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# CONSTRUCTION OF A 132kV DOUBLE CIRCUIT POWER LINE AND ON-SITE SUBSTATION FOR THE GOLDEN VALLEY II WIND ENERGY FACILITY, EASTERN CAPE

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## DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Revision 1  
March 2016

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## PROJECT DETAILS

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<b>Title</b>	:	Environmental Assessment Process EMPr for the Proposed 132kV Double Circuit Power line and On-site Substation Associated with the Golden Valley II Wind Energy Facility, Eastern Cape Province
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<b>Report Status</b>	:	Draft EMPr included as part of the Draft Basic Assessment Report for Public Review
<b>Review Period</b>	:	22 March 2016 – 25 April 2016

**When used as a reference this report should be cited as:** Savannah Environmental (2016) EMPr for the Proposed 132kV Double Circuit Power line and On-site Substation Associated with the Golden Valley II Wind Energy Facility, Eastern Cape Province.

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## DEFINITIONS AND TERMINOLOGY

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**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.

**Construction:** Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

**Cumulative impacts:** The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

**Decommissioning:** To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

**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 is 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 Authorisation (EA):** means the authorisation issued by a competent authority (Department of Environmental Affairs) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

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

**Environmental Control Officer (ECO):** An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

**Environmental impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

**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 coordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

**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.

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

**Indirect impacts:** Indirect or induced changes that may occur because 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 because 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 public.

**Method Statement:** 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.

**Pre-construction:** The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

**Photovoltaic effect:** Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

**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 List:** 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.

**Vulnerable species:** A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

**Waste:** Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of the NEM WA; or any other substance, material or object that is not included in Schedule 3 of the NEM WA that may be defined as a waste by that is identified as waste by the Minister of Environmental Affairs (by notice in the Gazette). Any waste or portion of waste, referred to in the section above, ceases to be a waste:

- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
- (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;
- (iii) where the Minister of Environmental Affairs has, in terms of Section 74 of the NEM WA, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
- (iv) where the Minister of Environmental Affairs has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste

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## INTRODUCTION

## CHAPTER 1

### 1.1 Project Details

Terra Wind Energy Golden Valley (Pty) Ltd received environmental authorisation in April 2011 for the Golden Valley Wind Energy Facility (WEF) (DEA Ref No: 12/12/20/1717). An application for amendment of this project to split it into 2 phases, i.e. Golden Valley Wind Energy Facility (Project I) which consists of 48 turbines and Golden Valley II Wind Energy Facility (Project II) up to 126 turbines, is currently underway. Project I is a Preferred Bidder project currently working towards Financial Close. Project II is to be developed by Golden Valley II Wind (RF) Proprietary Limited and will be bid into the Department of Energy (DoE) Renewable Energy Independent Power Producer Procurement Programme.

#### **The Proposed 132kV Double Circuit Power line and on-site Substation associated with the Golden Valley II Wind Energy Facility**

In order to connect the Golden Valley II WEF to the national electricity grid, the following is being proposed by Golden Valley II Wind (RF) Proprietary Limited:

- » The construction of a double circuit 132kV power line (approximately 7km in length); and
- » An on-site substation, located within the Golden Valley II WEF footprint, with a footprint of approximately 250m x 250m (62 500m<sup>2</sup>).

Initially the Developer looked at constructing two 132kV powerlines running parallel to one another to the existing Eskom Poseidon-Albany 132kV power line, but it was decided to run a double circuit on a single pole to minimise the environmental impacts, however, this may change due to Eskom requirements in the future and hence why the Developer included a 250m buffer in the assessments.

Two alternative substation locations (*CVG proposed substation* – the “preferred” location and the *BTE proposed substation* – the “alternative” location) and one connection point into the existing Eskom Poseidon-Albany 132kV power line have been identified. This has resulted in two alternative power line alignments being proposed. A 250m wide corridor is being investigated for the siting of the proposed power line for each alternative. Access roads (approximately 4m in width) will be constructed along the power line servitude where required.

The project site falls within the Blue Crane Route Local Municipality and Sarah Baartman District Municipality of the Eastern Cape Province. The development will take place approximately 16km east of Cookhouse and 20km south-west of Bedford (refer to Figure 1) and is located southwest of the gravel road connecting Middleton/N10 National Road

to the Cookhouse to Bedford road. The following properties will be affected by the construction of the proposed Project:

- » Parent Farm Olyf Fonteyn: Remaining extent of the Farm Mullerskraal Nr. 159;
- » Portion 1 of the Farm Nr. 158 (Varkens Kuyl);
- » Farm 155 (Quagas Kuyl);
- » Farm 260 Bedford; and
- » Farm 242.

In terms of the Environmental Impact Assessment (EIA) Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), Golden Valley II Wind (RF) Proprietary Limited requires authorisation for the construction of the power line and substation. In terms of Sections 24 and 24D of the National Environmental Management Act (No 107 of 1998), as read with the EIA Regulations of GN R982 – R985, a Basic Assessment process is required to be undertaken in support of the application for authorisation for the proposed project.

The EMPr has been developed on the basis of the findings of the EIA, and must be implemented to protect sensitive on-site and off-site features through controlling preconstruction, construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Golden Valley II Wind (RF) Proprietary Limited employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the proposed 132kV power line and on-site substation. The document will be adhered to and updated as relevant throughout the project life cycle.

## 1.2 Findings of the Environmental Impact Assessment

Potential impacts that could occur from the proposed power line and substation (as per the conclusion of the Basic Assessment report) include:

**Impact on ecology:** Overall, the impacts of the proposed 132kV power line and on-site substation will be low negative after mitigation, mainly due to a loss of small areas of vegetation, and habitat loss for fauna. The bulk of the study area (for both options) is located within Bedford Dry Grassland (Grassland Biome, Sub-Escarpment Bioregion) with only the on-site substation of the preferred option and a very small portion of the proposed power line located within the Great Fish Thicket (Albany Thicket Biome). Both biomes are considered Least Threatened by Mucina & Rutherford, 2006 and the National Ecosystem List (NEM:BA).

Within the study, only a small portion to the west is included in the Eastern Cape's Terrestrial and Aquatic Critical Biodiversity Areas (CBAs) map. Regarding the Terrestrial CBA's, both of the on-site substation options and small sections of power line is located within a CBA2 Corridor 1 area and regarding the Aquatic CBA, only the preferred CVG location for the on-site substation is located within an Aquatic CBA (CBA2 – A2b).

Given the limited footprint of the on-site substation and power line, and the low abundance of fauna and flora of concern that would be impacted by the development, the construction and operation of the proposed 132kv power line and on-site substation to connect to the existing Poseidon-Albany 132kv power line is not expected to result in any impact of high significance (refer to Figure 1).

**Avifaunal Impact:** The proposed development entails an optimised power line route within a broader corridor investigated, and a small substation in an area already authorised area for the Golden Valley Wind Energy Facility. The proposed power line will impact on avifauna as a result of displacement and disturbance during construction, and collisions and electrocution during operation. Impacts are expected to be of medium to low significance. As such, the risks posed to avifauna by the proposed development are considered to be limited and can be successfully mitigated to acceptable levels.

**Heritage:** The survey indicated that both alternative routes are of low heritage sensitivity and any of the two routes can be used. However, it would appear that BTE power line corridor is slightly the least sensitive route because no heritage sites were observe in the servitude. On the other hand two archaeological sites were observed in the servitude of the CVG route (Earlier and Middle Stone Age concentrations of stone tools were observed in areas where surface erosion occurred). The stone tools were in secondary context and not associated with other archaeological remains. The sites are of medium to low significance and can be avoided by re-routing the service road around the archaeological sensitive area which include sites msa1 and emsa2. The pylon positions must also be constructed at a safe distance from the sites. The area must be fenced-off and no construction activities may take place within at least 10m from the sites and care must be taken that the sites are not disturbed during the development.

**Visual Impacts:** The assessment found that given the extent of wind energy facilities that are currently planned or under development in the area surrounding the proposed project, the likely change in landscape character due to the project is likely to be negligible. The assessment indicates that largely due to the nature of the project and distance between the facility and sensitive receivers, impacts are likely to be low. It is also possible that given the likely low level of impact and the extent of wind energy development underway that sensitive receivers may not see the project as having a negative impact. The preferred alignment and substation was shown to be slightly less visible to sensitive receivers than the alternative alignment and substation.

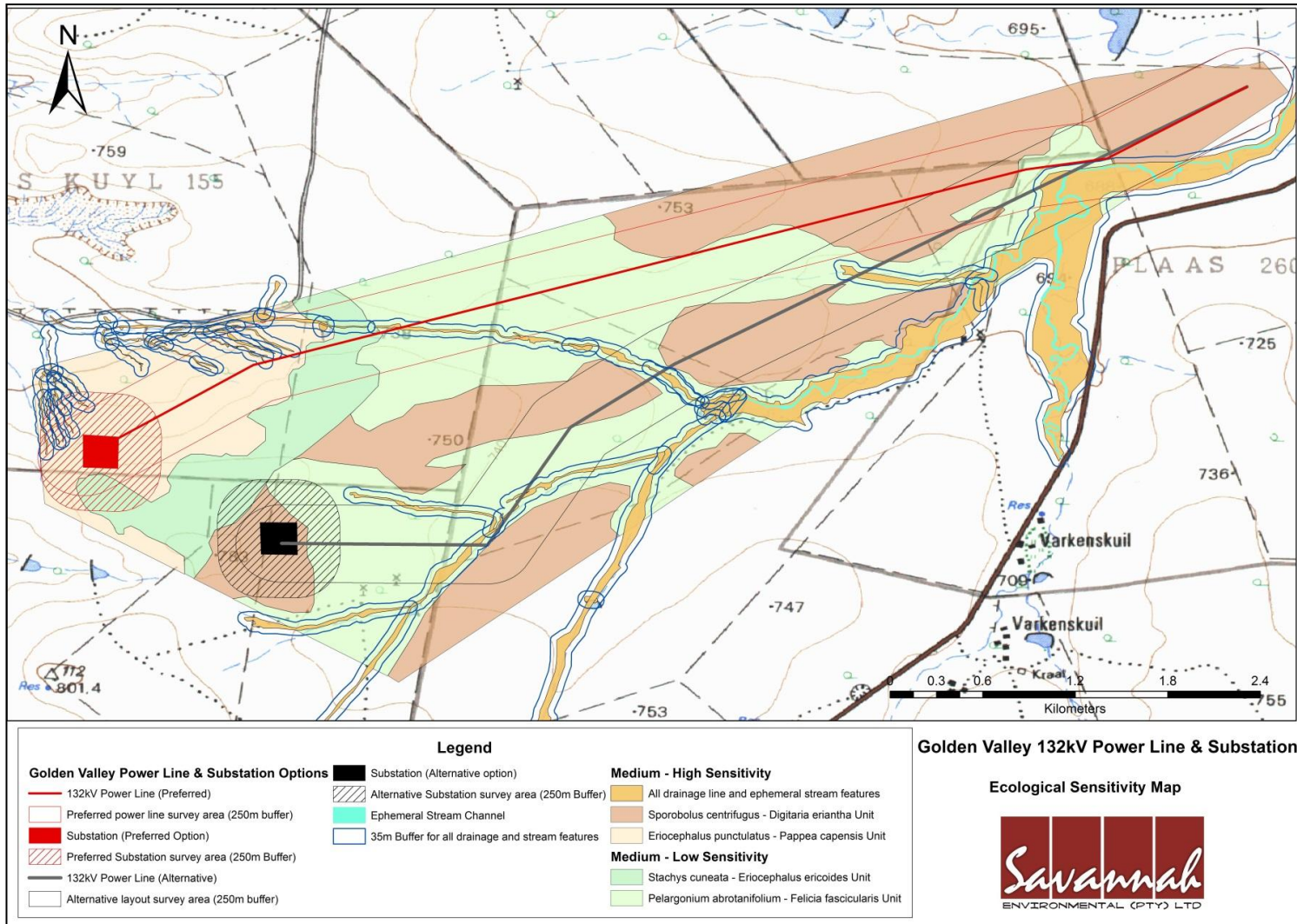


Figure 1: Ecological sensitivity map

### 1.3 Activities and Components associated with the Proposed Power Line and On-site Substation

The main activities/components associated with the proposed 132kV double circuit power line and on-site substation is detailed in the sections below.

#### 1.3.1. Construction Phase

##### » ***Construction of the Power line***

The proposed 132kV double circuit power line considered within this Basic Assessment Report will be approximately 7km in length, and would be constructed within a servitude of approximately 36m in width. This servitude would be within the 250m wide corridor assessed through this BAR. Power lines are constructed in the following simplified sequence:

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

Construction of the proposed power line will take approximately 15 months to complete.

Power line towers (or pylons) are an average distance of 200m apart but this can be increased to 375m depending on the topography and terrain to be spanned. Self-supporting structures (suspension pole), guyed intermediate or guyed suspension and angle strain structures can be used in the power line alignment. Construction of access roads to the tower positions and construction of tower foundations will be the most significant construction phase activity resulting in environmental impact requiring mitigation. The construction footprint of each tower will be approximately 10mx10m (100m<sup>2</sup>) depending on the final structure to be used and the geotechnical conditions on site.

The servitude width for a 132kV power line is approximately 36m. The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 3,8m while the minimum vertical clearance between the conductors and the ground is 6,7m. The minimum distance between trees or shrubs and any bare phase conductor of a 132 kV power line must be 4m, allowing for the possible sideways movement and swing of both the power line conductor and the tree or shrub. On receipt of an approval of the final corridor from the Environmental Authorities and after negotiations with landowners and final environmental and technical surveys, the final definition of the centre line for the power line and co-ordinates of each bend in the line will be determined. Optimal tower sizes and positions will be identified and verified using a ground survey (in terms of the Environmental Management Programme (EMPr)) requirements.

» ***Construction of the on-site substation***

An on-site substation will be required to evacuate the power into the Eskom grid. Substations are constructed in the following simplified sequence:

- Step 1:** Conduct geotechnical investigations to determine founding conditions;
- Step 2:** Conduct site survey;
- Step 3:** Vegetation clearance and construction of access road;
- Step 4:** Site grading and levelling;
- Step 5:** Construction of foundations;
- Step 6:** Import of substation components;
- Step 7:** Construction of on-site substation and control buildings;
- Step 8:** Rehabilitation of disturbed area and protection of erosion sensitive areas; and
- Step 9:** Testing and commissioning.

### **1.3.2. Operation and Maintenance Phase**

The proposed power line and on-site substation will require routine maintenance work throughout the operation period. During operation, the power line servitude and substation will be accessed using an authorised access road off the N10 national road or any access roads established during the construction phase. A servitude of approximately 36m will be registered (a right of way) along the length of the power line. During this operation phase vegetation within the servitude and at the substation will require management only if it impacts on the operational objectives of the infrastructure.



### 1.3.3. Decommissioning Phase

The power line and on-site substation are expected to have a lifespan of more than 25 years (with maintenance) and the infrastructure would only be decommissioned once it has reached the end of its economic life or is no longer required. If economically feasible/desirable the decommissioning activities would comprise the disassembly of the individual components and removal from site. This phase would include the following decommissioning activities:

**Site Preparation:** Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

**Disassemble Components:** The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

**Rehabilitation:** Disturbed areas (where infrastructure has been removed) will be rehabilitated, if required, depending on the future land-use of the site.

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## KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT

## CHAPTER 2

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

- » 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)
- » International Standards – IFC Standards and 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 the table that follows.

**Table 1:** Relevant legislative and permitting requirements applicable to the proposed double circuit power line and on-site substation

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
<b>National Legislation</b>			
<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 983 of 2014 a Basic Assessment Process is required to be undertaken for the proposed project.</p>	<p>Department of Environmental Affairs (DEA) – competent authority</p> <p>Eastern Cape: Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)</p>	<p>The listed activities triggered by the proposed power line and on-site substation 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</p>	<p>DEA</p> <p>DEDEAT</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
National Water Act (Act No 36 of 1998)	<p>cumulative effect of a variety of impacts.</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>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 water resources from occurring, continuing, or recurring.</p>	Department of Water and Sanitation (DWS)	<p>A water use license (WUL) is required to be obtained if water uses are identified in terms of Section 21 of the Act. Water uses identified may include Section 21 (c) &amp; (i) uses (i.e. crossing of watercourses).</p> <p>Section 19 of the Act will apply with respect to the potential impact on drainage lines and ephemeral streams which will potentially occur primarily during the construction phase (i.e. pollution from construction vehicles).</p>
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.	Department of Mineral Resources (DMR)	As no borrow pits are expected to be required for the construction of the power line or substation, no mining permit or right is required to be obtained.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas."</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p>	DEA  Sarah Baartman District Municipality	<p>No permitting or licensing requirements arise from this legislation.</p> <p>Dust Control Regulations describe the measures for control and monitoring of dust, including penalties. These</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas		regulations will be applicable during the construction phase of the project.
National Heritage Resources Act (Act No 25 of 1999)	<ul style="list-style-type: none"> <li>» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including                             <ul style="list-style-type: none"> <li>» The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;</li> <li>» Any development or other activity which will change the character of a site exceeding 5 000 m<sup>2</sup> in extent</li> </ul> </li> <li>» 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 m<sup>2</sup>; or the re-zoning of a site exceeding 10 000 m<sup>2</sup> 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.</li> <li>» Stand-alone HIAs are not required where an EIA is carried out as long as the EIA</li> </ul>	South African Heritage Resources Agency (SAHRA)  Eastern Cape Provincial Heritage Resources Authority	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.

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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>		
<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 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</p>	<p>DEA DEDEAT</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 ecology studies have been undertaken as part of the Basic Assessment process (refer to Appendix D).</p> <p>Only one species (<i>Euphorbia meloformis subsp. valida</i>) listed as a protected species within the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species was identified within the development area. A permit will be required to be obtained should this species be impacted by the final development footprint.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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>Most of the conservation worthy species is listed within Schedule 4 (Protected Plants) of the relevant conservation ordinance (Eastern Cape Nature and Environmental Conservation Ordinance No.19 of 1974 – referred to as PNCO hereforth).</p> <p>A total of 17 species are listed on the Red List plant species.</p> <p>A permit would need to be obtained for all SCC that are affected by the development.</p>
<p>National Environmental Management: Biodiversity Act 10 of 2004</p>	<p>GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.</p>	<p>Department of Agriculture, Forestry and Fisheries</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 be implemented.</p> <p>Category 1b invasive alien – <i>Opuntia engelmannii</i> is found within the study area.</p>
<p>National Forests Act (Act</p>	<p>In terms of S5(1) no person may cut,</p>	<p>Department of Agriculture,</p>	<p>A permit would need to be obtained</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
No. 84 of 1998)	<p>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".</p> <p>GN 908 provides a list of protected tree species.</p>	Forestry and Fisheries	<p>for any protected trees that are affected by the development.</p> <p>Tree species listed within the POSA generated list are protected within the National Forest Act (NFA) namely: <i>Curtisia dentata</i>, <i>Podocarpus falcatus</i> and <i>Sideroxylon inerme subsp. inerme</i>.</p>
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S13 the landowner would be required 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 S13 the landowner 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 Agriculture, Forestry and Fisheries	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,	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



Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>strongly sensitising or inflammable nature or the 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> <ul style="list-style-type: none"> <li>» 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</li> <li>» Group IV: any electronic product; and</li> <li>» Group V: any radioactive material.</li> </ul> <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>and in what operational context they 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</p>	<p>DEA: Chemicals and Waste Management</p>	<p>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> <li>» Adding other waste management activities to the list.</li> <li>» Removing waste management activities from the list.</li> <li>» Making other changes to the particulars on the list.</li> </ul> <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 (such as storage of waste) 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"> <li>» 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.</li> <li>» Adequate measures are taken to prevent</li> </ul>	<p>DEDEAT: General waste</p>	<p>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act.</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>accidental spillage or leaking.</p> <ul style="list-style-type: none"> <li>» The waste cannot be blown away.</li> <li>» Nuisances such as odour, visual impacts and breeding of vectors do not arise; and</li> <li>» Pollution of the environment and harm to health are prevented.</li> </ul>		
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<ul style="list-style-type: none"> <li>» 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 procedures to be followed in applying for exemption permits are described and discussed.</li> <li>» 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.</li> <li>» 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</li> </ul>	<p>South African National Roads Agency Limited (SANRAL) (national roads)</p> <p>Provincial Department of Transport</p>	<ul style="list-style-type: none"> <li>» 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.</li> <li>» Transport vehicles exceeding the dimensional limitations (length) of 22m.</li> <li>» Depending on the trailer configuration and height when loaded, some of the components may not meet specified dimensional limitations (height and width).</li> </ul>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
	<p>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.</p>		
<b>Provincial Legislation/ Policies / Plans</b>			
<p>Nature Conservation Ordinance (Act No. 19 of 1974)</p>	<ul style="list-style-type: none"> <li>» Article 63 prohibits the picking of certain fauna (including cutting, chopping, taking, and gathering, uprooting, damaging, or destroying).</li> <li>» Schedules 1 and 2 list Endangered and Protected animals.</li> <li>» Schedule 3 lists endangered flora and Schedule 4 lists protected flora.</li> <li>» Articles 26 to 47 regulate the use of wild animals.</li> </ul>	<p>DEDEAT</p>	<p>Species of conservation concern were identified within the project development area (refer to Appendix D for the list).</p> <p>Most of the conservation worthy species is listed within Schedule 4 (Protected Plants) of the relevant conservation ordinance (Eastern Cape Nature and Environmental Conservation Ordinance No.19 of 1974 – referred to as PNCO hereforth).</p> <p>A total of 17 species are listed on the Red List plant species and are as follows:</p> <ul style="list-style-type: none"> <li>» Endangered: <i>Euphorbia globosa, Haworthia aristata</i></li> <li>» Threatened: <i>Drosanthemum crissum</i></li> <li>» Vulnerable: <i>Bergeranthus</i></li> </ul>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			<p><i>albomarginatus</i>, <i>Nerine huttoniae</i>, <i>Erica glumiflora</i></p> <ul style="list-style-type: none"> <li>» Critically Rare: <i>Gasteria doreeniae</i></li> <li>» Rare: <i>Gasteria bicolor</i> var. <i>liliputana</i>, <i>Crassula socialis</i></li> <li>» Near Threatened: <i>Crinum campanulatum</i>, <i>Euphorbia meloformis</i> subsp. <i>valida</i>, <i>Pelargonium reniforme</i>,</li> <li>» Declining: <i>Boophone disticha</i>, <i>Crinum macowanii</i></li> <li>» Data Deficient: <i>Drimia anomala</i>, <i>Bergeranthus multiceps</i></li> </ul> <p>Only one species (<i>Euphorbia meloformis</i> subsp. <i>valida</i>) recorded on the site is included as a protected species within the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004): Publication of Lists of Critically Endangered, Endangered, Vulnerable and Protected Species (Referred to as TOPS, 2014 hereforth).</p> <p>A permit would need to be obtained</p>

Legislation	Applicable Requirements	Relevant Authority	Compliance Requirements
			for all SCC that are affected by the development.

**Table 2:** Standards applicable to the proposed 132kV double circuit power line and on-site substation

Theme	Standard	Summary
Air	National Dust Control Regulations	National ambient air quality standards
	SANS 1929: Ambient Air Quality	Sets limits for common pollutants
Noise	SANS 10103:2008: The Measurement and Rating of Environmental Noise with Respect to Land Use, Health, Annoyance and Speech Communication	Provides noise levels for various areas
	National Noise Control Regulations	Provides noise impact criteria
Waste	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) – National norms and standard for the storage of waste.	<ul style="list-style-type: none"> <li>» Provides uniform national approach relating the management of waste facilities</li> <li>» Ensure best practice in management of waste storage</li> <li>» Provides minimum standards for the design and operation of new and existing waste storage</li> </ul>
Water	Best Practise Guideline (G1) Storm Water Management DWA 2006	Provides guidelines to the management of storm water

## PURPOSE AND OBJECTIVES OF THE EMPr

## CHAPTER 3

An EMPr is a set of guidelines and actions aimed at ensuring that construction and/or installation activities, and subsequent management of developments, are undertaken in a manner that minimises environmental risks and impacts. The objective of this EMPr 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 EMPr is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr 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 EMPr 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 EMPr 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 EMPr 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 minimise the extent of potential environmental impacts associated with the power line and on-site substation.
- » 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 Basic Assessment (BA) process are systematically addressed in this EMPr, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Golden Valley II Wind (RF) Proprietary Limited 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 EMPr and through its integration into the contract documentation. Since this EMPr 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 EMPr 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 EMPr and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr 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 EMPR**

**CHAPTER 5**

The preceding chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

- » Planning and design activities
- » Construction activities
- » Operation activities
- » Decommissioning activities

These chapters set out the procedures necessary for the project, as the project owner, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the solar energy facility project, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management programme 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 EMPr table has been established for each environmental objective. The information provided within the EMPr table for each objective is illustrated below:

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

<b>Project Component/s</b>	» List of project components affecting the objective.
<b>Potential Impact</b>	» Description of potential environmental impact if objective is not met.
<b>Activity/Risk Source</b>	» Description of activities which could affect achieving objective.
<b>Mitigation: Target/Objective</b>	» 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	Time periods for implementation of measures

<b>Performance Indicator</b>	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.
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### **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 EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the facility)
- » Modification to or addition to environmental objectives and targets
- » Relevant legal or other requirements are changed or introduced
- » 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.

### **5.1. Project Team**

This draft EMP was compiled by Diloni Somai, John von Mayer and Jo-Anne Thomas of Savannah Environmental. The Savannah Environmental team has extensive knowledge and experience in EIA and environmental management, having been involved in EIA processes over the past ten years. The company has managed and drafted EMPrs for other power generation projects throughout South Africa, including numerous wind and solar energy facilities.

**MANAGEMENT PROGRAMME: PRE-CONSTRUCTION**

**CHAPTER 6**

**Overall Goal:** undertake the pre-construction activities (planning and design phase) in a way that:

- » Ensures that the design of the power line and on-site substation responds to the identified environmental constraints and opportunities.
- » Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements
- » 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.
- » 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.

**6.1. Objectives**

**OBJECTIVE 1: Ensure the power line and on-site substation design responds to identified environmental constraints and opportunities**

The following potentially sensitive areas were identified:

*Areas of high ecological sensitivity* – there are sensitive habitats which include listed and red data species, recorded for the site.

<b>Project Component/s</b>	» Power line and on-site substation
<b>Potential Impact</b>	» Design fails to respond optimally to the environmental consideration
<b>Activities/Risk Sources</b>	» Positioning of all the facilities components » Construction of the power line » Construction of the on-site substation » Access road upgrade
<b>Mitigation:</b>	» The design of the power line and on-site substation responds to the

<b>Target/Objective</b>	<p>identified environmental constraints and opportunities.</p> <p>» Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.</p>
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<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Proponent	Pre-construction
Undertake negotiations with affected landowners and agree on landowner-specific conditions for construction and maintenance.	Proponent	Project planning
Where water course crossings are required, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint).	Proponent	Design
Undertake a geotechnical pre-construction survey.	Geotechnical specialist	Design
Ecological survey for the final development area should be surveyed for species suitable for search and rescue, which should be trans-located prior to the commencement of construction.	Ecologist and Proponent	Design
Obtain any additional environmental permits required (e.g. permit to impact on protected plant species, water use license to cross drainage lines).	Proponent	Project planning
Consider and incorporate design level mitigation measures recommended by the specialists as detailed within the Basic Assessment Report and relevant appendices.	Proponent	Design review
External access point and internal access road to be carefully planned to maximise road user safety.	Proponent	Design
Compile a comprehensive storm water management plan for hard surfaces as part of the final design of the project.	Proponent	Design
Include stormwater management systems along the roads that would reduce flow velocities. Stormwater and any runoff generated by the hard surfaces should be discharged into retention swales or areas with rock rip-rap. These energy dissipation structures should be placed in manner that flows are managed prior to being discharged back into the natural systems, thus not only preventing erosion, but would support the maintenance of natural base flows within these systems, i.e. hydrological regime (water quantity and quality) is maintained.	Proponent	Design
Bird Diverters are required for the power line.	Proponent	Planning
Bird-friendly power line tower design to be utilised.	Proponent	Design
Line to avoid areas with high bird densities or areas which	Developer and	Planning

Mitigation: Action/Control	Responsibility	Timeframe
attract birds.	ornithologist	
Consider design level mitigation measures recommended by the specialists as detailed within the Basic Assessment report and relevant appendices.	Proponent	Design

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» The design meets the objectives and does not degrade the environment.</li> <li>» Design and layouts respond to the mitigation measures and recommendations in the Basic Assessment Report.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.</li> </ul>

## OBJECTIVE 2: Minimise storm water runoff (guideline for stormwater management plan)

Management of storm water will be required during the construction and operational phases of the power line and on-site substation. A detailed storm water management plan is required to be compiled as part of the final design to ensure compliance with applicable regulations and to prevent off-site migration of contaminated storm water or increased soil erosion. The section below provides a guideline for the management of storm water on site and will need to be supplemented with the relevant method statements during the construction and operation phases of the power line and on-site substation.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Storm water management components.</li> <li>» Any hard engineered surfaces (i.e. access roads).</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Poor storm water management and alteration of the hydrological regime (i.e. drainage lines).</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Construction of the power line and access roads (i.e. placement of hard engineered surfaces).</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Appropriate management of storm water to minimise impacts on the environment.</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
A Method Statement for the management of storm water which also considers the recommendations below is to be submitted to the ECO prior to the commencement of construction. This Method Statement must be approved by the Site Manager/ Site Engineer	Proponent	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
prior to implementation.		
Reduce the potential increase in surface flow velocities and the resultant impact on the localised drainage system through increased sedimentation.	Proponent	Planning and design
Design measures for storm water management needed to allow for surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows.	Proponent	Planning and design

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Appropriate storm water management measures included within the power line and on-site substation design.</li> <li>» Sound water quality and quantity management during construction and operation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Devise a suitable surface water quality monitoring plan for implementation during construction and operation.</li> </ul>

**OBJECTIVE 3: The mitigation and possible negation of visual impacts associated with the planning of the proposed power line and on-site substation.**

<b>Project component/s</b>	The power line and on-site substation and associated with the development.
<b>Potential Impact</b>	Primary visual impact of the infrastructure due to the presence of the power line and on-site substation associated with the development in the landscape.
<b>Activity/risk source</b>	The viewing of the above mentioned by observers near the infrastructure as well as within the region.
<b>Mitigation: Target/Objective</b>	Optimal planning of infrastructure so as to minimise visual impact.

Mitigation: Action/control	Responsibility	Timeframe
Implement an environmentally responsive planning approach to roads and infrastructure to limit cut and fill requirements. Plan with due cognisance of the topography.	Proponent	Pre-construction (construction procedure) Pre-operation (operation procedure)
Consolidate infrastructure and make use of already disturbed sites rather than pristine areas.	Proponent	Pre-construction

<b>Performance Indicator</b>	No access roads and other associated infrastructure are visible from surrounding areas.
<b>Monitoring</b>	Not applicable.

#### OBJECTIVE 4: 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 development. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

<b>Project component/s</b>	» Power line and on-site substation
<b>Potential Impact</b>	» Impacts on affected and surrounding landowners and land uses
<b>Activity/risk source</b>	» Activities associated with construction of the power line and on-site substation » Activities associated with power line and on-site substation operation
<b>Mitigation: Target/Objective</b>	» 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

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Implement a grievance mechanism procedure for the public (as outlined in <b>Appendix A</b> ) to be implemented during both the construction and operational phases of the power line and on-site substation. 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.	Proponent	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.	Proponent	Pre-construction

<b>Performance Indicator</b>	» Effective communication procedures in place.
<b>Monitoring</b>	» An incident reporting system should be used to record non-conformances to the EMPr.

## MANAGEMENT PROGRAMME: CONSTRUCTION

## CHAPTER 7

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

- » Ensures that construction activities are appropriately 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.

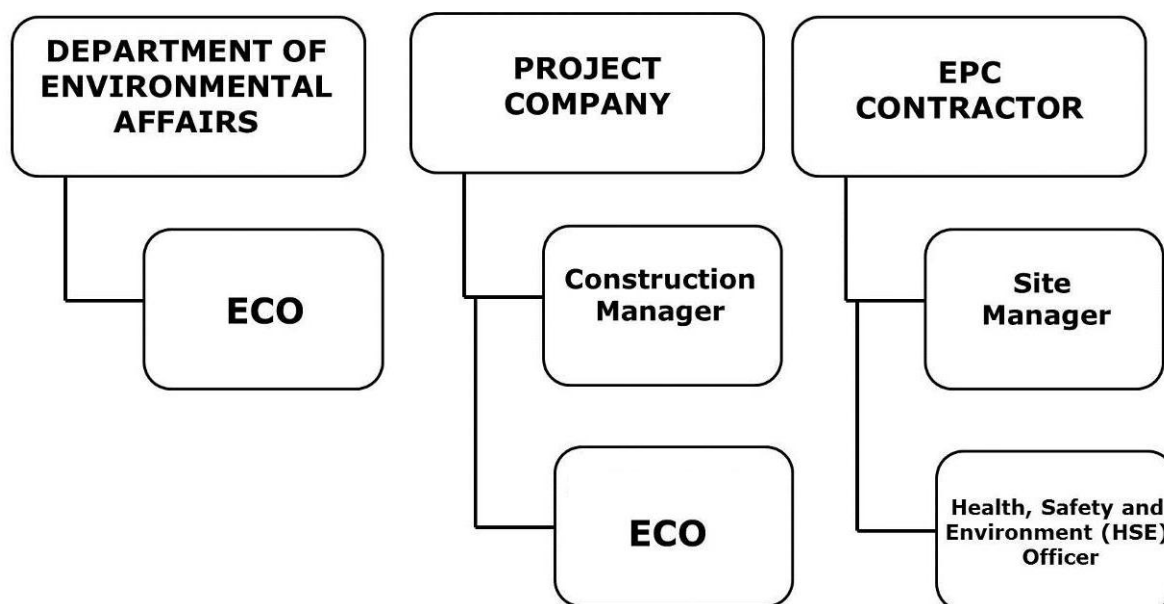
### 7.1. Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Golden Valley II Wind (RF) Proprietary Limited 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 EMPr, and the implementation of the EMPr through its integration into the contract documentation. Golden Valley II Wind (RF) Proprietary Limited will retain various key roles and responsibilities during the construction phase.

#### **OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr**

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager; Site Manager; Internal Environmental Officer, Safety and Health Representative; Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. Figure 6.1 provides an organogram indicating the organisational structure for the implementation of the EMPr.





**Figure 6.1:** Organisational structure for the implementation of the EMPr

**Construction 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 Golden Valley II Wind (RF) Proprietary Limited and its Contractor(s) are made aware of all stipulations within the EMPr.
- » Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes through input from the independent ECO.
- » Be fully conversant with the EIA for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.
- » Be fully knowledgeable with the contents of all relevant licences and permits.

**Site Manager** (EPC Contractor's 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.
- » Be fully knowledgeable with the contents of the EMPr.
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- » Have overall responsibility of the EMPr and its implementation.
- » Conduct audits to ensure compliance to the EMPr.

- » Ensure there is communication with the Technical Director, the ECO, the Internal Environmental Officer and relevant discipline engineers on matters concerning the environment.
- » Be fully knowledgeable with the contents of all relevant licences and permits.
- » 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.

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 EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- » Be fully knowledgeable with the contents with the EIA.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Be fully knowledgeable with the contents with all relevant environmental legislation, and ensure compliance with them.
- » 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 the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » 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.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- » Ensure that the compilation of progress reports for submission to the Technical Director, 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.
- » Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.

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 owner's 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 will appoint an Internal Environmental Officer whom will be responsible for informing contractor 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 Internal Environmental Officer and Contractor's obligations in this regard include the following:

- » Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation.
- » Be fully knowledgeable with the contents with the EMPr.
- » Be fully knowledgeable of all the licences and permits issued to the site.
- » Ensure a copy of the Environmental Authorisation and EMPr must be easily accessible to all on-site staff members.
- » Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.
- » Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended an environmental awareness included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor
- » Manage the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports.
- » Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- » Staff will be informed of environmental issues as deemed necessary by the Independent ECO.

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 EMPr.
- » 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.
- » 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 EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations).

**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 EMPr, 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 EMPr-related activities on site.

## 7.2. Objectives

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

### OBJECTIVE 1: Minimise impacts related to inappropriate site establishment

The contractor must take all reasonable measures to ensure the safety of the public in the surrounding area.

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

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access routes.	Contractor	Site establishment, and duration of construction
Fence and secure contractor's equipment camp.	Contractor	Site

Mitigation: Action/Control	Responsibility	Timeframe
		establishment
The construction camp used to house equipment must be located in a disturbed area and must be screened off as far as practical during the entire construction phase.	Contractor	Erection: during site establishment Maintenance : for duration of Contract
Establish appropriately banded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
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 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

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners injured.</li> <li>» Appropriate and adequate waste management and sanitation facilities provided at construction site.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> <li>» 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.</li> </ul>



## OBJECTIVE 2: Appropriate management of the construction site and construction workers

Only security personnel will be accommodated on site. Contractors and their employees are expected to be accommodated at existing accommodation facilities in the study area or within an appropriately sited construction camp. Construction equipment will need to be stored at appropriate locations on site.

In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation, the EIA Report, and this EMP, as well as the requirements of all relevant environmental legislation.

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

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
No vehicles to refuel within drainage lines/ riparian vegetation.	Contractor	Construction
The location of this construction camp and lay down areas shall be approved by the project ECO.	Contractor	Pre-construction
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 storage facilities are maintained and emptied on a	Contractor	Site

Mitigation: Action/Control	Responsibility	Timeframe
regular basis.		establishment, and duration of construction
The terms of this EMPr and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts.	Proponent	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 fires are allowed on site. 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 and implement a 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

**Performance Indicator**

- » The construction 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.



	<ul style="list-style-type: none"> <li>» All areas are rehabilitated promptly after construction in an area is complete.</li> <li>» Excess vegetation clearing and levelling is not undertaken.</li> <li>» No complaints regarding contractor behaviour or habits.</li> <li>» Appropriate training of all staff is undertaken prior to them commencing work on the construction site.</li> <li>» Code of Conduct drafted before commencement of construction phase.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular audits of the construction camps and areas of construction on site by the ECO.</li> <li>» Proof of disposal of sewage at an appropriate licensed wastewater treatment works.</li> <li>» Proof of disposal of waste at an appropriate licensed waste disposal facility.</li> <li>» An incident reporting system should be used to record non-conformances to the EMPr.</li> <li>» Observation and supervision of Contractor practices throughout construction phase by the ECO.</li> <li>» Complaints will be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

### OBJECTIVE 3: Maximise local employment and business opportunities associated with the construction phase

Limited employment opportunities could be created during the construction phase, specifically for semi-skilled and unskilled workers.

<b>Project Component/s</b>	» Construction and establishment activities associated with the establishment of the power line and on-site substation.
<b>Potential Impact</b>	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
<b>Activities/Risk Sources</b>	» The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.
<b>Mitigation: Target/Objective</b>	» Wherever possible, aim to employ low-skilled workers from the local area. This should also be made a requirement for all contractors. Also develop a database of local BEE service providers.

**Mitigation: Action/Control**

**Responsibility**

**Timeframe**

Mitigation: Action/Control	Responsibility	Timeframe
Attempt to employ a majority of the low-skilled workers from the local area.	Proponent	Employment and business policy document that sets out local employment targets to be in place before construction phase commences.
Develop a database of local BEE service providers and ensure that they are informed of tenders and job opportunities.	Proponent	Pre-construction
Identify potential opportunities for local businesses.	Proponent	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Employment and business policy document that sets out local employment and targets completed before construction phase commences.</li> <li>» Majority of semi and unskilled labour locally sourced.</li> <li>» Database of potential local BEE services providers in place before construction phase commences.</li> <li>»</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitor indicators listed above to ensure that they have been met for the construction phase.</li> </ul>

#### OBJECTIVE 4: Minimise the potential impact on health, safety and security

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. Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.

The actual safety of construction workers is also of concern. Further health and safety issues associated with the actual construction site include unauthorised entry to the site

and construction areas, the usage of large equipment on site, the risks associated with the storage of equipment and material on site, as well as the increased risk of accidents due to the increased movement of construction vehicles on the local roads.

Other concerns relate to littering, unwanted behaviour of construction workers, transmission of Sexually Transmitted Diseases (STDs), environmental pollution, an increase risk in fires and so forth. Although such perceptions cannot be substantiated or be changed it should be sensitively dealt with. It is thus clear that even though the construction phase when these impacts could occur is only of a short duration, the effects of the impacts could remain in the medium term.

<b>Project Component/s</b>	» Inflow of workers could result in increased safety and security risks.
<b>Potential Impact</b>	» Outside workers are involved in criminal activities and/or fires occur.
<b>Activities/Risk Sources</b>	» Theft of construction material. » On-site accidents. » Spread of sexually transmitted diseases. » Littering and environmental pollution.
<b>Mitigation: Target/Objective</b>	» Employment of local labour should be maximised and strict security measures should be implemented at the construction site.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
On-site security should be active prior to the construction phase.	EPC Contractor	Pre- construction
Construction workers should be easily identifiable by wearing uniforms and identification tags/ induction cards.	EPC Contractor	Construction
All staff should undergo a general H&S induction and simplified environmental awareness training session	EPC Contractor (and sub-contractor/s)	Duration of contract
The construction site should be fenced and access to the area controlled.	EPC 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	Owner, Local Municipality, and local communities	Pre- construction and when required
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	EPC Contractor	Construction
Contact details of emergency services should be prominently displayed on site.	EPC Contractor	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No theft of material or equipment on site</li> <li>» No fires originating on the site or on-site accidents occur.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» The Owner, and appointed ECO must monitor indicators listed above to ensure that they have been implemented.</li> </ul>

### OBJECTIVE 5: Minimise the potential impact on the daily living and movement patterns

Some intrusion impacts due to the construction activities and vehicular movements (noise and dust) on the surrounding property owners could be experienced.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Construction activities associated with the area and linear infrastructure.</li> <li>» Delivery of any component required within the construction phase.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals.</li> <li>» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted.</li> <li>» Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.</li> <li>» Possible increase in dust, noise, and general intrusion.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Construction vehicle movement.</li> <li>» Increased risk of accidents due to increase in vehicle movement.</li> <li>» Mobile construction equipment movement on-site.</li> <li>» Possible degradation of local roads.</li> <li>» Site preparation and earthworks.</li> <li>» Emissions from construction vehicles.</li> <li>» Excavation, grading, scraping, levelling, digging, drilling</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Limit any negative impacts on the surrounding property owners' daily living and movement patterns.</li> <li>» Minimise impact of traffic associated with the construction of the facility on local traffic volume, existing infrastructure, property owners, animals, and road users.</li> <li>» 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</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Adequate parking for all employees, contractors and sub-contractors will be made available and should not impact	EPC Contractor	Pre-construction and construction

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
negatively on neighbouring farmers.		
Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users and to limit any accident risks. Additional access roads should be kept to a minimum.	EPC Contractor	Pre-construction and construction
Source general construction material and goods locally where available to limit transportation over long distances.	EPC Contractor	Construction
Local labourers should be used during the construction phase to limit the inflow of outsiders to the area.	EPC Contractor	Construction
Construction activities should not interfere with the farming activities on surrounding properties.	EPC Contractor	Construction
Compile and implement a traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted.	EPC Contractor	Pre-construction
Gravel roads and cleared areas should be sprayed with an appropriate dust suppressant, if deemed necessary, to limit dust creation.	EPC Contractor	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.	EPC Contractor	Construction
Strict vehicle safety standards should be implemented and monitored.	Developer/Owner	Construction
All relevant permits for abnormal loads must be applied for from the relevant authority.	EPC Contractor (or appointed transportation contractor)	Pre-construction
No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	EPC Contractor	Duration of 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.	EPC Contractor (or appointed transportation contractor)	Pre-construction
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	EPC Contractor	Duration of contract
The movement of all vehicles within the site must be on designated roadways.	EPC Contractor	Duration of contract
Signage must be established at appropriate points warning of turning traffic and the construction site,	EPC Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
identifying speed limits, travel restrictions, and other standard traffic control information. All signage to be in accordance with prescribed standards and must be appropriately maintained for the duration of the construction period.		
Ensure that any damage to internal roads because of construction activities is repaired before completion of the construction phase.	EPC Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown will be covered with suitable material.	EPC Contractor	Duration of contract
Speed of construction vehicles must be restricted, as defined by the EPC contractor.	EPC 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.	EPC Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Limited noise and dust pollution.</li> <li>» Limited intrusions on surrounding property owners.</li> <li>» Vehicles are in good working order and safety standards are implemented.</li> <li>» Local residents and road users are aware of vehicle movements and schedules.</li> <li>» Local road conditions and road surfaces are maintained</li> <li>» No reports from property owners regarding problems with construction activities and workforce.</li> <li>» Limited degradation of local roads.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Owner, and appointed ECO must monitor indicators listed above to ensure that they have been implemented.</li> <li>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.</li> <li>» 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.</li> <li>» An incident reporting system must be used to record non-conformances to the EMP.</li> </ul>

## OBJECTIVE 6: Minimisation of development footprint

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

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Area infrastructure (i.e. power line footprint, substation area).</li> <li>» Offices and workshops.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impacts on natural vegetation.</li> <li>» Loss of indigenous natural vegetation due to construction activities.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Vegetation clearing</li> <li>» Site preparation and earthworks.</li> <li>» Excavation of foundations.</li> <li>» Construction of site access roads.</li> <li>» Site preparation (e.g. compaction).</li> <li>» Foundations or plant equipment installation.</li> <li>» Substation construction activities.</li> <li>» Stockpiling of topsoil, subsoil and spoil material.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To retain natural vegetation, where possible.</li> <li>» To minimise footprints of disturbance of vegetation/habitats on-site</li> <li>» Minimise loss of topsoil.</li> <li>» Minimise spoil material.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Permits must be obtained to trans-locate or destroy all the identified protected species that are located in the development footprint	Developer/Owner and ECO	Pre-construction
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	EPC Contractor in consultation with the ECO	Duration of Construction
Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.	EPC Contractor	Site establishment & duration of contract
No-Go areas are to be demarcated with tape and warning signs prohibiting access erected. Plant and vehicle operators must be instructed by the SHE on where these No-Go sites are.	EPC Contractor	Construction
No vegetation removal must be allowed outside the designated project development footprint.	EPC Contractor	Construction
Ridges and areas which include protected and red data species must be avoided at all costs during construction, unless the necessary permits are obtained.	ECO/SHE	Pre-construction; Site establishment
A site rehabilitation programme must be implemented.	EPC Contractor in consultation with ECO/Ecologist	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
Disturbed areas should be rehabilitated when construction in an area is completed. Rehabilitated areas must be inspected on a monthly basis and maintained, if necessary	EPC Contractor	Rehabilitation; Post-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas.</li> <li>» Minimise clearing of existing vegetation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of vegetation clearing activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

#### OBJECTIVE 7: Appropriate management of topsoil

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Any infrastructure or activity that will result in disturbance to natural areas.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Loss of topsoil</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks.</li> <li>» Excavation of foundations.</li> <li>» Construction of site access roads.</li> <li>» Site preparation (e.g. compaction).</li> <li>» Foundations or plant equipment installation.</li> <li>» Power line construction activities.</li> <li>» Stockpiling of topsoil, subsoil and spoil material.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise footprints of disturbance</li> <li>» Minimise loss of topsoil</li> </ul>

Mitigation: Action/Control	Responsibility	Timeframe
Topsoil must be stockpiled and appropriately managed to ensure viability for reuse during rehabilitation.	EPC Contractor	Duration of contract
No mixing of topsoil and subsoil must be permitted. Stockpiles must be stored separately and returned for backfilling in the correct soil horizons.	EPC Contractor	Site establishment, during construction
Should topsoil be stockpile for longer than 6 months it must be vegetated.	EPC Contractor	Site establishment & duration of contract



Mitigation: Action/Control	Responsibility	Timeframe
Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	EPC Contractor	Site establishment Maintenance: for duration of contract
Topsoil is to be stripped to a depth of 300 mm where possible from construction areas will be stockpiled in a designated area, not exceeding a height of 2 m. The stockpile shall be located away from seepage zones, floodlines, water courses and other ecological sensitive areas (drainage lines).	EPC Contractor	Site establishment, during construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Minimised loss of topsoil.</li> <li>» Appropriate stockpiling and management of topsoil</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring of topsoil clearing activities</li> <li>» An incident reporting system will be used to record non-conformances to the EMP.</li> </ul>

### OBJECTIVE 8: Minimise soil degradation and erosion

The soil on site may be impacted in terms of:

- » Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion.
- » Incorrect storage of topsoil
- » Accidental spillages
- » Poor rehabilitation
- » Erosion from rainwater

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Substation, section of power line, offices and workshops.</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil and rock degradation.</li> <li>» Soil erosion.</li> <li>» Increased deposition of soil into drainage systems.</li> <li>» Increased run-off over the site.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil.</li> <li>» Rainfall - water erosion of disturbed areas.</li> <li>» Wind erosion of disturbed areas.</li> <li>» High velocity discharge of water from construction activity.</li> </ul>

<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise extent of disturbance areas.</li> <li>» Minimise activity within disturbance areas.</li> <li>» Minimise soil degradation (mixing, wetting, compaction, etc.).</li> <li>» Minimise soil erosion.</li> <li>» Minimise deposition of soil into drainage lines as a result of runoff.</li> <li>» Minimise instability of embankments/excavations.</li> </ul>
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<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Identify disturbance areas and restrict construction activity to these areas.	EPC Contractor	Before and during construction
Rehabilitate disturbance areas as soon as practicable when construction in an area is complete.	EPC Contractor	During and after construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	EPC Contractor	Design and construction
Minimise removal of vegetation which adds stability to soil.	EPC Contractor	Construction
Erosion and loss of soil must be prevented by minimizing the construction site exposed to surface water run-off. Where necessary erosion stabilizing actions such as gabions or re-vegetation must be implemented to prevent further habitat deterioration.	EPC Contractor	Construction
Erosion control measures: Run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, gabions or temporary mulching over denuded area as required.	EPC Contractor	Erection: Before construction Maintenance: Duration of contract
No soil is to be stripped from areas within the site that the contractor does not require for construction works.	EPC Contractor ECO	Construction
Erosion control measures to be regularly maintained.	EPC Contractor ECO	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No activity outside demarcated disturbance areas.</li> <li>» Limited soil erosion around site.</li> <li>» No increase in siltation in drainage lines as a result of construction activities.</li> <li>» No activity in restricted areas.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going inspections of the site by the ECO.</li> <li>» Monthly inspections of sediment control devices by the ECO</li> <li>» Monthly inspections of surroundings, including drainage lines (outside the development area) by the ECO.</li> <li>» An incident reporting system will record non-conformances.</li> </ul>

## OBJECTIVE 10: Minimise the impacts on fauna

<b>Project Component/s</b>	» Any infrastructure or activity that will result in disturbance to natural areas.
<b>Potential Impact</b>	» Loss or displacement of fauna
<b>Activity/Risk Source</b>	» Site preparation and earthworks. » Construction-related traffic. » Foundations or plant equipment installation. » Mobile construction equipment.
<b>Mitigation: Target/Objective</b>	» To minimise footprints of habitat destruction » To minimise disturbance to (and death of) resident and visitor faunal and avifaunal species

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing/disturbance.	EPC Contractor in consultation with the ECO	Pre-construction
The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	EPC Contractor	Site establishment & duration of contract
Vehicles to adhere to speed limits at all times	EPC Contractor	Construction Operation
The intentional harming or killing of animals will be prohibited through on-site supervision and worksite rules.	EPC Contractor	Construction Operation
A site rehabilitation programme should be implemented.	EPC Contractor in consultation with Specialist	Duration of contract

<b>Performance Indicator</b>	» No disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation and habitats for fauna » Limited impacts on faunal species (i.e. noted/recorded fatalities)
<b>Monitoring</b>	» Observation of vegetation clearing activities by ECO throughout construction phase » Supervision of all clearing and earthworks » Recording faunal fatalities to monitor success of relocation efforts » An incident reporting system will be used to record non-conformances to the EMPr.

## OBJECTIVE 11: Minimise impacts on water resources

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Construction activities</li> <li>» Storage of chemicals and hazardous materials.</li> <li>» Ablution facilities.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Pollutants such hydrocarbons could be harmful to aquatic biota, particularly during low flows when dilution is reduced.</li> </ul>
<b>Activity/Risk Source</b>	<ul style="list-style-type: none"> <li>» Fuelling, usage and maintenance of construction vehicles.</li> <li>» Labourer using ablution facilities.</li> <li>» Use of any chemicals or hazardous materials during construction.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» No incidents related to spills of chemicals and hazardous materials.</li> <li>» No release of contaminated water in drainage lines.</li> <li>» No misbehaviour of construction workers (i.e. ablution activities, washing).</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
A buffer zone of 50m must be maintained around the main drainage system (that is located outside the development area) with 30m buffer zones around its tributaries.	EPC Contractor	Pre-construction
Implement strict management of all hazardous materials used on site.	EPC Contractor	Construction
Ensure strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.).	EPC Contractor	Construction
No unauthorised groundwater abstraction may occur on site.	EPC Contractor	Construction
Should any water be discharged from the site, the water is to comply with national effluent standards. No contaminated water may be discharged from site.	EPC Contractor	Construction
Potentially contaminated water originating from site must be directed through an oil and water separator. Oil is to be removed and/or recycled from site by a licensed contractor.	EPC Contractor	Construction
Proper use of chemical toilets should be strictly enforced.	EPC Contractor	Construction
No activities shall be allowed to encroach into a water course or wetland/pan without a Water Use License being in place from the Department of Water and Sanitation (DWS).	EPC Contractor Owner	Design Construction

<b>Performance Indicator</b>	» No spillages are recorded
<b>Monitoring</b>	» Monitor management measures in place for potentially hazardous materials

## OBJECTIVE 12: Appropriate Stormwater Management

<b>Project Component/s</b>	» Alteration of sandy substrata into hard surfaces impacting on the local hydrological regime
<b>Potential Impact</b>	» Poor stormwater management and the alteration hydrological regime
<b>Activities/Risk Sources</b>	» Placement of hard engineered surfaces
<b>Mitigation: Target/Objective</b>	» Reduce the potential increase in surface flow velocities and the impact on dry riverbeds and the localised drainage systems

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Any stormwater within the site must be handled in a suitable manner, i.e. clean and dirty water streams around the plant and install stilling basins to capture large volumes of run-off, shade nets, or gabions trapping sediments and reduce flow velocities.	EPC Contractor O&M Operator	Planning, design and operation
Stormwater control systems must be implemented to reduce erosion on the project site.	EPC Contractor	Design Construction
New access roads within the site are to be constructed according to design and contract specifications. The access routes must have suitable stormwater management plans and erosion control measures.	EPC Contractor	Design Construction
Drainage measures must promote the dissipation of storm water run-off.	EPC Contractor Owner	Design Construction
All stormwater mitigation measures must be implemented according a Stormwater Management Plan.	EPC Contractor	Construction

<b>Performance Indicator</b>	» No impacts on water quality, water quantity, riparian vegetation, natural status of watercourses
<b>Monitoring</b>	» Appropriate stormwater management system in place

### OBJECTIVE 13: 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. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large-scale excavations for foundations will damage archaeological sites, as will road construction activities.

Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with the development and hence to limit secondary impacts during the medium and longer term working life of the power line and on-site substation.

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

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas (which will not be surveyed in detail by a heritage specialist).	EPC Contractor in consultation with Heritage Specialist	Pre-construction
Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	Heritage Specialist	Pre-construction
Project employees and any contract staff must maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.	EPC Contractor	Duration of contract
If a heritage object is found, work in that area must be stopped immediately, and appropriate specialists	EPC Contractor in consultation with	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Heritage Specialist	
In the event that fossils resources are discovered during excavations, immediately stop excavation in the vicinity of the potential material. Mark (flag) the position and also spoil that may contain fossils. Inform the site foreman and the ECO. ECO to inform the developer, the developer contacts the standby archaeologist and/or palaeontologist. ECO to describe the occurrence and provide images by email.	Contractor and ECO	Construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas</li> <li>» All heritage items located are dealt with as per the legislative guidelines</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of excavation activities by SHE throughout construction phase</li> <li>» Supervision of all clearing and earthworks</li> <li>» Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported.</li> <li>» Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites (if required).</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

#### OBJECTIVE 14: 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 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 facility. 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.

<b>Project Component/s</b>	» Construction site.
<b>Potential Impact</b>	» Visual impact of general construction activities and the potential

	scarring of the landscape due to vegetation clearing.
<b>Activity/Risk Source</b>	» The viewing of the above mentioned by observers on or near the site.
<b>Mitigation: Target/Objective</b>	» Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate works areas.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	EPC Contractor	Construction
Ensure that rubble, litter, and disused construction materials are managed and removed regularly.	EPC Contractor	Construction
Ensure that all infrastructure and the site and general surrounds are maintained in a neat a manner.	EPC Contractor	Construction
Reduce and control construction dust using approved dust suppression techniques.	EPC Contractor	Construction
As far as possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	EPC Contractor	Construction
Rehabilitate all disturbed areas, construction areas, roads, and servitudes to acceptable visual standards.	EPC Contractor	Construction
Any additional external lighting of the facility will be limited.	EPC Contractor	Construction

<b>Performance Indicator</b>	» Vegetation cover on and near the site is intact with no evidence of degradation or erosion. » Construction site is kept in a neat and tidy state.
<b>Monitoring</b>	» Monitoring of vegetation clearing during construction. » Monitoring of rehabilitated areas post construction.

## **OBJECTIVE 15: Appropriate handling and management of waste**

The construction of the power line and on-site substation will involve the generation of various wastes. 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. The main wastes expected to be generated by the construction of the power line and substation will include:

- » General solid waste
- » Hazardous waste



» Liquid waste (including grey water and sewage)

A waste management plan is included as **Appendix C** of this EMPr.

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

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	EPC Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	EPC 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.	EPC 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.).	EPC Contractor	Duration of contract
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	EPC Contractor	Duration of contract

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	EPC Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	EPC 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.	EPC Contractor	Duration of contract
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal	EPC Contractor	Maintenance: duration of contract within a particular area
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	EPC Contractor	During and post construction.
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.	EPC Contractor	Duration of contract
SABS approved spill kits to be available and easily accessible.	EPC Contractor	Duration of contract
Regularly serviced chemical toilets facilities and septic tanks must be used to ensure appropriate control of sewage.	EPC Contractor	Duration of contract
Under no circumstances may waste be burnt on site.	EPC 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.	EPC Contractor	Duration of construction
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate.	EPC Contractor	Duration of construction
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately	EPC Contractor	Completion of construction

Mitigation: Action/Control	Responsibility	Timeframe
disposed of or the material re-used for an appropriate purpose.		

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping.</li> <li>» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately.</li> <li>» Provision of all appropriate waste manifests for all waste streams.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of waste management practices throughout construction phase.</li> <li>» Waste collection will be monitored on a regular basis.</li> <li>» Waste documentation completed.</li> <li>» Proof of disposal of sewage at an appropriate waste water treatment works.</li> <li>» 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.</li> <li>» An incident reporting system will be used to record non-conformances to the EMPr.</li> </ul>

### OBJECTIVE 16: 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. Chemical storage is likely to occur within the on-site substation.

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

does not cause pollution of the environment or harm to persons.

Mitigation: Action/Control	Responsibility	Timeframe
All chemicals, fuels and other hazardous materials are to be stored in designated and bunded areas, where the bunded area is impermeable and is impervious to the stored substance as per the requirements of SABS 089:1999 Part 1. The bunded area will contain 110% volume of the largest container stored.	EPC Contractor	Construction
Bunds and service area platforms to be cleaned and maintained regularly.	EPC Contractor	Construction
SABS approved Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. The relevant construction crew members must be trained in their use.	EPC Contractor	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of 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.	EPC 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.	EPC Contractor	Duration of contract
Any contaminated/polluted soil must be removed, stored as hazardous waste and disposed of at a licensed hazardous waste disposal facility.	EPC 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.	EPC Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	EPC Contractor	Duration of contract
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	Contractor O&M contractor	During and post construction.
Any water that collects in bunds must not be allowed to stand. Should the water be contaminated, it is to be removed and treated prior to discharge, or disposed of as hazardous waste. Clean stormwater contained within the bunds may be reused.	EPC Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area. If machinery cannot be	EPC Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
stored in a sealed area then a drip tray must be used to prevent spillage from any leaks.		
All generators on site, including generators that are not in use should be located in a bunded area or on a drip tray. Bunded areas and drip trays must be maintained on a regular basis.	EPC Contractor	Duration of contract
No chemicals must be stored or vehicle maintenance undertaken within 100m of wetlands or drainage lines.	EPC Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files and applicable regulations and safety instructions.	EPC 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.	EPC Contractor	Duration of contract
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations	EPC Contractor	Duration of contract
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	EPC Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	EPC Contractor	Construction
Upon the completion of construction, the area must be cleared of potentially polluting construction materials.	EPC Contractor	Completion of construction

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

## OBJECTIVE 17: Limit direct and indirect terrestrial faunal and avifaunal impacts

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

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Environmental induction for all staff	Contractor	Construction & Operation
ECO to monitor and enforce ban on hunting, collecting etc. of all plants and animals or their products.	ECO	Construction & Operation
Any fauna encountered during construction should be removed to safety by the ECO or other suitably qualified person.	Contractor	Construction & Operation
Regular surveys of large collision-prone species, especially cranes, flamingos and raptors within the study area to determine the relative importance of local populations of priority taxa.	Contractor	Construction & Operation
The effectiveness or otherwise of bird diverters and especially any hot spots of collisions along the power lines.	Contractor	Construction & Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Minimum disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing/natural vegetation and habitats for fauna and avifauna.</li> <li>» Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring for compliance during the construction phase. All incidents to be noted.</li> </ul>

### OBJECTIVE 18: Minimise soil degradation and erosion (Erosion management plan)

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 in areas that are underlain by fine grained soil which can be mobilised when disturbed, even on relatively low slope gradients (accelerated erosion).
- » Uncontrolled run-off relating to the construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation along natural drainage lines or catchment areas.
- » Degradation of the natural soil profile due to excavation, removal of topsoil, stockpiling, wetting, compaction, pollution and other construction activities may affect soil forming processes and associated agricultural potential.

Management of erosion will be required during the construction phase of the power line. An erosion management plan is required to ensure compliance with applicable regulations and to prevent increased soil erosion and sedimentation of the downstream environment. The section below provides a guideline for the management of erosion on site and will need to be supplemented with the principles for erosion management contained in the Erosion Management plan included in **Appendix B**.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line</li> <li>» On-site substation</li> <li>» Access roads.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil degradation including erosion, dust and siltation.</li> <li>» Reduction in agricultural potential.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Earthworks &amp; activity on site.</li> <li>» Rainfall and concentrated discharge causing water erosion of disturbed areas.</li> <li>» Wind - erosion of disturbed areas.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimise soil degradation (removal, excavation, mixing, wetting, compaction, pollution, etc.).</li> <li>» Minimise erosion.</li> <li>» Minimise sediment transport downstream (siltation).</li> <li>» Minimise dust pollution.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Identify areas of high erosion risk (drainage lines/watercourses, existing problem areas). Only special works to be undertaken in these areas to be authorised by ECO and Site Manager.	ECO/ER	At design stage.
Identify construction areas for general construction work and restrict construction activity to these areas.	Contractor	At design stage and during construction
Prevent unnecessary destructive activity within construction	Contractor	During

Mitigation: Action/Control	Responsibility	Timeframe
areas (prevent over-excavations and double handling).		construction
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary degradation of soil. Special attention to be given to roads that cross drainage lines and roads on steep slopes (to prevent unnecessary cutting and filling operations).	Contractor	At design stage and during construction
Dust control on construction site through wetting or covering of cleared areas.	Contractor	Daily during construction
Minimise removal of vegetation which aids soil stability.	Contractor	Continuously during construction
Rehabilitate disturbance areas as soon as an area is vacated.	Contractor	Continuously during and after construction
Soil conservation - stockpile topsoil for re-use in rehabilitation phase. Protect stockpile from erosion. Topsoil should be stockpiled for as short a period as possible to ensure survival of the soil seed bank and other soil-borne organisms.	Contractor	Continuously during construction
Control depth of excavations and stability of cut faces/sidewalls.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Only authorised activity outside construction areas.</li> <li>» No activity in no-go areas.</li> <li>» Acceptable level of activity within construction areas, as determined by ECO.</li> <li>» Limited soil erosion attributable to construction activities around site.</li> <li>» Limited sedimentation along drainage lines as a result of construction activities.</li> <li>» No soil degradation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Immediate reporting of ineffective sediment control systems.</li> <li>» An incident reporting system will record non-conformances.</li> </ul>

### OBJECTIVE 19: Limit damage to drainage lines

Construction within drainage lines has been minimised as far as possible. Where impacts are unavoidable, mitigation measures are required to minimise impacts on these systems.

<b>Project</b>	» Power line.
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<b>Component/s</b>	
<b>Potential Impact</b>	» Damage to water course areas by any means that will result in hydrological changes (includes erosion, siltation, dust, direct removal of soil of vegetation, dumping of material within wetlands). The focus should be on the functioning of the watercourse as a natural system.
<b>Activities/Risk Sources</b>	» Construction and operation of power line and on-site substation. » Construction of access roads.
<b>Mitigation: Target/Objective</b>	» No damage to the delineated watercourses within project footprint (i.e. no-go area). » Minimise damage to watercourse areas where crossings are to be built or upgraded.

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Rehabilitate any disturbed areas as soon as possible once construction is completed in an area.	Proponent and contractors, ECO	Duration of construction
Control storm water and runoff water through the implementation of a storm water management plan for the site.	Contractors, ECO	Duration of construction
Obtain a permit as required in terms of the National Water Act from DWS to impact on any wetland or water resource.	Proponent	Duration of construction

<b>Performance Indicator</b>	» No impacts on water quality, water quantity, riparian vegetation, natural status of watercourses
<b>Monitoring</b>	» Habitat loss in watercourses should be monitored before and after construction. » The presence and development of erosion features downstream of any construction through wetlands must be monitored. » The ECO should be responsible for driving this process. » An incident reporting system must be used to record non-conformances to the EMP. » Public complaints register must be developed and maintained on site.

### 7.3. Detailing Method Statements

**OBJECTIVE 20: 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:

- » Responsible person/s;
- » 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;
- » Preparation of the site;
- » 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);
- » Storm water management procedures;
- » Wash bay for the construction vehicles and or machineries;
- » Ablution facilities (placement, maintenance, management and servicing);
- » Solid Waste Management;
- » Liquid waste management;
- » Dust and noise pollution;
- » 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);
- » Fire prevention and management measures on site;
- » Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary);
- » 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 ECO and 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.

#### 7.4. Awareness and Competence: Construction Phase

**OBJECTIVE 21: 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 EMPr. 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 EMPr is readily available on-site, and that all site employees are aware of the location and have access to the document.
- » Employees shall be familiar with the requirements of the EMPr 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 relevant 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.

#### **7.4.1 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. Proof of awareness training should be kept on record.

#### **7.4.2 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. Proof of induction training should be kept on record.

#### **7.4.3 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 ones recommended by the onsite ECO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

### **7.5. Monitoring Programme: Construction Phase**

**OBJECTIVE 22: 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 EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr 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). Where this is not clearly dictated, Golden Valley II Wind (RF) Proprietary Limited will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ 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.

The ECO will ensure compliance with the EMPr, will conduct monitoring activities, and will report any non-compliance or where corrective action is necessary to the Site Manager and/or any other monitoring body stipulated by the regulating authorities. The ECO must have the appropriate experience and qualifications to undertake the necessary tasks.

#### ***7.5.1. Non-Conformance Reports***

All supervisory staff including Foremen, 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.

### **7.5.2. Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to Proponent for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded if any, corrective action required, and details of those non-conformances or incidents which have been closed out.

### **7.5.3. Final Audit Report**

A final environmental audit report must be compiled by the independent ECO 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 8**

**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

**8.1. Objectives**

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

**OBJECTIVE 1: 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.

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

Mitigation: Action/Control	Responsibility	Timeframe
All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works



<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following 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, Proponent and ECO	Pre-construction
Where disturbed areas are not to be used during the operation of the proposed power line and on-site substation, 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 need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
Erosion control measures should be used in sensitive areas such as areas with steep slopes.	specialist Proponent in consultation with ECO and rehabilitation specialist (if required)	Post-rehabilitation
On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Proponent	Post-rehabilitation

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

## MANAGEMENT PROGRAMME: OPERATION

## CHAPTER 9

**Overall Goal:** To ensure that the operation of the power line and on-site substation do 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 be appointed during operation whose duty it will be to ensure the implementation of the operational EMPr.

### 9.1. Objectives

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

#### OBJECTIVE 1: Minimise Impacts on Vegetation, Soils and Ecology and Avifauna

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.
- » Soil contamination due to use of hazardous substances such as transformer oils.

Management of erosion will be required during the operation phase of the power line and on-site substation. An erosion management plan is required to ensure compliance with applicable regulations and to prevent increased soil erosion and sedimentation of the downstream environment. The section below provides a guideline for the management of erosion on site and will need to be supplemented with the principles for erosion management contained in the Erosion Management plan included in **Appendix B**.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Power line</li> <li>» On-site substation</li> <li>» Access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Soil degradation.</li> <li>» Soil erosion.</li> <li>» Increased deposition of soil into drainage systems.</li> <li>» Increased run-off over the site.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Poor rehabilitation and/or re-vegetation of cleared areas.</li> <li>» Rainfall - water erosion of disturbed areas.</li> <li>» Wind erosion of disturbed areas.</li> <li>» Concentrated discharge of water from construction activity.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Ensure rehabilitation of disturbed areas is maintained.</li> <li>» Minimise soil degradation (i.e. wetting).</li> <li>» Minimise soil erosion and deposition of soil into drainage lines.</li> <li>» Ensure continued stability of embankments/excavations.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Rehabilitate disturbance areas should the previous attempt be unsuccessful.	The operator	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, storm water catch-pits, and shade nets).	The operator	Operation
Develop and implement an appropriate stormwater management plan for the operational phase of the power line and on-site substation	The operator	Operation
Site access should be controlled and only authorized staff and contractors should be allowed on-site.	The operator	Operation
Notice boards stating that fauna and flora may not be collected, harvested etc. should be placed at the entrances to the site.	The operator	Operation
Any maintenance activities should avoid listed plant species and strive to keep the footprint as low as possible.	The operator	Operation
No herbicides should be used and if vegetation clearing needs to take place, this should be done by hand.	The operator	Operation
The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	The operator	Operation
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	The operator	Operation
Spill kits must be kept on-site.	The operator	Operation
Regular monitoring for erosion post-construction to ensure that no erosion problems have developed as result of the past	The operator	Operation

Mitigation: Action/Control	Responsibility	Timeframe
disturbance.		
Regular monitoring must be undertaken for alien plant invasion, which is likely to occur in previously disturbed areas or in areas receiving runoff from the hardened surfaces of the infrastructure.	The operator	Operation

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

## OBJECTIVE 2: Protection of avifauna from collision and electrocution

During the operation, the threat of collision with the power line is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. The threat of electrocution while perching on the power line and associated infrastructure serves as a threat to certain sensitive species, depending on the power line structures implemented.

<b>Project Component/s</b>	» Power line.
<b>Potential Impact</b>	» Collision and electrocution events with the overhead power line.
<b>Activities/Risk Sources</b>	» Operation of the power line without appropriate mitigation measures.
<b>Mitigation: Target/Objective</b>	» Maintain a low number of collision, and electrocution events.

Mitigation: Action/Control	Responsibility	Timeframe
Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.	The operator	Operation
Insulate live components at support structures.	Contractor	Operation

<b>Performance</b>	» Minimal collision, or electrocution events.
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<b>Indicator</b>	
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of electrocution or collision events with the power line.</li> <li>» Monitor power line servitude for mortalities.</li> </ul>

### OBJECTIVE 3: Minimise dust and air emissions

During the operational phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles), and from the augmentation plant. Windy conditions and the movement of vehicles on site may lead to dust creation.

<b>Project Component/s</b>	<ul style="list-style-type: none"> <li>» Hard engineered surfaces.</li> <li>» On-site vehicles.</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Dust and particulates from vehicle movement to and on-site.</li> <li>» Release of minor amounts of air pollutants (for example NO<sub>2</sub>, CO and SO<sub>2</sub>) from vehicles and the augmentation plant.</li> </ul>
<b>Activities/Risk Sources</b>	<ul style="list-style-type: none"> <li>» Re-entrainment of deposited dust by vehicle movements.</li> <li>» Wind erosion from unsealed roads and surfaces.</li> <li>» Fuel burning vehicle and construction engines.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure emissions from all vehicles are minimised, where possible.</li> <li>» To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements.</li> </ul>

<b>Mitigation: Action/Control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Roads must be maintained to a manner that will ensure that nuisance to the community from dust is not visibly excessive.	The operator	Operation
Appropriate dust suppression must be applied to the roads as required to minimise/control airborne dust.	The operator	Operation
Speed of vehicles must be restricted on site, as defined by the Environmental Manager.	The operator	Operation
Vehicles and equipment must be maintained in a road-worthy condition at all times.	The operator	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints from affected residents or community regarding dust or vehicle emissions.</li> <li>» Dust suppression measures implemented for where required.</li> <li>» Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager.</li> <li>» A complaints register must be maintained, in which any complaints</li> </ul>

	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 EMPr.
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**OBJECTIVE 4: Ensure the implementation of an appropriate fire management plan during the operation phase**

The increased presence of people on the site could increase the risk of veld fires, particularly in the dry season.

<b>Project Component/s</b>	» Operation and maintenance of the power line and on-site substation.
<b>Potential Impact</b>	» Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a risk to the power line and associated infrastructure.
<b>Activities/Risk Sources</b>	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
<b>Mitigation: Target/Objective</b>	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Join the local Fire Protection Agency.	The operator	Operation
Provide adequate fire-fighting equipment on site.	The operator	Operation
Provide fire-fighting training to selected operation and maintenance staff.	The operator	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	The operator	Operation
Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.).	The operator	Operation
An emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	The operator	Operation
Contact details of emergency services should be prominently displayed on site.	The operator	Operation

<b>Performance</b>	» Fire-fighting equipment and training provided before the operational
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<b>Indicator</b>	phase commences. » Appropriate fire breaks in place and maintained.
<b>Monitoring</b>	» Golden Valley II Wind (RF) Proprietary Limited must monitor indicators listed above to ensure that they have been met.



## MANAGEMENT PROGRAMME: DECOMMISSIONING

## CHAPTER 10

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It is most likely that decommissioning activities of the infrastructure would comprise the disassembly and removal of the power line and substation from the site.

*The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore is not repeated in this section.*

### » **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.

### » **Disassemble and Remove Infrastructure**

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

## 10.1. Objectives

The overall objective of the decommissioning phase is to leave the project area in a condition that minimises adverse impacts on the socio-economic and biophysical environment, with a legacy that contributes to sustainable development.

The objectives of the decommissioning phase of the proposed project are to:

- » Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
- » Implement progressive rehabilitation measures, beginning during the construction phase.
- » Leave a safe and stable environment for both humans and animals and make their condition sustainable.
- » Return rehabilitated land-use to a standard that can be useful to the post-project land user.
- » Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems.
- » Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

## **10.2. Approach to the Decommissioning Phase**

It is recommended that planning of the decommissioning of the project and rehabilitation of the site should take place well in advance (at least two years) of the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

### **10.2.1. Identification of structures for post-closure use**

Access roads should be assessed in conjunction with the ultimate land users to determine if these could be used in future. Where not required, these access roads should be decommissioned and rehabilitated.

### **10.2.2. Removal of infrastructure**

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a registered landfill site. All foundations must be removed to a depth of 1m. Hard surfaced must be ripped to a depth of 1m and vegetated.

### **10.2.3. Soil amelioration**

The steps that should be taken during the amelioration of soils are as follows:

- » The deposited soils must be ripped to ensure reduced compaction;
- » An acceptable seed bed should be produced by surface tillage;
- » Restore soil fertility;
- » Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- » Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

### **10.2.4. Establishment of vegetation**

The objective is to restore the project site to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- » Prevent erosion;
- » Restore the land to the agreed land capability;

- » Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- » Restore the biodiversity of the area as far as possible.

#### **10.2.5. Maintenance**

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular maintenance will be required until the natural fertility cycle has been restored.

#### **10.2.6. Monitoring**

The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:

- » Erosion status;
- » Surface drainage systems and surface water quality;
- » Vegetation species diversity; and
- » Faunal re-colonisation.

## **REVISION OF THE EMPR**

## **CHAPTER 11**

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The EMPr is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this draft EMPr be updated to include site-specific information and specifications following the final walk-through survey by specialists of the power line and on-site substation. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features. Any amendments must be approved by the Competent Authority (i.e. DEA) prior to implementation, unless these are required to address an emergency situation.

## **GRIEVANCE MECHANISM / PROCESS**

### **PURPOSE**

This Grievance Mechanism has been developed to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The aim of the grievance mechanism is to ensure that grievances or concerns raised by local landowners and or communities are addressed in a manner that:

- » Provides a predictable, transparent, and credible process to all parties, resulting in outcomes that are seen as fair, effective, and lasting.
- » Builds trust as an integral component of broader community relations activities.
- » Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to address grievances in a manner that does not require a potentially costly and time consuming legal process.

### **PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES**

- » Local landowners, communities and authorities must be informed in writing by the Proponent of the grievance mechanism and the process by which grievances can be brought to the attention of the Proponent through its designated representative.
- » A company representative must be appointed as the contact person for grievances to be addressed to. The name and contact details of the contact person must be provided to local landowners, communities and authorities.
- » Project related grievances relating to the construction, operational and or decommissioning phase must be addressed in writing to the contact person. The contact person should assist local landowners and or communities who may lack resources to submit/prepare written grievances.
- » The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- » The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed).

- » Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or proponent are entitled to invite their legal representatives to attend the meeting/s, it should be made clear that to all the parties involved in the process that the grievance mechanism process is not a legal process. It is therefore recommended that the involvement of legal representatives be limited.
- » The meeting should be chaired by the Proponent's representative appointed to address grievances. The Proponent must provide a person to take minutes of and record the meeting/s. Any costs associated with hiring venues must be covered by the Proponent.
- » Draft copies of the minutes must be made available to the Complainant and the Proponent within 4 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days of receipt of the draft minutes.
- » In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- » In the event of a dispute between the Complainant and the Proponent regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- » In the event that the parties agree to appoint a mediator, the Proponent will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Proponent, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Proponent. The Proponent must provide a person to take minutes of and record the meeting/s.
- » In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party

responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.

- » In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- » The draft report must be made available to the Complainant and the Proponent for comment before being finalised and signed by all parties. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 4 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action can be or needs to be taken. Closure status will be classified in the Complaints Register as follows:

- » Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- » Unresolved. Complaints where it has not been possible to reach an agreed resolution and the case has been authorised for close out by the Appeals Committee.
- » Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Proponent, either party may be of the opinion that legal action may be the most appropriate option.

## **PRINCIPLES FOR EROSION MANAGEMENT**

### **1. PURPOSE**

Exposed and unprotected soils are the main cause of erosion in most situations. This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

- A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction related activities.
- An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

### **2. EROSION AND SEDIMENT CONTROL PRINCIPLES**

The goals of erosion control during and after construction at the site should be to:

- » Protect the land surface from erosion;
- » Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
- » Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

#### **3.1. On-Site Erosion Management**

General factors to consider regarding erosion risk at the site includes the following:

- » Soil loss will be greater during wet periods than dry periods. Intense rainfall events outside of the wet season, such as occasional summer thunder storms can also cause significant soil loss. Therefore precautions to prevent erosion should be present throughout the year.
- Soils loss will be greater on steeper slopes. Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- » Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore the gap between construction



activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.

- » The extent of disturbance will influence the risk and consequences of erosion. Therefore site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
- » Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
- » Where necessary, new roads constructed should include water diversion structures present with energy dissipation features present to slow and disperse the water into the receiving area.
- » Roads and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- » Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
- » All bare areas should be re-vegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
- » Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- » Gabions and other stabilisation features should be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- » Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced.
- » Topsoil should be removed and stored separately during construction activities (as per the recommendations in the EMPr), and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.
- » Regular monitoring of the site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

### **2.1.1. Erosion control mechanisms**

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

- Reno mattresses;
- Slope attenuation;
- Hessian material;
- Shade catch nets;
- Gabion baskets;
- Silt fences;
- Storm water channels and catch pits;
- Soil bindings;
- Geofabrics;
- Hydro-seeding and/or re-vegetating;
- Mulching over cleared areas;
- Boulders and size varied rocks; and
- Tilling.

## **2.2. Engineering Specifications**

A detailed engineering specifications Storm-water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and this should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
- An onsite Engineer or Environmental Officer (EO) to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO to monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
- The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved Storm-Water Plan is not correctly or appropriately implemented and damage to the environment is caused.

## **2.3. Monitoring**

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on site the Environmental Officer (during construction) or Environmental Manager (during operation) must:

- » Assess the significance of the situation.
- » Take photographs of the soil degradation.
- » Determine the cause of the soil erosion.
- » Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
- » Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- » Report and monitor the progress of the rehabilitation weekly and record all the findings in a site register (during construction).
- » All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

- » Select a system/mechanism to treat the erosion.
- » Design and implement the appropriate system/mechanism
- » Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- » Continue monitoring until the area has been stabilised.

### **3. CONCLUSION**

The Erosion Management Plan is a document to assist the Proponent/ EPC Contractor with guidelines on how to manage erosion during all phases of the project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable).

#### **4. REFERENCES**

- Department of Environmental Affairs. (1983). *Conservation of Agricultural Resources Act 43 of 1983*. Pretoria: Department of Environmental Affairs.
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## **WASTE MANAGEMENT PLAN**

### **1. PURPOSE**

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste that is generated from the project activities on site.

This WMP has been compiled as part of the project Environmental Management Programme (EMPr) and includes waste stream information available at the time of compilation. Construction practices and operations must be measured and analysed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be further updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operational stages.

### **2. RELEVANT ASPECTS OF THE SITE**

It is expected that the development of the 132kV power line and on-site substation for the Golden Valley Wind Energy Facility will generate construction solid waste, general waste, contaminated water and soil.

Waste generated on site, originates from various sources including but not limited to:

- » Construction waste generated from spoil material from clearing activities as well as metal and cabling off-cuts.
- » Contaminated water, soil and vegetation due to hydrocarbon spills.
- » Hydrocarbon waste from vehicle, equipment and machinery parts (oil cans, filters, rags etc), and servicing.
- » Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE), cardboard and rockwool. Organic waste from food waste and alien vegetation removal.
- » Sewage from portable toilets and septic tanks.
- » Inert waste from excess rock and soil from site clearance and trenching works.

### 3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by means of a number of pieces of legislation, including:

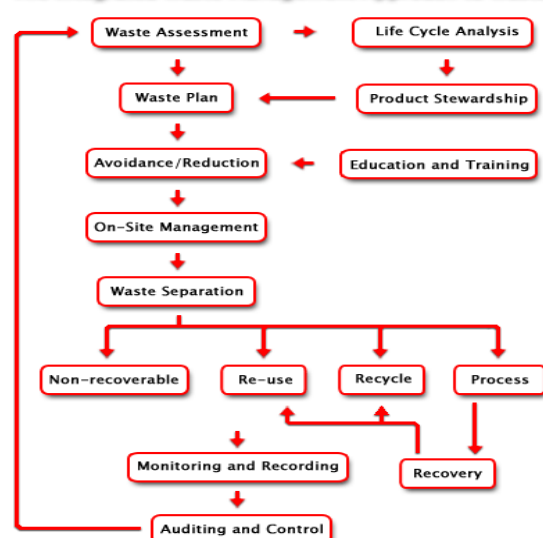
- » National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008)
- » National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)
- » The South African Constitution (Act 108 of 1996)
- » Hazardous Substances Act (Act 5 of 1973)
- » Health Act (Act 63 of 1977)
- » Environment Conservation Act (Act 73 of 1989)
- » Occupational Health and Safety Act (Act 85 of 1993)
- » National Water Act (Act 36 of 1998)
- » The National Environmental Management Act (Act 107 of 1998) (as amended)
- » Municipal Structures Act (Act 117 of 1998)
- » Municipal Systems Act (Act 32 of 2000)
- » Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- » Air Quality Act (Act 39 of 2004)

Storage of waste must be undertaken in accordance with the National Norms and Standards for the Storage of Waste published in GN926.

### 4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management on site is needed. Such an approach is illustrated in the figure below.

The Integrated Waste Management Approach to Waste



Source: <http://www.enviroserv.co.za/pages/content.asp?SectionId=496>

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- » Reducing volumes of waste is a priority;
- » If reduction is not feasible, the maximum amount of waste is to be recycled; and
- » Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner as possible.

#### **4.1. Construction phase**

A plan for the management of waste during construction waste is detailed below. As previously stated, construction practices must be measured and analysed in order to determine the efficacy of the plan and whether further revision of the plan is required. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction.

##### **4.1.1. Waste Assessment / Inventory**

- » The Environmental Officer (EO), or someone else designated for the job, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- » Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.
- » Once a waste inventory has been established, targets for recovery of waste (minimisation, re-use, recycling) should be set.
- » The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

##### **4.1.2. Waste collection, handling and storage**

- » It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc.
- » Septic tanks and portable toilets must be monitored and maintained daily. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the area.
- » Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at various areas around site for the storage of organic, recyclable and hazardous waste.

- » A dedicated waste area must be established on site for the storage of all waste streams, before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- » Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- » Hazardous waste must be stored within a bunded area constructed according to SABS requirements. The volume of waste stored in the bunds must not exceed 110% of the bund capacity.
- » The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.
- » Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- » A dedicated waste management team must be appointed by the principal contractors' EO, whom will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the EO.
- » All waste removed from site must be done so by a registered/ licensed subcontractor, whom must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made.

#### **4.1.3. Management of waste storage areas**

- » The position of all waste storage areas must be located at least 32m away from water courses and ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and dirty storm water.
- » Collection bins placed around site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor.
- » Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained, not allowing access to vermin or other rodents. Shade cloth should ideally be used to ensure avifauna does not have access to waste.
- » Waste must be stored in designated containers and not on the ground.
- » Inspections and maintenance of bunds must be undertaken daily. Bunds must be inspected for leaks or cracks in the foundation and walls.
- » It is assumed that any rainwater collected inside the bund is contaminated and must be removed and stored as hazardous waste, and not released into the environment. If any leaks occur in the bund, these must be removed immediately.



#### **4.1.4. Disposal**

- » Waste generated on site must be removed on a regular basis, as determined by the EO and ECO. This frequency may change during construction depending on waste volumes generated at different stages of the construction process.
- » Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

#### **4.1.5. Record keeping**

The success of the Waste Management Plan is determined by measuring criteria such as waste volumes, cost recovery from recycling, cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

- » Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- » Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

#### **4.1.6. Training**

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

### **5. Operational phase**

It is expected that the operational phase will result in the production of limited amounts of general waste and limited amounts of hazardous wastes (grease, oils) may also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site.

The following waste management principles apply during the operational phase:

- » The Environmental Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- » Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- » Recyclable waste must be removed from the waste stream and stored separately.
- » All waste must be stored in appropriate temporary storage containers (separated between different construction wastes, and contaminated or wet waste).
- » Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- » Waste generated on site must be removed on a regular basis throughout the operational phase.
- » Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

## **6. Monitoring of Waste Management Activities**

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- » Monthly volumes/ mass of the different waste streams collected;
- » Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- » Monthly volumes/ mass of the waste that is recycled;
- » Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must form part of the EO and ECO weekly and monthly reporting.