
**PROPOSED BOSJESMANSBERG SOLAR
ENERGY FACILITY TO CUPRUM
SUBSTATION 132kV POWER LINE,
NEAR COPPERTON IN THE NORTHERN
CAPE PROVINCE**

**DRAFT ENVIRONMENTAL MANAGEMENT
PROGRAMME (EMPr)**

DEA Reference Number 14/12/16/3/3/1/1150

April 2014

Prepared for:

Networx Renewables (Pty) Ltd
20 The Piazza, 2nd Floor
Melrose Arch
2076 Johannesburg
South Africa

Prepared by

Savannah Environmental (Pty) Ltd
PO Box 148
Sunninghill
2175



PROJECT DETAILS

DEA Reference No. : 14/12/16/3/3/1/1150

Title : Environmental Management Programme
Proposed Bosjesmansberg Solar Energy Facility to
Cuprum Substation 132kv Power Line, Near
Copperton in the Northern Cape Province

Authors : Savannah Environmental
Steven Ingle
Karen Jodas

Client : Networx Renewables (Pty) Ltd

COPYRIGHT RESERVED

This technical report has been produced by Savannah Environmental (Pty) Ltd for Networx Renewables (Pty) Ltd. No part of the report may be copied, reproduced or used in any manner without written permission from Networx Renewables (Pty) Ltd or Savannah Environmental (Pty) Ltd.

DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: 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 Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management Programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Environmental assessment practitioner: An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010;pg 185).

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Natural properties of an ecosystem (*sensu* Convention on Wetlands): Defined in Handbook 1 as the "...physical, biological or chemical components, such as soil, water, plants, animals and nutrients, and the interactions between them". (Ramsar Convention Secretariat. 2004. Ramsar handbooks for the wise use of wetlands. 2nd Edition. Handbook 1. Ramsar Convention Secretariat, Gland, Switzerland.) (see <http://www.ramsar.org/>).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste (Van der Linde and Feris, 2010; pg 186).

TABLE OF CONTENTS

	PAGE
CHAPTER 1 PROJECT DETAILS.....	1
1.1. Potential impacts.....	Error! Bookmark not defined.
1.2. Activities and Components associated with the Proposed Power Line... 3	3
CHAPTER 2 PURPOSE and OBJECTIVES OF THE EMP	5
CHAPTER 3 STRUCTURE OF THIS EMP	7
3.1. Project Team	8
CHAPTER 4 KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT	10
CHAPTER 5 MANAGEMENT PROGRAMME: PLANNING AND DESIGN.....	21
5.1 Objectives	21
OBJECTIVE: Ensure the design responds to identified environmental constraints and opportunities	21
OBJECTIVE: To ensure selection of best environmental option for alignment/design of the power lines and associated access roads	23
CHAPTER 6 MANAGEMENT PROGRAMME: CONSTRUCTION.....	26
6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase	26
OBJECTIVE: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMP.....	26
6.2 Objectives	31
OBJECTIVE: Environmentally sensitive location of construction equipment camps on site.....	31
OBJECTIVE: Minimise impacts related to inappropriate site establishment..	32
OBJECTIVE: Appropriate management of the construction site and construction workers.....	34
OBJECTIVE: Maximise local employment and business opportunities associated with the construction phase.....	36
OBJECTIVE: Minimise impacts related to traffic management and transportation of equipment and materials to site	37
OBJECTIVE: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities	39
OBJECTIVE: Management of dust and air emissions	41
OBJECTIVE: Minimisation of development footprint and disturbance to topsoil	43
OBJECTIVE: Limit impacts on vegetation communities and species of special concern to limit the loss of biodiversity.....	44
OBJECTIVE: Limit direct and indirect terrestrial faunal impacts	45
OBJECTIVE: Limit the damage to possible drainage lines	46
OBJECTIVE: Minimise the establishment and spread of alien invasive plants	47
OBJECTIVE: Minimise soil degradation and erosion	50
OBJECTIVE: Protection of heritage resources.....	52

OBJECTIVE: Minimisation of visual impacts associated with construction....	53
OBJECTIVE: Appropriate handling and management of waste.....	54
OBJECTIVE: Appropriate handling and storage of chemicals, hazardous substances.....	57
OBJECTIVE: Noise control	59
6.3 Detailing Method Statements	60
OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk.....	60
6.4 Awareness and Competence: Construction Phase	62
OBJECTIVE: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm	62
6.4.1 <i>Environmental Awareness Training</i>	63
6.4.2 <i>Induction Training</i>	63
6.4.3 <i>Toolbox Talks</i>	64
6.5 Monitoring Programme: Construction Phase.....	64
OBJECTIVE: To monitor the performance of the control strategies employed against environmental objectives and standards.....	64
6.5.1 <i>Non-Conformance Reports</i>	65
6.5.2 <i>Monitoring Reports</i>	65
6.5.3 <i>Final Audit Report</i>	66
CHAPTER 7 MANAGEMENT PROGRAMME: REHABILITATION.....	67
7.1. Objectives	67
OBJECTIVE: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed ...	67
CHAPTER 8 MANAGEMENT PROGRAMME: OPERATION	70
8.1. Objectives	70
OBJECTIVE: Management of Power Line Servitude	70
OBJECTIVE: Protection of avifauna from collision and electrocution	71
OBJECTIVE: Minimise soil degradation and erosion	72
CHAPTER 9 MANAGEMENT PROGRAMME: DECOMMISSIONING	74
9.1. Site Preparation	74
9.2 Disassemble and Replace Infrastructure	74

PROJECT DETAILS

CHAPTER 1

Networx Renewables (Pty) Ltd is proposing the establishment of a new 132 kV power line approximately 17.6 km in length from the Bosjesmansberg PV Solar Energy Facility to the Eskom Cuprum Substation in order to evacuate the generated power into the Eskom grid.

The proposed Bosjesmansberg to Cuprum 132kV power line is located within the Siyathemba Local Municipality (within the Pixley ka Seme District Municipality) of the Northern Cape Province. The power line will be approximately 17.6km in length originating on the Farm Bosjesmansberg situated approximately 15km east of the town of Copperton and connecting to the Cuprum Substation approximately 3.5km to the south of the town of Copperton.

The entire route of the proposed Bosjesmansberg to Cuprum 132kV power line is situated adjacent (within 20m) from the existing Burchel – Cuprum 132kV power line which traverses portion 1 of the Farm Bosjesmansberg 67 in an east to west direction. From the point of origin at the northern boundary of the Bosjesmansberg PV Substation, the proposed line moves in a south westerly direction for 16.5km before changing course in a north westerly direction to connect at the Cuprum Substation. The proposed power line traverses three farm portions, before crossing the main road into Copperton.

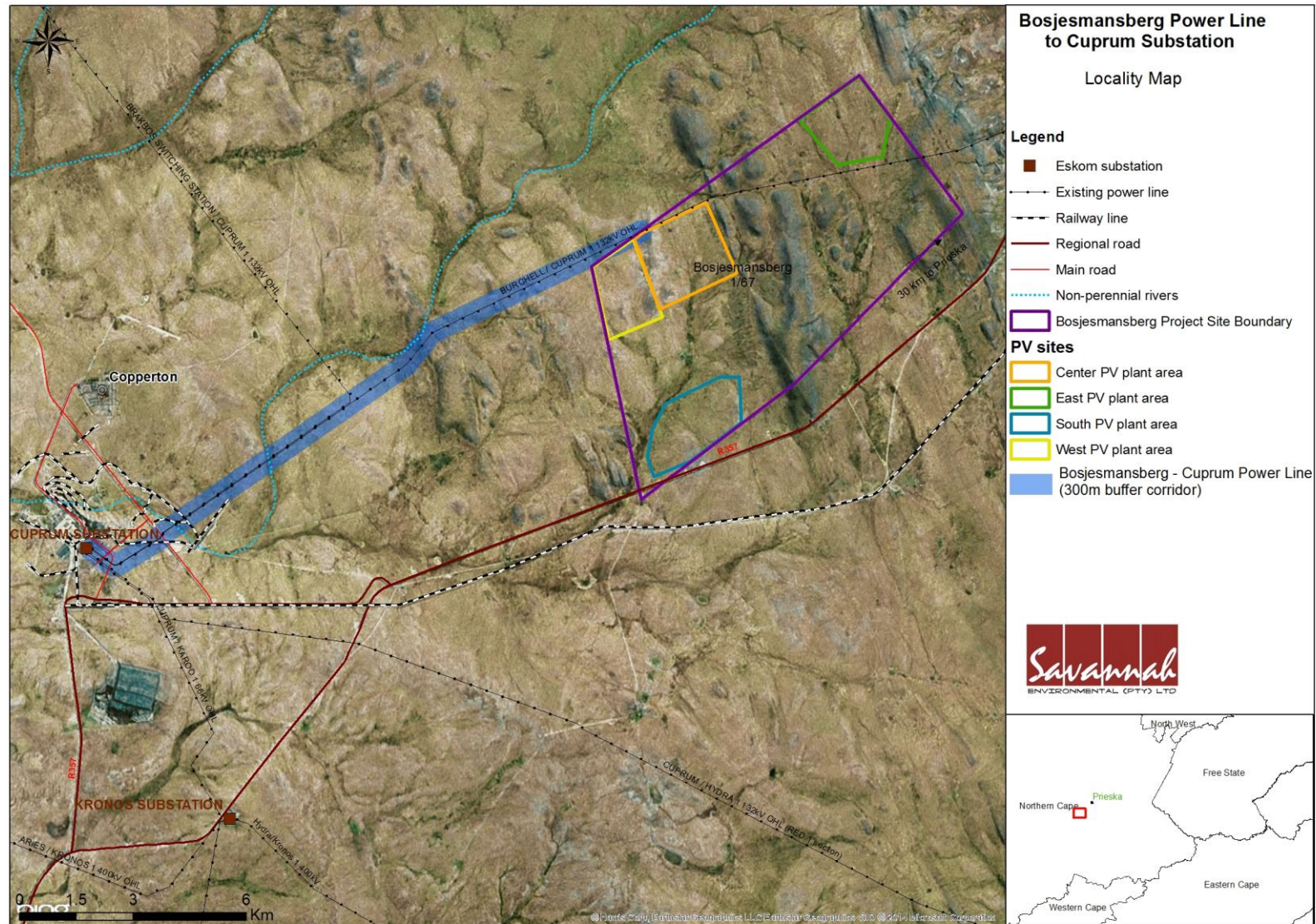


Figure 1.1: Locality map showing the proposed 132kv power line connecting the Bosjesmansberg PV facility to the Cuprum Substation

1.2. Activities and Components associated with the Proposed Power Line

The power line is to be constructed in accordance with the following simplified sequence:

- Step 1:** Survey of the route
- Step 2:** Selection of best-suited conductor, towers, insulators, foundations
- Step 3:** Final design of line and placement of towers
- Step 4:** Issuing of tenders and award of contract to construction companies
- Step 5:** Vegetation clearance and construction of access roads (where required)
- Step 6:** Tower pegging
- Step 7:** Construction of foundations
- Step 8:** Assembly and erection of towers on site
- Step 9:** Stringing of conductors
- Step 10:** Rehabilitation of disturbed area and protection of erosion sensitive areas
- Step 11:** Testing and commissioning
- Step 12:** Continued maintenance

Construction of the power line is required to be undertaken in accordance with the specifications of this Environmental Management Programme (EMP).

The construction of the power line will require the establishment of a construction equipment camp/s at an appropriate location along the route. The exact siting of this construction equipment camp/s is required to be negotiated with the relevant landowner, and must take cognisance of any no-go and sensitive areas identified by the Basic Assessment studies conducted for the proposed 132kV power line development (Savannah Environmental, 2012). The location of this construction equipment camp (or camps) must be approved by the project Environmental Control Officer (ECO).

The expected lifespan of the proposed power line is approximately 40 years, depending on the maintenance undertaken on the power line structures. During the life-span power line, on-going maintenance is performed. Power line inspections are undertaken on an average of 1 – 2 times per year, depending on the area. During this maintenance period, the line is accessed via the access routes established during the construction phase. Maintenance of the power line is required to be undertaken in accordance with the specifications of this EMP.

The management of power line servitude is dependent on the details and conditions of the agreement between the landowner and Eskom, and are

therefore site-specific. These may, therefore, vary from one location to another. However, it is a common occurrence that there is a dual responsibility for the maintenance of the servitude:

- » Eskom will be responsible for the tower structures, maintenance of access roads, watercourse crossings, and gates and fences relating to servitude access.
- » The landowner will retain responsibility for the maintenance of the land and land use within the servitude (e.g. cropping activities, veld management, etc.).

Exceptions to the above may arise where, for example dual use is made of the access roads and gates or specific land use limitations are set by Eskom within the servitude which directly affects the landowner. Maintenance responsibilities are, ultimately, clearly set out in the servitude agreement. Once agreed upon, these maintenance agreement conditions must be deemed to form part of this EMP and must be adhered to at all times.

PURPOSE AND OBJECTIVES OF THE EMP

CHAPTER 2

An Environmental Management Programme (EMP) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts associated with the planning, construction, operation and decommissioning of a project are avoided or mitigated, and that the positive benefits of the projects are enhanced.”¹ The objective of this EMP is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMP is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMP provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site rehabilitation (i.e. soil stabilisation, re-vegetation), during operation and during decommissioning (i.e. similar to construction phase activities).

This EMP has been compiled in accordance with Section 33 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. The EMP has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMP has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and

¹ Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

minimise the extent of potential environmental impacts associated with the power line.

- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities.
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process.

The management and mitigation measures identified within the Environmental Basic Assessment (BA) process are systematically addressed in this EMP, and ensure the minimisation of adverse environmental impacts to an acceptable level.

The developer must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMP and through its integration into the contract documentation. Since this EMP is part of the EIA process, it is important that this document be read in conjunction with the Basic Assessment Report compiled for this project. This will contextualise the EMP and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMP and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMP, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMP.

This EMP shall be binding on all the parties involved in the construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project.

STRUCTURE OF THIS EMP

CHAPTER 3

The first two chapters provide background to the EMP and the proposed project, while the chapters which follow consider the following:

- » Key legislation applicable to the development;
- » Planning and design activities;
- » Construction activities;
- » Operation activities; and
- » Decommissioning activities.

These chapters set out the procedures necessary for the construction of the proposed 132kV power line to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMP has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMP table has been established for each environmental objective. The information provided within the EMP table for each objective is outlined below.

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project Component/s	» List of project components affecting the objective.
Potential Impact	» Description of potential environmental impact if objective is not met.
Activity/Risk Source	» Description of activities which could affect achieving objective.
Mitigation: Target/Objective	» Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures?	Periods for implementation.

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the EMP.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMP tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change;
- » Modification to or addition to environmental objectives and targets;
- » Relevant legal or other requirements are changed or introduced; or
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

3.1. Project Team

This draft EMP was compiled by Steven Ingle and Karen Jodas.

- » *Karen Jodas* - a registered Professional Natural Scientist and holds a Master of Science degree. She has 16 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country
- » *Steven Ingle* - the principle author of this report, holds a Bachelors degree in Environmental Management and has 8 years of experience in environmental management and has undertaken numerous EIAs for a number of proposed large-scale infrastructure project and renewable energy facilities across South Africa.

The Savannah Environmental team have extensive knowledge and experience in EIAs and environmental management, having been involved in EIA processes over the past fourteen years. They have managed and drafted EMPs for other

electricity transmission projects throughout South Africa, including major Eskom transmission lines.

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT CHAPTER 4

The following legislation and guidelines have informed the scope and content of this EMP Report:

- » National Environmental Management Act (Act No 107 of 1998).
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR R545, GNR 546 in Government Gazette 33306 of 18 June 2010).
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010).
 - * Public Participation in the EIA Process (DEA, 2010).
 - * Integrated Environmental Management Information Series (published by DEA)
- » International guidelines, including the Equator Principles.

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the EIA Report. A review of legislative requirements applicable to the proposed project is provided in Table 4.1.

Table 4.1: Relevant legislative and permitting requirements applicable to the proposed power line

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
National Legislation			
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GNR 544 and 546 of June 2010 a Basic Assessment Process is required to be undertaken for the proposed project.</p>	<p>Department of Environmental Affairs – competent authority</p> <p>Department of Environment and Nature Conservation – commenting authority</p>	<p>The listed activities triggered by the proposed power line have been identified and assessed in the EIA process being undertaken (i.e. Basic Assessment).</p> <p>This Basic Assessment Report will be submitted to the competent and commenting authority in support of the application for authorisation.</p>
<p>National Environmental Management Act (Act No 107 of 1998)</p>	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p>	<p>Department of Environmental Affairs</p>	<p>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section has found application during the Basic Assessment process through the consideration of potential impacts (cumulative, direct, and indirect). It will continue to apply throughout the life cycle of the project.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<p>Environment Conservation Act (Act No 73 of 1989)</p>	<p>National Noise Control Regulations (GN R154 dated 10 January 1992)</p>	<p>Department of Environmental Affairs Department of Environment and Nature Conservation Local Authorities</p>	<p>Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion to the local community. Therefore is no requirement for a noise permit in terms of the legislation.</p> <p>On-site activities should be limited to 6:00am - 6:00pm, Monday - Saturday (excluding public holidays).</p> <p>Should activities need to be undertaken outside of these times, the surrounding communities will need to be notified and appropriate approval will be obtained from DEA and the Local Municipality.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation.</p>	<p>Department of Water Affairs Provincial Department of Water Affairs</p>	<p>A water use license (WUL) is required to be obtained if drainage lines are impacted on in terms of Section 21 c and i of the Act. Furthermore construction of towers within 500m from a wetland must be authorised by the Department of Water Affairs.</p>
<p>National Water Act (Act No 36 of 1998)</p>	<p>In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to</p>	<p>Department of Water Affairs Provincial Department of Water Affairs</p>	<p>This section of the Act will apply with respect to the potential impact on drainage lines, primarily during the construction phase (i.e. pollution from</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	water resources from occurring, continuing, or recurring.		construction vehicles).
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act.	Department of Mineral Resources	As no borrow pits are expected to be required for the construction of the facility, no mining permit or right is required to be obtained.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas." Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.	Department of Environmental Affairs	No permitting or licensing requirements arise from this legislation. The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.
	GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas	Department of Environmental Affairs	Describes the measures for control and monitoring of dust, including penalties.
National Heritage Resources Act (Act No 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a	South African Heritage Resources Agency	A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development. A HIA has been undertaken as part of

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>site exceeding 5 000 m² in extent</p> <ul style="list-style-type: none"> » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Stand alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component. 		<p>the Basic Assessment Process to identify potential heritage sites.</p>
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p> <p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as</p>	<p>Department of Environmental Affairs</p>	<p>As the applicant will not carry out any restricted activity, as is defined in S1 of the Act, no permit is required to be obtained in this regard.</p> <p>Specialist flora and fauna studies have been undertaken as part of the basic Assessment process. As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species, as well as critically endangered (CR), endangered (EN), vulnerable (VU) or protected ecosystems and the</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011).</p>		<p>potential for them to be affected has been considered.</p>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Weeds are described as Category 1 plants, while invader plants are described as Category 2 and Category 3 plants. These regulations provide that Category 1, 2 and 3 plants must</p>	<p>Department of Agriculture</p>	<p>This Act will find application throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.		be implemented.
National Forests Act (Act No. 84 of 1998)	<ul style="list-style-type: none"> » In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated”. » GN 1042 provides a list of protected tree species. 	National Department of Forestry	A permit would need to be obtained for any protected trees that are affected by the development.
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S21 the applicant would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land.</p> <p>In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material.</p> <p>In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p>	Department of Water Affairs	While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the	Department of Health	It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <p>Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance Group IV: any electronic product; and Group V: any radioactive material.</p> <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p>		<p>are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</p>
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</p>	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <p>» Adding other waste management activities to the list.</p>	<p>National Department of Water and Environmental Affairs</p> <p>Provincial Department of Environmental Affairs (general waste)</p>	<p>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</p> <p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<ul style="list-style-type: none"> » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities must be undertaken in accordance with the necessary norms and standards.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. 		<p>the Act, as detailed in the EMP (refer to Appendix G).</p> <p>The volumes of waste to be generated and stored on the site during construction and operation of the facility will not require a waste license.</p>
National Road Traffic Act (Act No 93 of 1996)	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed 	<ul style="list-style-type: none"> » South African National Roads Agency Limited (national roads) » Provincial Department of Transport 	<ul style="list-style-type: none"> » An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>procedures to be followed in applying for exemption permits are described and discussed.</p> <ul style="list-style-type: none"> » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. 		<ul style="list-style-type: none"> » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the substation components may not meet specified dimensional limitations (height and width).
Provincial Legislation			
<p>Northern Cape Nature Conservation Act, Act No. 9 of 2009</p>	<p>This Act provides for the sustainable utilisation of wild animals, aquatic biota and plants; provides for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; provides for offences and penalties for contravention of the Act; provides for the appointment of nature conservators to implement the provisions of the Act; and provides for the issuing of permits and other authorisations. Amongst other regulations, the following may apply to the current project:</p> <ul style="list-style-type: none"> » Boundary fences may not be altered in 	<p>Provincial Department of Environmental Affairs</p>	<p>Permitting or licensing requirements may arise from this legislation for the proposed activities to be undertaken for the proposed project.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>such a way as to prevent wild animals from freely moving onto or off of a property;</p> <ul style="list-style-type: none">» Aquatic habitats may not be destroyed or damaged;» The owner of land upon which an invasive species is found (plant or animal) must take the necessary steps to eradicate or destroy such species. <p>The Act provides lists of protected species for the Province</p>		

MANAGEMENT PROGRAMME: PLANNING AND DESIGN CHAPTER 5

Overall Goal: undertake the planning and design phase in a way that:

- » Ensures that the design responds to the identified environmental constraints and opportunities.
- » Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Ensures that the best environmental options are selected for the linear components, including the access roads and power line alignments.
- » Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

5.1 Objectives

OBJECTIVE: Ensure the design responds to identified environmental constraints and opportunities

In order to minimise impacts associated with the construction and operation of the power line, the following is required to be undertaken during the final design phase:

- » Geotechnical survey – this will investigate foundation conditions and the availability of natural construction materials.
- » Specialist walk-through surveys – undertake ecological and avifauna walk through surveys once final power line alignment and tower positions are known.

Project Component/s	<ul style="list-style-type: none"> » Power line » Access roads
Potential Impact	<ul style="list-style-type: none"> » Soil erosion » Loss of agricultural land » Impacts on ecology & birds » Impact on heritage sites
Activities/Risk Sources	<ul style="list-style-type: none"> » Positioning of all the facilities components

Mitigation: Target/Objective	» The design responds to the identified environmental constraints and opportunities
---	---

Mitigation: Action/Control	Responsibility	Timeframe
Undertake negotiations with affected landowners not within the solar energy facility development footprint and agree on landowner-specific conditions for construction and maintenance	Developer	Project planning
Undertake specialist walk through surveys – ecology and avifauna.	Developer Specialists	Design
Undertake a detailed geotechnical survey of the proposed realigned tower positions in order to fully understand the soils in terms of founding conditions and erosion potential.	Developer	Design
Obtain any additional environmental permits required	Developer	Project planning
Ensure that the line does not hinder any centre pivot system or other irrigation systems	Developer	Project planning
Bird-friendly power line tower and conductor designs will be used. The tower designs used should be those which are poorly suited to serve as nesting substrates by most bird species and with perching areas situated in areas either off-set or well away from the conductors.	Developer	Design phase
Ensure that erosion mitigation measures are considered in the construction when planning the project.	Developer	Design
Ensure that riparian areas are spanned/ pole structures are not placed within proximity to rivers, streams. Ensure placement of footprints outside 1:100 year floodlines.	Developer	Design

Performance Indicator	<ul style="list-style-type: none"> » The design meets the objectives and does not degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the BA Report.
------------------------------	--

Monitoring	<ul style="list-style-type: none"> » Review of the design by the Project Manager prior to the commencement of construction. » Review of the alignment of the servitude by the Environmental Control Officer (ECO) prior to the commencement of construction.
-------------------	--

OBJECTIVE: To ensure selection of best environmental option for alignment/design of the power lines and associated access roads

Project component/s	» Power lines
Potential Impact	» Route that degrades environment unnecessarily, particularly with respect to visual aesthetics, loss of indigenous flora, erosion, and impacts on local communities/residents » Substation site that degrades environment unnecessarily, particularly with respect to visual aesthetics, loss of indigenous flora, erosion, and impacts on local communities/residents
Activities/risk sources	» Alignment of power line within corridor » Construction of substation
Mitigation: Target/Objective	» To ensure selection of best environmental option for alignment for the power line and site for the substation

Mitigation: Action/control	Responsibility	Timeframe
Select an alignment that curtail environmental impacts and enhances environmental benefits.	Developer	Design phase
Consider design level mitigation measures recommended by the specialists, especially with respect to visual aesthetics, noise, flora, ecology (i.e. wetlands and pans), avifauna, and heritage, as detailed within the EIA report and relevant appendices.	EPC Contractor	Design phase
Plan new access roads according to contour lines to minimise cutting and filling operations.	EPC Contractor	Design phase
Use bird-friendly power line tower and conductor, and substation designs to minimise electrocution risk. All exposed, live elements are to be fully insulated and/or air gaps between live and earthed components should exceed 2 m.	Developer	Design phase
In order to minimise impacts associated with the power lines and substation, the following surveys are required to be undertaken during the final design phase of the facility: » Ecological survey. A walk-through survey of the final power line route is required once tower positions have been finalised in order to minimise any impacts as far as possible.	Developer	Design phase

Performance Indicator	» Power line alignments meet environmental objectives. » Selected power line alignments that minimises any negative environmental impacts and maximises any benefits.
------------------------------	--

Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the EIA report through review of the design by the Project Manager, SHE representative and the ECO prior to the commencement of construction.
-------------------	--

OBJECTIVE: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operational phases of the solar energy facility. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» Power line » Access roads
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with construction » Activities associated with operation
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (as outlined in Appendix A) to be implemented during both the construction and operational phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Developer	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operational and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer/ Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with landowners is to be undertaken prior to the commencement of construction in order to provide sufficient time for them to plan agricultural activities.	Developer/ Contractor	Pre-construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	» An incident reporting system should be used to record non-conformances to the EMP.

MANAGEMENT PROGRAMME: CONSTRUCTION

CHAPTER 6

Overall Goal: Undertake the construction phase in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- » Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
- » Minimises impacts on fauna (including birds) in the study area.
- » Minimises the impact on heritage sites should they be uncovered.
- » Establishes an environmental baseline during construction activities on the site, where possible.

6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Networkx Renewables (Pty) Ltd must ensure that the project complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Networkx Renewables (Pty) Ltd will retain various key roles and responsibilities during the construction phase.

OBJECTIVE: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMP

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Site Manager; Safety, Health and Environment Representative; Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below.

Project Manager will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
- » Ensure that Networx Renewables (Pty) Ltd and its Contractor(s) are made aware of all stipulations within the EMP.
- » Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Be fully conversant with the EIA for the project, the EMP, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation.

Site Manager (Developers on-site Representative) will:

- » Be fully knowledgeable with the contents of the EIA and risk management.
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents of the EMP.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » Have overall responsibility of the EMP and its implementation.
- » Conduct audits to ensure compliance to the EMP.
- » Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.
- » Confine activities to the demarcated construction site.

The **Safety, Health and Environment Representative** (SHE officer) will:

- » Develop and compile environmental policies and procedures.
- » Direct and liaise with the Environmental Control Officer (ECO) regarding monitoring and reporting on the environmental performance of the construction phase.
- » Conduct internal environmental audits and co-ordinate external environmental audits.
- » Liaise with statutory bodies on environmental performance and other issues as required.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMP and the conditions of the Environmental Authorisation Accordingly, the ECO will:

- » Be fully knowledgeable with the contents with the Basic Assessment.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents with the EMP.
- » Be fully knowledgeable with the contents with all relevant environmental legislation, and ensure compliance with them.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable of the content of the water use licence and the authorisation granted from the department of forestry and fisheries.
- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that if the EMP conditions or specifications are not followed then appropriate measures are undertaken to address this.
- » Ensure that the compliance of the EMP, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMP, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.
- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMP.
- » Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.

- » Ensure that any non-compliance or remedial measures that need to be applied are reported.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Independently report to DEA in terms of compliance with the specifications of the EMP and conditions of the Environmental Authorisation (once issued).

As a general mitigation strategy, the Environmental Control Officer (ECO) should be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, facilitate environmental induction with construction staff and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations). Thereafter weekly site compliance inspections would probably be sufficient. However, in the absence of the ECO there should be a designated environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » A copy of the EMP must be easily accessible to all on-site staff members.
- » Employees must be familiar with the requirements of this EMP and the environmental specifications as they apply to the construction of the power line.
- » Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Staff will be informed of environmental issues as deemed necessary by the ECO.

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMP, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

The Contractor's Safety, Health and Environment Representative should:

- » Be well versed in environmental matters.
- » Understand the relevant environmental legislation and processes.
- » Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- » Know the background of the project and understand the implementation programme.
- » Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
- » Keep accurate and detailed records of all EMP-related activities on site.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications.
- » Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken.
- » Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMP.
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to.
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- » Ensuring that a register of all public complaints is maintained.
- » Establish a complaints and communication hotline for the public
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e. ensure their staff are appropriately trained as to the environmental obligations).

6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE: Environmentally sensitive location of construction equipment camps on site

No construction workers will be accommodated on site. In addition, construction equipment may need to be stored at an appropriate location along the power line route and at the substation site for the duration of the construction period.

Project component/s	Project components affecting the objective: » Construction equipment camp/s
Potential Impact	» Damage to protected / endangered vegetation » Damage to and/or loss of topsoil » Compacting of ground » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities
Activities/risk sources	» Bush clearing and levelling of equipment storage area/s » Access to and from the equipment storage area/s
Mitigation: Target/Objective	» To minimise impacts on the social and biophysical environment. » To limit equipment storage to within the demarcated site

Mitigation: Action/control	Responsibility	Timeframe
Before construction commences, representatives from the local authority and community-based organisations (e.g. residents associations), as well as neighbouring residents should be informed of the details of the construction company, size of the workforce and construction schedules	Developer	Pre-construction
The exact siting of the construction equipment camp shall be negotiated with the relevant landowner, and must take cognisance of any sensitive areas identified by the environmental studies. The location of this construction equipment camp shall be approved by the project Environmental Control Officer (ECO)	Contractor	Pre-construction
Minimise vegetation clearing and levelling for equipment storage areas. All plants that are able to be rescued and transplanted must be done in a manner recommended in the Plant Rescue Plan (refer to Appendix F), and then used for rehabilitation.	Contractor	Erection: during site establishment Maintenance: for duration of Contract

Mitigation: Action/control	Responsibility	Timeframe
Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract

Performance Indicator	<ul style="list-style-type: none"> » No visible erosion scars once construction in an area is completed. » No claims regarding damage leading to litigation due to unauthorised removal of vegetation. » All damaged areas successfully rehabilitated one year after completion » No damage to wetland or riverine areas. » Appropriate waste management.
Monitoring	<ul style="list-style-type: none"> » Regular audits of the construction camps and areas of construction on site. » An incident reporting system should be used to record non-conformances to the EMP.

OBJECTIVE: Minimise impacts related to inappropriate site establishment

Site establishment is the first activity which is to be undertaken within the construction phase. The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant local languages, all to the approval of the Project Manager.

Project Component/s	» All infrastructure
Potential Impact	<ul style="list-style-type: none"> » Hazards to landowners and public. » Damage to indigenous natural vegetation, due largely to ignorance of where such areas are located. » Loss of threatened plant species
Activities/Risk Sources	<ul style="list-style-type: none"> » Excavations. » Movement of construction vehicles in the area and on-site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

Mitigation: Action/Control	Responsibility	Timeframe
----------------------------	----------------	-----------

Mitigation: Action/Control	Responsibility	Timeframe
Secure site, working areas and excavations in an appropriate manner, as agreed with the ECO.	Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
Fence and secure contractor's equipment camp.	Contractor	Site establishment
Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant local languages, all to the approval of the Site Manager.	Contractor	Site establishment and duration of construction
All unattended open excavations shall be adequately demarcated and/or fenced. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.	Contractor	Site establishment and duration of construction
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
All development footprints should be appropriately fenced off and clearly demarcated.	Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor	Site establishment, and duration of construction
Ablution or sanitation facilities should not be located within 100 m from a 1:100 year flood line including drainage lines.	Contractor	Site establishment, and duration of construction
Supply adequate (closable, tamper proof) waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction

Performance Indicator	<ul style="list-style-type: none"> » Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	<ul style="list-style-type: none"> » An incident reporting system will be used to record non-conformances to the EMP. » ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager.

OBJECTIVE: Appropriate management of the construction site and construction workers

Project Component/s	<ul style="list-style-type: none"> » Power line infrastructure.
Potential Impact	<ul style="list-style-type: none"> » Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	<ul style="list-style-type: none"> » Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMP, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract
Ensure waste removal facilities are maintained and emptied on a regular basis.	Contractor	Site establishment,

Mitigation: Action/Control	Responsibility	Timeframe
		and duration of construction
The terms of this EMP and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts	Developer	Tender process
Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no ablution activities will be permitted outside the designated areas. These facilities must be regularly serviced by appropriate contractors. A minimum of one toilet shall be provided per 15 persons at each working area such as the Contractor's camp	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
No one other than the ECO or personnel authorised by the ECO may disturb flora or fauna outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Fire fighting equipment and training must be provided before the construction phase commences.	Contractor and sub-contractor/s	Duration of contract
Draft Code of conduct for construction workers.	Contractor and sub-contractor/s	Pre-construction
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor and sub-contractor/s	Construction
On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction

<p>Performance Indicator</p>	<ul style="list-style-type: none"> » The construction equipment camps have avoided sensitive areas, as approved by the ECO. » Ablution and waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not reported by the ECO. » No complaints regarding contractor behaviour or habits. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct drafted before commencement of construction phase.
<p>Monitoring</p>	<ul style="list-style-type: none"> » Regular audits of the construction camps and areas of construction on site by the ECO. » Proof of disposal of sewage at an appropriate wastewater treatment works. » An incident reporting system should be used to record non-conformances to the EMP. » Observation and supervision of Contractor practices throughout construction phase by the ECO. » Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE: Maximise local employment and business opportunities associated with the construction phase

Although limited, employment opportunities could be created during the construction phase, specifically for semi-skilled and unskilled workers, use should be made of local labour as far as possible.

<p>Project Component/s</p>	<ul style="list-style-type: none"> » Construction activities.
<p>Potential Impact</p>	<ul style="list-style-type: none"> » The opportunities and benefits associated with the creation of local employment and business.
<p>Activities/Risk Sources</p>	<ul style="list-style-type: none"> » Contractors who make use of their own labour for unskilled tasks, thereby reducing the employment and business opportunities for locals.

	<ul style="list-style-type: none"> » The inflow of various specialists from outside the study area and even abroad. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Employment of a maximum number of low-skilled to semi-skilled workers for the project from the local area where possible.

Mitigation: Action/Control	Responsibility	Timeframe
Construction workers should be recruited, as far as possible, from the local area in and around the Copperton Community area in the Siyathemba municipality (construction workers should be able to provide proof of having lived in the area for five years or longer).	Contractor	Duration of construction
Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses, and SMMEs from the local sector.	Contractor	Pre-construction
Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities.	Contractor	Pre-construction and construction

Performance Indicator	<ul style="list-style-type: none"> » The involvement of local labour and previously disadvantaged individuals is promoted. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation.
Monitoring	<ul style="list-style-type: none"> » Developer and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE: Minimise impacts related to traffic management and transportation of equipment and materials to site

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment (including turbine components) and materials and construction crews to the site and the return of the vehicles after delivery of materials.

Existing public roads will be used during construction, such as the R35

The section below provides a guideline for the Traffic Management and Transportation Plan on site and will need to be supplemented with the relevant final transport plan devised by the EPC partner.

Project Component/s	» Delivery of any component required within the construction phase.
Potential Impact	<ul style="list-style-type: none"> » Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	<ul style="list-style-type: none"> » Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix cement from off-site batching plant to the site. » Mobile construction equipment movement on-site. » Power line construction activities.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimise impact of traffic on local traffic volume, existing infrastructure, property owners, animals, and road users. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/Control	Responsibility	Timeframe
Appropriate dust suppression techniques must be implemented to minimise dust from gravel roads.	Developer and ECO	Construction
Construction vehicles and those transporting materials and goods should be inspected by the contractor or a sub-contractor to ensure that these are in good working order and not overloaded.	Contractor	Construction
Strict vehicle safety standards should be implemented and monitored.	Contractor and ECO	Construction
All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor (or appointed transportation contractor)	Pre-construction
A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
No deviation from approved transportation routes	Contractor	Duration of

Mitigation: Action/Control	Responsibility	Timeframe
must be allowed, unless roads are closed for whatever reason outside the control of the contractor.		contract
Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
Any traffic delays resulting from the presence of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	Contractor	Duration of contract
Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	Duration of contract
Appropriate maintenance of all vehicles of the contractor must be ensured.	Contractor	Duration of contract
All vehicles of the contractor travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract
Signs must be placed along construction roads to identify speed limits, travel restrictions and other standard traffic control information.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Vehicles keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements and schedules. » No construction traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	<ul style="list-style-type: none"> » Developer and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE: To avoid and or minimise the potential impact of the activities during the construction on the safety of local communities

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to “outsiders” being in the area to undertake their criminal activities.

Project Component/s	» Construction and establishment activities
Potential Impact	» Impact on safety of farmers and communities (increased crime etc.) and potential loss of livestock due to stock theft by construction workers and also damage to farm infrastructure, such as gates and fences. » Impact on irrigated fields
Activities/Risk Sources	» The presence of construction workers on the site can pose a potential safety risk to local farmers and communities and may result in stock thefts. The activities of construction workers may also result in damage to farm infrastructure.
Mitigation: Target/Objective	» To avoid and or minimise the potential impact on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
The housing of construction workers on the site should be limited to security personnel.	Contractor	Construction
Ensure that all farm gates are locked and secure at all times	Developer and Contractor	Construction and Operation
Ensure that no construction hinders the function of pivot irrigation systems.	Developer and Contractor	All phases of project
Inform all land owners of activity on their land	Developer	All phases of the project
The construction site should be fenced and access to the area controlled.	Developer and Contractor	All phases of project
Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners and the local municipality	Developer, Local Municipality, and local communities	Pre-construction and when required
Contact details of emergency services should be prominently displayed on site.	Developer and Contractor	Construction
Appropriate fire-fighting equipment must be present on site and members of the workforce should be appropriately trained in using this equipment in the fighting of veld fires	Developer and Contractor	Construction

Performance Indicator	» No criminal activities and theft of livestock are reported. » No fires or on-site accidents occur.
------------------------------	---

Monitoring	» Developer and appointed ECO must monitor indicators listed above to ensure that they have been implemented.
-------------------	---

OBJECTIVE: Management of dust and air emissions (Refer to Appendix E: Standard specifications for Earth Works)

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project Component/s	<ul style="list-style-type: none"> » Power line infrastructure. » Access road
Potential Impact	» Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing. Release of minor amounts of air pollutants (for example NO ₂ , CO and SO ₂) from vehicles and construction equipment
Activities/Risk Sources	<ul style="list-style-type: none"> » Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling. » Transport of materials, equipment, and components on internal access roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase

Mitigation: Action/Control	Responsibility	Timeframe
Roads must be maintained in a manner that will ensure that nuisance from dust emissions from road or vehicle sources are not visibly excessive.	Contractor	Site establishment and construction
Ensure that any damage to roads because of construction activities is repaired before completion of	Contractor	Site establishment

Mitigation: Action/Control	Responsibility	Timeframe
the construction phase.		and construction
Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins if required by the wind conditions.	Contractor	Duration of contract
Speed of construction vehicles must be restricted, as defined by the ECO.	Contractor	Duration of contract
Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
Strictly control vibration pollution from compaction plant or excavation plant.	Contractor	Duration of contract
Disturbed areas must be re-vegetated as soon as practicable once construction in an area is completed.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » All heavy vehicles equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation. » Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.
Monitoring	<p>Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods:</p> <ul style="list-style-type: none"> » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-

conformances to the EMP.

OBJECTIVE: Minimisation of development footprint and disturbance to topsoil

In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited.

Project Component/s	<ul style="list-style-type: none"> » Power line. » Access roads
Potential Impact	<ul style="list-style-type: none"> » Impacts on natural vegetation. » Impacts on soil. » Loss of topsoil.
Activity/Risk Source	<ul style="list-style-type: none"> » Site preparation and earthworks. » Excavation of foundations. » Construction of site access road. » Site preparation (e.g. compaction). » Power line construction activities. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To retain natural vegetation, where possible. » To minimise footprints of disturbance of vegetation/habitats. » Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas. » Minimise spoil material.

Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on flora and fauna and their habitats is restricted.	Contractor	Site establishment & duration of contract
Construction activities must be restricted to demarcated areas so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
Any fill material required must be sourced from a commercial off-site suitable/permitted source, quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Excavated topsoil must be stockpiled in designated areas separate from base material at a maximum height and covered until replaced during rehabilitation.	Contractor	Site establishment & duration of contract
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Site establishment Maintenance: for duration of contract
As far as possible, the maximum topsoil stockpile height must not exceed 2 m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Minimal disturbance outside of designated work areas. » Minimise clearing of existing vegetation. » Topsoil appropriately stored.
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation clearing and soil management activities by ECO throughout construction phase. » Supervision of all clearing and earthworks. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE: Limit impacts on vegetation communities and species of special concern to limit the loss of biodiversity

Project Component/s	<ul style="list-style-type: none"> » All infrastructure and activities which result in vegetation loss or clearing including the power line support structures; substation, operations and maintenance buildings, access and maintenance roads.
Potential Impact	<ul style="list-style-type: none"> » Loss of plant cover leading to erosion as well as loss of faunal habitat and loss of specimens of protected plants.
Activity/Risk Source	<ul style="list-style-type: none"> » Construction activities
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimal impact on biodiversity & terrestrial environment. » Low impact on protected species

Mitigation: Action/Control	Responsibility	Timeframe
----------------------------	----------------	-----------

Mitigation: Action/Control	Responsibility	Timeframe
Preconstruction walk-through of power line route and support structure positions and use micro-siting to reduce local impact.	Management/E CO	Construction & Operation
Affected individuals of protected species which cannot be avoided should be translocated to a safe area on the site prior to construction.	Management/E CO	Construction & Operation
Erosion control measures should be implemented in areas where slopes have been disturbed.	Management/E CO	Construction & Operation
Revegetation of cleared areas or monitoring to ensure that recovery is taking place Alien plant clearing where necessary	Management/E CO	Construction & Operation

Performance Indicator	<ul style="list-style-type: none"> » Vegetation loss restricted to infrastructure footprint. » Protected species avoided by flexible infrastructure such as power line.
Monitoring	<ul style="list-style-type: none"> » Vegetation is cleared only within essential areas. » Monitor alien plant abundance along the route on an annual basis. » Document revegetation actions taken and their success » Document erosion problems and the control measures implemented

OBJECTIVE: Limit direct and indirect terrestrial faunal impacts

Project component/s	Construction activities, operational activities and human presence
Potential Impact	Disturbance of faunal communities due to construction as well as poaching and hunting risk from construction staff.
Activity/risk source	Habitat transformation during construction; site fencing, presence of construction and operation personnel.
Mitigation: Target/Objective	Low faunal impact, during construction and operation.

Mitigation: Action/control	Responsibility	Timeframe
Environmental induction for all staff	Management/E CO	Construction & Operation
ECO to monitor and enforce ban on hunting, collecting etc of all plants and animals or their products.	Management/E CO	Construction & Operation
Any fauna encountered during construction should be removed to safety by the ECO or other suitably qualified person,	Management/E CO	Construction & Operation
All vehicles to adhere to low speed limits (40km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust	Management/E CO	Construction & Operation
All night-lighting should use low-UV type lights (such as most LEDs), which do not attract insects. The lights should also be of types which are directed downward and do not result in large amounts of light pollution.	Management/E CO	Construction & Operation
Access to the site should be controlled and spot checks on vehicles if necessary.	Management/E CO	Construction & Operation

Performance Indicator	» Low number of incidents with fauna during construction » No removal of vegetation/plants during construction
Monitoring	» Monitoring for compliance during the construction phase. All incidents to be noted.

OBJECTIVE: Limit the damage drainage lines along the alignment

Project component/s	» Activities and infrastructure that will result in the disturbance to the drainage area
Potential Impact	» Damage to drainage that will impact on ecosystem functioning.
Activity/risk source	» Construction, environmental management
Mitigation: Target/Objective	Target: No damage to the drainage lines along the power line alignment

Mitigation: Action/control	Responsibility	Timeframe
Where this is not possible, infrastructure and access roads should be:	Construction team, management,	Construction

Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> » Aligned with existing roads » Should go around wetlands where possible » Should cross watercourses perpendicularly to reduce the footprint » Infrastructure should not be placed within drainage lines » Disturbed areas should be rehabilitated immediately » Stormwater and runoff should be controlled » Adequate bridges and culvert structures should be provided at the crossings 	environmental officer.	

Performance Indicator	<ul style="list-style-type: none"> » No disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation
Monitoring	<ul style="list-style-type: none"> » An Environmental control officer should monitor the habitat loss before and after construction

OBJECTIVE: Minimise the establishment and spread of alien invasive plants (refer to Appendix B: Invasive Management Plan)

On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis.

Project component/s	<ul style="list-style-type: none"> » power lines » access roads
Potential Impact	<ul style="list-style-type: none"> » Impacts on or loss of indigenous natural vegetation due to construction activities » Impacts on soil » Loss of topsoil
Activity/risk source	<ul style="list-style-type: none"> » Site preparation and earthworks » Construction-related traffic » Foundations or plant equipment installation » Mobile construction equipment » Power line construction activities » Dumping or damage by construction equipment outside of demarcated construction areas.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To retain natural vegetation in the highly sensitive areas the site » To minimise footprints of disturbance of vegetation/habitats on-site » To minimise loss of indigenous vegetation

- » No alien plants within project control area
- » No loss of species of conservation concern

Mitigation: Action/control	Responsibility	Timeframe
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing. Before any clearing of vegetation takes place, protected plants must be rescued with the methods recommended in the Plant Rescue Plan (refer to Appendix F).	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
Construction activities must be restricted to demarcated areas so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
Unnecessary impacts on surrounding natural vegetation must be avoided. No off-road driving is permitted unless authorised by the ECO.	Contractor	Site establishment & duration of contract
Existing roads must be used as far as possible.	Contractor	Site establishment & duration of contract
All foundations and trenched areas must be backfilled with as much original material as possible.	Contractor	Site establishment & duration of contract
Roads must be aligned away from steep slopes and drainage lines as much as possible.	Contractor	Design; Duration of construction
A transport management Plan must be compiled and implemented by the EPC Contractor, particularly for the transport of turbine components and all large equipment.	EPC Contractor	Design; Duration of construction
A traffic management plan must be compiled and implemented by the EPC Contractor, and must address the site access roads to ensure that no hazards would result for the increased truck traffic and that the impact on traffic flow is minimised.	EPC Contractor	Duration of construction
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum	EPC Contractor	Construction & Operation

Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> » Rehabilitate disturbed areas as quickly as possible » Do not import soil from areas with alien plants 		
Establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per conservation of agricultural resources act)	Specialist	Construction & Operation
Immediately control any alien plants that become established using registered control methods.	Specialist	Construction & Operation
Avoid the unnecessary removal of vegetation for the distribution power line servitudes and limit access to the servitudes (during both construction and operational phases) along existing access roads as far as possible.	Contractor	Duration of contract
Soil stockpiles should not be translocated from areas with alien plants into the mine area and within the mine area alien plants on stockpiles must be controlled so as to avoid the development of a soil seed bank of alien plants within the stock-piled soil.	Contractor in consultation with the ECO.	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Zero disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation » Loss of natural vegetation equivalent to the exact footprint of the proposed project » Number of plants and aerial cover of plants within project area and immediate surroundings
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation clearing and soil management activities by ECO throughout construction phase » Before construction, determine required number of hectares to accommodate footprint of proposed infrastructure. » After construction, determine amount of natural vegetation lost due to construction. » Supervision of all clearing and earthworks » Annual audit of project area and immediate surroundings by qualified botanist. If no species are detected, then this can be stated. If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. The environmental manager should be responsible for driving this process. Reporting frequency depends on legal compliance framework. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE: Minimise soil degradation and erosion (refer to Appendix C: Soil Erosion Management Plan)

Most of the study area appears to be underlain by unconsolidated sediments.

The soil on site may be impacted in terms of:

- » Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere (i.e. into the drainage lines)
- » Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of the drainage lines.
- » Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems. Degradation of parent rock is considered low as there are no deep excavations envisaged.

Project Component/s	<ul style="list-style-type: none"> » Power line. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Soil and rock degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	<ul style="list-style-type: none"> » Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimise extent of disturbance areas. » Minimise activity within disturbance areas. » Minimise soil degradation (mixing, wetting, compaction, etc). » Minimise soil erosion. » Minimise deposition of soil into drainage lines. » Minimise instability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Identify disturbance areas and restrict construction activity to these areas.	Contractor	Before and during construction
Rehabilitate disturbance areas as soon as practicable when construction in an area is complete.	Contractor	During and after

Mitigation: Action/Control	Responsibility	Timeframe
		construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	Engineer, ECO, and Contractor	Design and construction
Where access roads cross natural drainage lines, culverts must be designed to allow free flow and regular maintenance must be carried out.	Engineer, ECO, and Contractor	Design, before and during construction
Dust control on construction site (i.e. wetting of denuded areas).	Contractor	Construction
It may be necessary to use geotextiles and/or wind nets to limit wind erosion of exposed areas, where wind erosion could present difficulties and result in the loss of valuable topsoil.	Contractor	Site establishment & duration of contract
Minimise removal of vegetation which adds stability to soil.	ECO/Contractor	Construction
Soil conservation: Stockpile topsoil for re-use in rehabilitation phase, protect stockpile from erosion	Contractor	Before and during construction
Erosion control measures (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, or temporary mulching over denuded area as required).	Contractor, and ECO	Erection: Before construction Maintenance: Duration of contract
Control depth of excavations and stability of cut faces/sidewalls.	Engineer, ECO, and Contractor	Before construction and Maintenance Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No activity outside demarcated disturbance areas. » Acceptable level of activity within disturbance areas, as determined by the ECO. » Acceptable level of soil erosion around site, as determined by the ECO. » Acceptable level of increased siltation in drainage lines, as determined by the ECO. » Acceptable state of excavations, as determined by the ECO. » No activity in restricted areas.
Monitoring	<ul style="list-style-type: none"> » Monthly inspections of the site by the ECO. » Monthly inspections of sediment control devices. » Monthly inspections of surroundings, including drainage lines.

- » Immediate reporting of ineffective sediment control systems.
- » An incident reporting system will record non-conformances.

OBJECTIVE: Protection of heritage resources

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context.

The impacts to heritage resources by the proposed development are not considered to be highly significant. No heritage sites were identified by the specialist along the alignment or in the near vicinity of the line.

Project Component/s	<ul style="list-style-type: none"> » Power line. » Access roads.
Potential Impact	» Heritage objects/ artefacts/ Unidentified Sites/ Burial and Grave Sites (found on site are inappropriately managed or destroyed
Activity/Risk Source	<ul style="list-style-type: none"> » Site preparation and earthworks » Foundations or plant equipment installation » Mobile construction equipment movement on site » Power line and access roads construction activities.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor in consultation with Specialist	Pre-construction
Project employees and any contract staff will maintain, at all times, a high level of awareness of the possibility of discovering heritage sites. Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	Developer / Contractor	Duration of contract
If a heritage object is found i.e grave/ burial site, or archaeological site, work in that area will be stopped immediately, and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Developer , and Contractor in consultation with Specialist	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
Apply for sampling permits from SAHRA for work on any archaeological sites identified as needing intervention.	Developer in consultation with Specialist	Pre-construction
Placement of pylons should avoid potential sites of high archaeological sensitivity such as pans, rocky ridges and river beds.	Developer in consultation with Specialist	Pre-construction

Performance Indicator	<ul style="list-style-type: none"> » Zero disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring	<ul style="list-style-type: none"> » Observation of excavation activities by ECO throughout construction phase. » Supervision of all clearing and earthworks. » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported. » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE: Minimisation of visual impacts associated with construction

During the construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a cumulative visual nuisance to landowners and residents in the area as well as road users. The placement of lay-down areas and temporary construction camps should be carefully considered in order to not negatively influence the future perception of the project. Secondary visual impacts associated with the construction phase, such as the sight of construction vehicles, dust and construction litter must be managed to reduce visual impacts. The use of dust-suppression techniques on the access roads (where required), timely removal of rubble and litter, and the erection of temporary screening will assist in doing this.

Project Component/s	Construction activities along the power line
Potential Impact	Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing.
Activity/Risk Source	The viewing of the above mentioned by observers near the infrastructure.
Mitigation:	Minimal visual intrusion by construction activities and intact

Target/Objective vegetation cover outside of immediate works areas.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure that vegetation is not unnecessarily cleared or removed during the construction period.	Developer/ contractor	Early in the construction phase.
Reduce the construction period through careful logistical planning and productive implementation of resources.	Developer/ contractor	Early in the construction phase.
Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Developer/ contractor	Early in and throughout the construction phase.
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Developer/ contractor	Throughout the construction phase.
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Developer/ contractor	Throughout the construction phase.
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Developer/ contractor	Throughout the construction phase.
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Developer/ contractor	Throughout the construction phase.

Performance Indicator	Vegetation cover within the servitudes and in the vicinity of the infrastructure is intact with no evidence of degradation or erosion.
Monitoring	Monitoring of vegetation clearing during construction. Monitoring of rehabilitated areas post construction.

OBJECTIVE: Appropriate handling and management of waste (Refer to Appendix D: Construction Waste Guideline)

In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented.

Project Component/s	» Power line.
Potential Impact	<ul style="list-style-type: none"> » Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices.
Activity/Risk Source	<ul style="list-style-type: none"> » Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks, and site preparation.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/Control	Responsibility	Timeframe
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract
Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
Disposal of waste must be in accordance with relevant	Contractor	Duration of

Mitigation: Action/Control	Responsibility	Timeframe
legislative requirements, including the use of licensed contractors.		contract
Uncontaminated waste will be removed at least weekly for disposal; other wastes will be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Duration of contract
Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
Spilled cement will be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
Regularly serviced chemical toilets facilities will be used to ensure appropriate control of sewage.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site.	Contractor	Duration of construction
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction

Performance Indicator	<ul style="list-style-type: none"> » No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed.

- » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.
- » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE: Appropriate handling and storage of chemicals, hazardous substances

The construction phase will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	<ul style="list-style-type: none"> » Storage and handling of chemicals, hazardous substances.
Potential Impact	<ul style="list-style-type: none"> » Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers.
Activity/Risk Source	<ul style="list-style-type: none"> » Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon use and storage.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.

Mitigation: Action/Control	Responsibility	Timeframe
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Corrective action must be undertaken immediately if a potential/actual leak or spill of a polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Spilled cement must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	Contractor	Duration of contract
All stored fuels to be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately banded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations	Contractor	Duration of contract
The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times.	Contractor	Duration of contract
Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

Performance Indicator	<ul style="list-style-type: none"> » No chemical spills outside of designated storage areas. » No unattended water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping.
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system will be used to record non-

conformances to the EMP.

OBJECTIVE: Noise control

Traffic movement to and from the site, particularly of heavy-duty vehicles during construction, could potentially result in a noise impact on the residents adjacent (very low density) to the R357 near the site.

Project component/s	<ul style="list-style-type: none"> » Power line » Access roads
Potential Impact	<ul style="list-style-type: none"> » Nuisance noise from construction affecting the surrounding community
Activity/risk source	<ul style="list-style-type: none"> » Site preparation and earthworks » Construction-related transport » Foundations or plant equipment installation » Power line construction activities
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To minimise noise to any surrounding residences from the construction activities » To comply with Noise Control Regulations and SANS Guidelines » To ensure noise levels are acceptable at residences in close proximity to construction activities

Mitigation: Action/control	Responsibility	Timeframe
On-site construction activities will be limited to 6:00am to 6:00pm Monday – Saturday (excluding public holidays) (in terms of the Environment Conservation Act). Should construction activities need to be undertaken outside of these times, the surrounding communities will be notified and appropriate approval will be obtained from DEAT and/or the Local Authority.	Contractor	Duration of contract
Construction noise will be managed according to the Noise Control Regulations and SANS 10103.	Contractor	Duration of contract
All construction equipment, including vehicles, will be properly and appropriately maintained in order to minimise noise generation.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints received concerning noise
Monitoring	<ul style="list-style-type: none"> » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will

- be investigated and, if appropriate, acted upon.
- » An incident reporting system will be used to record non-conformances to the EMP.

6.3 Detailing Method Statements

OBJECTIVE: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMP will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

A Method Statement is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications". The Method Statement must cover applicable details with regard to:

- » Construction procedures;
- » Materials and equipment to be used;
- » Getting the equipment to and from site;
- » How the equipment/material will be moved while on-site;
- » How and where material will be stored;
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- » Timing and location of activities;
- » Compliance/non-compliance with the Specifications; and
- » Any other information deemed necessary by the Site Manager.

Specific method statements required may include:

- » Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- » Preparation of the site (i.e. Clearing vegetation, compacting soils and removing existing infrastructure and waste).
- » Soil management/stockpiling and erosion control.
- » Excavations and backfilling procedure.
- » Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions)
- » Stipulate the storm water management procedures recommended in the storm water management method statement.
- » Ablution facilities (placement, maintenance, management and servicing)
- » Solid Waste Management:
 - * Description of the waste storage facilities (on site and accumulative).
 - * Placement of waste stored (on site and accumulative).
 - * Management and collection of waste process.
 - * Recycle, re-use and removal process and procedure.
- » Liquid waste management:
 - * The design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
 - * Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facilities where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no seepage into wetlands or natural watercourses.
- » Dust and noise pollution
 - * Describe necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels (construction activities generating output levels of 85 dB(A) near human settlement, are to be confined to working hours (08h00 - 17h00) Mondays to Fridays).
 - * Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- » Hazardous substance storage (Ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other

harmful and hazardous substances and materials. South African National Standards apply).

- * Lists of all potentially hazardous substances to be used.
 - * Appropriate handling, storage and disposal procedures.
 - * Prevention protocol of accidental contamination of soil at storage and handling areas.
 - * All storage areas, (ie: for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- » Fire prevention and management measures on site.
 - » Fauna and flora protection process on and off site (ie removal to reintroduction or replanting, if necessary).
 - * Rehabilitation and re-vegetation process.
 - » Incident and accident reporting protocol.
 - » General administration
 - » Designate access road and the protocol on while roads are in use.
 - » Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved. The ECO should monitor the construction activities to ensure that these are undertaken in accordance with the approved Method Statement.

6.4 Awareness and Competence: Construction Phase

OBJECTIVE: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately

experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractors obligations in this regard include the following:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » Ensuring that a copy of the EMP is readily available on-site, and that all site staff are aware of the location and have access to the document.
- » Employees will be familiar with the requirements of the EMP and the environmental specifications as they apply to the construction of the power line.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course.
- » The course should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Awareness of any other environmental matters, which are deemed necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
- » Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
- » Records must be kept of those that have completed the relevant training.
- » Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
- » Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible, detailed below.

6.4.1 Environmental Awareness Training

Environmental Awareness Training must take the form of an on-site talk and demonstration by the ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the ECO on site.

6.4.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should include discussing the developer's environmental policy and values, the function of the EMP and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the SHE Officer on site.

6.4.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the Works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Monitoring Programme: Construction Phase

OBJECTIVE: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). The Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to monitor the implementation of the specified environmental specifications, in order to:

- » Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.

- » Ensure adequate and appropriate interventions to address non-compliance.
- » Ensure adequate and appropriate interventions to address environmental degradation.
- » Provide a mechanism for the lodging and resolution of public complaints.
- » Ensure appropriate and adequate record keeping related to environmental compliance.

An independent Environmental Control Officer (ECO) must be appointed, and must have the appropriate experience and qualifications to undertake the necessary tasks. The ECO will ensure compliance with the environmental authorisation (once issued), EMP, relevant permits and licences and the environmental legislation during construction, and will conduct monitoring activities on a regular basis. The ECO will report any non-compliance or where corrective action is necessary to the Site Manager, DEA and/or any other monitoring body stipulated by the regulating authorities.

The ECO shall remain on site on a full-time basis as long as construction activities dictate. Thereafter provided compliance is maintained, monthly or bi-weekly site compliance inspections would be sufficient, reducing as construction proceeds. However, in the absence of the ECO there should be a designated environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills.

6.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Resident Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor. Records of penalties imposed may be required by the relevant authority within 48 (forty eight) hours.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

6.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents

recorded, corrective action required, and details of those non-conformances or incidents which have been closed out.

6.5.3. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover)) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMP.

MANAGEMENT PROGRAMME: REHABILITATION

CHAPTER 7

Overall Goal: Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	<ul style="list-style-type: none"> » Power line. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	<ul style="list-style-type: none"> » Temporary construction areas. » Temporary access roads/tracks. » Power line servitudes. » Other disturbed areas/footprints.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control	Responsibility	Timeframe
All temporary facilities, equipment, and waste materials must be removed from site.	Contractor	Following execution of the works
All temporary fencing and danger tape must be	Contractor	Following

Mitigation: Action/Control	Responsibility	Timeframe
removed once the construction phase has been completed.		completion of construction activities in an area
The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
Temporary roads must be closed and access across these blocked.	Contractor	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
A rehabilitation plan should be drawn up that specifies the rehabilitation process and should be approved by the ECO.	Contractor, Developer and ECO	Pre-construction
Where disturbed areas are not to be used during the construction of the proposed power line, these areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use of native/indigenous plant species removed from disturbance areas in the rehabilitation phase to be determined by a botanist, as applicable.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Developer in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures should be used in sensitive areas such as areas with steep slopes.	Developer in consultation with ECO and rehabilitation	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
	specialist (if required)	
On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Developer	Post-rehabilitation

Performance Indicator	<ul style="list-style-type: none"> » All portions of site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required after construction and temporarily utilised areas. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Completed site free of erosion and alien invasive plants.
Monitoring	<ul style="list-style-type: none"> » On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

MANAGEMENT PROGRAMME: OPERATION

CHAPTER 8

Overall Goal: To ensure that the operation of the power line does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the line in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- » Enables the operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.

An environmental manager must ensure the implementation of the operational EMP.

8.1. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE: Management of Power Line Servitude

Indirect impacts on vegetation and fauna during operation could result from maintenance activities and the movement of people and vehicles on site and in the surrounding area. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	» power line servitude
Potential Impact	» Disturbance to or loss of fauna and/or habitat » Increased erosion
Activity/risk source	» Management of power lines servitude area
Mitigation: Target/Objective	» To minimise disturbance of natural vegetation/habitats within the servitude » To minimise erosion

Mitigation: Action/control	Responsibility	Timeframe
Utilise existing access roads as far as possible	Developer	During construction and during operation
In sections that cross natural or semi-natural vegetation or land that has been left fallow for several years, no indigenous vegetation shall be brush-cut.	Developer and contractors	Operation
Clear servitude of alien vegetation and implement an appropriate alien plant management plan.	Developer	Operation
Implement appropriate erosion management measures within the servitude area (refer to Appendix H). The servitude and its access route must be monitored for signs of erosion, and signs of erosion remedied immediately	Developer and contractors	Operation

Performance Indicator	» Limited disturbance to natural vegetation/habitats within the servitude area
Monitoring	<ul style="list-style-type: none"> » Annual monitoring must be carried out together with monitoring of the remainder of the development to detect and eradicate new infestations of alien plant species before they become well established and may spread » Monitoring of erosion within servitude.

OBJECTIVE: To restrict the impacts of the proposed power line on birds to an absolute minimum. Since the primary impact of concern for this power line is that of collision (the other impacts being easily manageable).

The proposed power line can be built with acceptable levels of impact on avifauna should the recommendations in this report be followed. Of particular importance are: using the correct pole or pylon structure to avoid electrocution of various large bird species, and conducting an avifaunal walk.

Project Component/s	» Overhead cables, in particular earth wire.
Potential Impact	» Collision of birds with overhead cables because they either don't see them or see them too late to take evasive action whilst in flight
Activities/Risk Sources	» Stringing of cables, both conductors and earth wires
Mitigation:	» Increase the visibility of the cables in order to reduce the

Target/Objective number of bird collisions per year.

Mitigation: Action/Control	Responsibility	Timeframe
Install suitable, effective, Eskom approved line marking devices on the earth wire of high collision risk sections of power line. These should be installed according to Eskom standards in this regard.	Contractor	Line marking devices should be installed immediately after string of earth wire as it will immediately pose a collision risk.

Performance Indicator	» Since the primary impact of this power line is likely to be collision of birds, the number of recorded bird collisions per year is the most appropriate indicator.
Monitoring	» This power line should be monitored regularly once operation in order to detect any bird collisions that may occur.

OBJECTIVE: Minimise soil degradation and erosion

The soil on site may be impacted in terms of:

- » Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern across the entire site which is underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
- » Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of drainage systems.
- » Degradation of the natural soil profile due to pollution.

Project Component/s	<ul style="list-style-type: none"> » Power line. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Soil degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.

Activities/Risk Sources	<ul style="list-style-type: none"> » Poor rehabilitation of cleared areas. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion and deposition of soil into drainage lines. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Rehabilitate disturbance areas should the previous attempt be unsuccessful.	Contractor	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, and shade nets).	Contractor	Operation

Performance Indicator	<ul style="list-style-type: none"> » Acceptable level of soil erosion around site, as determined by the site manager. » Acceptable level of increased siltation in drainage lines, as determined by the site manager.
Monitoring	<ul style="list-style-type: none"> » Inspections of site on a bi-annual basis. » Water management plan

MANAGEMENT PROGRAMME: DECOMMISSIONING

CHAPTER 9

It is most likely that decommissioning activities of the infrastructure would comprise the disassembly and replacement of the power line infrastructure with more appropriate technology/infrastructure available at that time.

The section on Rehabilitation (chapter 7) is also relevant to the decommissioning of sections of the proposed distribution line and must be adhered to.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMP to be revisited and amended.

9.1. Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment.

9.2 Disassemble and Replace Infrastructure

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.