environmental quality and importance classification	Standard	Generation
7		Requirements for the safe processing, storing, removing and handling of asbestos or asbestos containing materials	Procedure	PIESA / Utility
8		Distribution fire risk management	Standard	Distribution
9		Environmental Management Plan	Procedure	PIESA / Utility
10		Standard for bush clearance and the maintenance of overhead powerline routes	Standard	PIESA / Utility

A.3 Guide and advisory notes

No	Document No.	Title	Document Type	Document applicability
1		The safe use of pesticides and herbicides	Guide	PIESA / Utility
2		Introduction to the use of herbicides in PIESA / Utility	Report	PIESA / Utility
3		Guidelines for Chemical control of herbicide usage under powerlines	Report	PIESA / Utility
4		Guidelines to establish fire-breaks around Power Stations using herbicides	Report	PIESA / Utility
5		Guidelines for weed eradication at PIEASA / Utility Sub Stations using herbicides	Report	PIESA / Utility
6		Guidelines for chemical moving or "species switch" between security fences using herbicides	Report	PIESA / Utility
7		Oil spill clean-up and rehabilitation	Guide	PIESA / Utility
8		Generation Environmental Monitoring Procedure	Procedure	Generation

Annex B**Model checklist for background data required for route/site**

Site name:.....

Responsible Person:.....

Assessor's name:..... Unique No:.....

Assessment date:

No.	Item	Yes	No	Reference/location	Action
1	Map showing extent of PIEESA / Utility properties (property diagrams)				
2	Air quality permit/licence/certificate				
3	Water quality requirements (permits)				
4	Registration certificate of waste site				
5	Copies of title deeds of properties				
6	All lease contracts of PIEESA / Utility land with third parties				
7	Special conditions in terms of land use zoning and landowners' "Special Agreements"				
8	Layout map showing site layout on PIEESA / Utility property and associated plant and activities				
9	Plans/schematic drawings showing: coal stock yard, coal bunkers and mills, coal conveyors, dumping of coal discards				
10	Plans showing location and drainage at: precipitators, hoppers, ash and slurry plant, ash pipelines/conveyors, ash disposal areas				
11	Plans showing location and drainage at: turbine lubricating store and processing plant, transformer oil purification and processing plant, bulk oil and lighting up plant, clean and dirty oil stores				

12	Plans showing: water systems i.e. Potable water treatment plant, demineralization plant, condensate polishing plant, chemical laboratories and stores, stormwater drainage system, blowdowns, dirty water effluent dam/station drain dams, clean water dams, intermediate/emergency dams, stormwater disposal systems, sewage plant, raw water reservoir, diversion of streams				
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Annex C

(normative)

Model checklist for identification of environmental aspects (issues) and impacts on power line routes

Site name:.....

Responsible Person:.....

Assessor's name:.....Employee No:.....

Assessment date:

From tower No..... To tower No:.....

(Environmental issues identified shall be marked-up on a sketch or map of powerline)

C.1 Checklist for issues to be identified

Issue	Issue	Issue
Access road: <ul style="list-style-type: none"> • Centre line • Other 	Bird interactions <ul style="list-style-type: none"> • Collisions • Electrocutions • Pollution • Nests • Need for remedial action 	Stormwater drainage <ul style="list-style-type: none"> • Natural • Berms • Channels • Pipes
Soil erosion <ul style="list-style-type: none"> • Tower position • Access road • River crossing • Other 	PIESA / Utility gates <ul style="list-style-type: none"> • General condition • Closed and locked • Locks 	Social activities under powerline <ul style="list-style-type: none"> • houses • farming • structures • mining • airfields • powerlines • telephone lines • other
Bush encroachment <ul style="list-style-type: none"> • Clearance • Fire risk 	Construction material <ul style="list-style-type: none"> • Concrete • Steel works 	Visual impact

	<ul style="list-style-type: none"> • Insulators • Conductor • General 	
Alien/invader vegetation <ul style="list-style-type: none"> • Access • Fire risk • Clearance • Spread 		Soil type <ul style="list-style-type: none"> • sandy • clay • rocks • wet
Protection of natural vegetation	Fence crossings <ul style="list-style-type: none"> • General condition 	Lightning
Archaeological / historical / natural heritage / cultural sites	River crossings	Complaints or requests from land owners
Noise complaints	Risk to airfields and flight paths (crop spraying and game management)	Radio/TV interference

C.2 Model field checklist to identify environmental issues to be corrected

			Impact			
Pole No.	Issue	Description	N/A	High	Med	Low

Annex D
(normative)

Model EMP register

Site/Power line:.....

Compiled by:.....

Date:.....

Revision date:.....

Activity/location	Environmental aspect (issue)	Impact (Y/N)	Significance (H/M/L)	Regulatory requirement	Action to be taken	Responsible