

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

PROPOSED AGGENEIS-PAULPUTS 400KV TRANSMISSION POWERLINE AND SUBSTATIONS UPGRADE, NORTHERN CAPE PROVINCE

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TITLE

DEA REF NO	14/12/16/3/3/2/1012
TITLE:	Draft Environmental Management Programme for the Proposed Aggeneis-Paulputs 400kV Transmission Powerline and Substations Upgrade, Northern Cape Province
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1. OVERVIEW OF THE PROJECT

1.1 NEED AND DESIRABILITY

Eskom has a major role to generate, transmit and distribute electricity used in South Africa. The electricity is generated at power stations located in the Mpumalanga coal fields, which is instantly transmitted via kilometres of high voltage transmission lines to major substations around the country. Voltage is reduced at the major substations for further distribution to smaller substations, from where the electricity is distributed to the customer (Eskom annual report, 2009).

Eskom has to supply reliable power to meet the increasing needs of electricity users. Therefore on a continuous basis, Eskom needs to construct, maintain and upgrade its infrastructure of transmission powerlines and substations. According to Eskom's Transmission Development Plan (TDP) for 2016–2025, some of the goals are to implement transmission network strengthening plans and reliability projects, which would ensure that the transmission system reliability and adequacy are sustained as load demand increases on the network. Furthermore, in terms of the network reliability criteria, as approved by the National Energy Regulation of South Africa (NERSA), compliance to the N-1¹ criterion is required.

At present, the Namaqualand Customer Load Network (CLN) is supplied via the Aggeneis Main Transmission Substation (MTS). The Aries-Aggeneis 400kV line is the only main feed into the Namaqualand CLN. This network cannot be back-fed via either the Kokkerboom (Habib)-Aggeneis 220kV or the Aggeneis-Paulputs 220kV. Voltage collapse and associated power outages cannot be avoided if the transmission line supply is lost.

The current Aggeneis-Paulputs network's main problem is the reliability, which does not meet the minimum reliability standards of the South African Grid Code which require minimum N-1 reliability for the transmission network. The other problem faced by the Aggeneis-Paulputs network is that planned transmission capacity will soon be exhausted at Paulputs if electricity generation by Independent Power Producers (IPPs) continues at present levels.

Therefore, to address the N-1 reliability, the construction of the Aggeneis-Paulputs 400kV line is a preferred solution. It ensures the network is firm for N-1 contingency, as well as to ensure that there is sufficient line capacity to evacuate potential IPPs in the area.

1.2 BRIEF SCOPE OF PROJECT

The proposed 400kV overhead transmission powerline would be constructed from Aggeneis substation to Paulputs substation in the Northern Cape Province. The length of the proposed line is approximately 97km, depending on the final route alignment.

To facilitate final route determination, three possible alternative route corridors of 2km wide (1km on either side of the centre line) were identified. The purpose of having a

¹ The N-1 means that the system is planned such that, with all transmission facilities in service, the system is in a secure state, and for any one credible contingency event, the system moves to a satisfactory state. However, if more than one contingency event was to occur, load may have to be shed to return to a satisfactory state.

2km corridor is to ensure more space for biodiversity assessment surveys along the corridor and to avoid any environmentally sensitive features during the powerline construction along the route. In addition, the corridors closer towards Paulputs substation will be 4km wide. This is to allow sufficient space within the corridors to locate the powerline and to avoid clashes with the Independent Power Producers (IPPs) in proximity to Paulputs substation. Once the final route corridor is authorised, a 55m servitude (27.5m on either side of the centre line) would be negotiated and acquired within the final corridor with the affected landowners (prior to construction phase).

Furthermore, the transmission powerline would require support structures and towers which would be spaced at approximately 400m intervals along the powerline route, depending on the towers to be used and the prevailing environment. In addition, vehicular access may be required along the route for construction and maintenance purposes.

The project will entail the upgrade of the capacity of the existing Aggeneis substation and Paulputs substation, to accommodate additional transmission capacity. In addition, Aggeneis and Paulputs substations would require footprint expansions.

1.3 LOCALITY OF THE PROPOSED PROJECT

The proposed Aggeneis-Paulputs 400kV Transmission Powerline is located within the Khai-Ma Local Municipality, within the jurisdiction of Namakwa District Municipality in the Northern Cape Province. The study area covers the area between the Aggeneis substation (approximately 5km south west of a mining town of Aggeneys) to Paulputs substation (approximately 35km north east of the town called Pofadder). The approximate length of the proposed transmission line is 97km.

The approximate coordinates are provided below:

Table 1: Approximate Coordinates between Aggeneis and Paulputs Substations

	Alternative Route Corridor 1	Alternative Route Corridor 2	Alternative Route Corridor 3
Start point at Aggeneis	29°17'51.4"S 18°48'17.4"E	29°17'51.4"S 18°48'17.4"E	29°17'51.4"S 18°48'17.4"E
Mid-point	29°8'9.477"S 19°14'13.806"E	29°7'5.347"S 19°18'34.388"E	29°10'13.002"S 19°16'28.034"E
End point at Paulputs	28°52'42.4"S 19°33'53.4"E	28°52'42.4"S 19°33'53.4"E	28°52'42.4"S 19°33'53.4"E

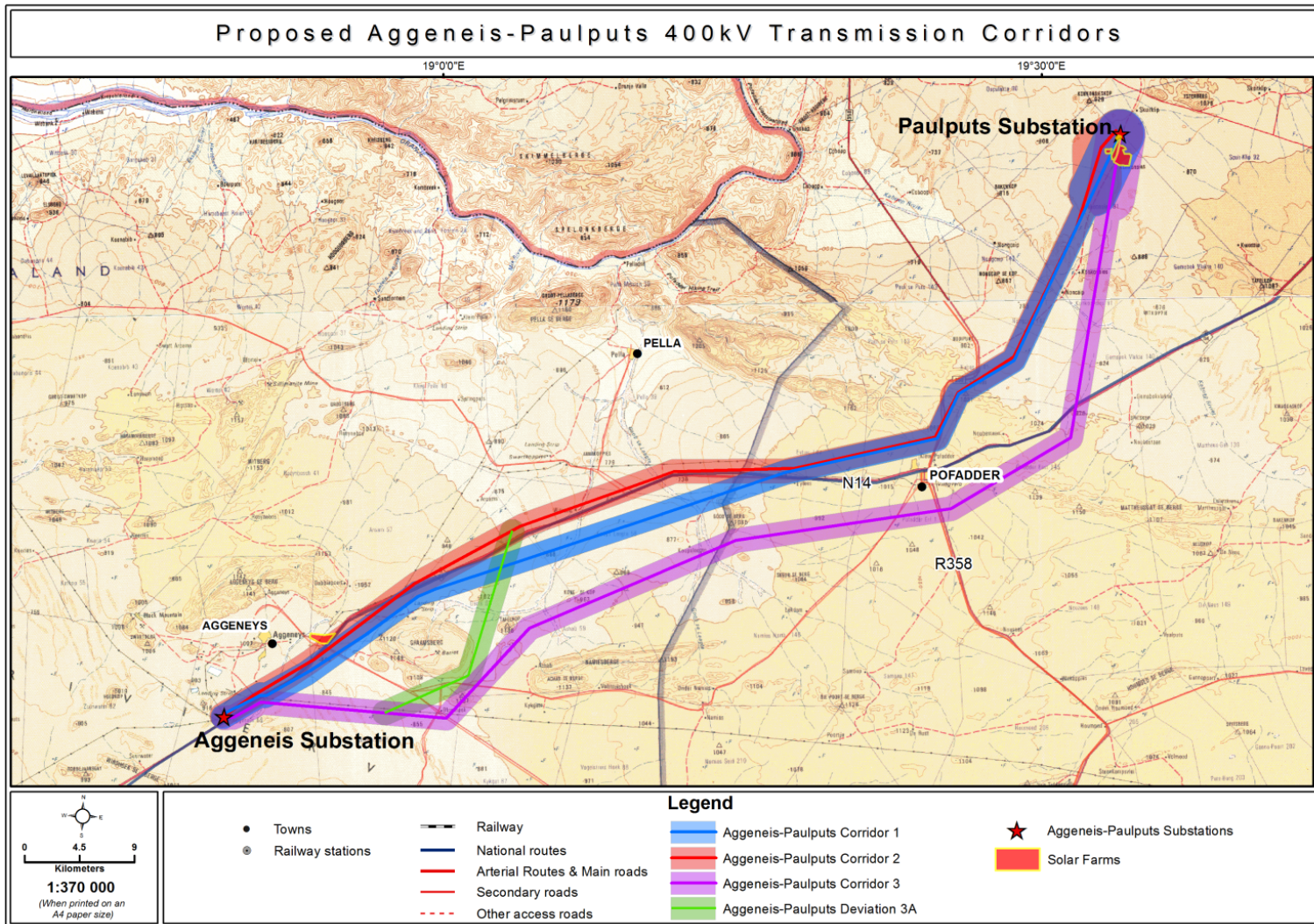


Figure 1: Locality Map

1.4 POTENTIAL ENVIRONMENTAL IMPACTS ASSOCIATED WITH THE PROPOSED TRANSMISSION POWERLINE

Specialist findings were assessed and summarised in Environmental Impact Report. Potential Environmental Impacts associated with the proposed transmission powerline are expected to occur during the construction and operational phases. Some of the identified potential impacts and recommended mitigation measures in the specialist studies include the following:

- **Vegetation impacts** are due to the removal of vegetation for the purpose of the powerline servitude and the tower footprints. In particular, the clearance of vegetation and plants of conservation concern would cause habitat loss. Mitigation measures should take the form of preventing construction of towers in / on ecologically sensitive areas. Where possible, construction activities must be restricted to previously disturbed areas.
- **Fauna impacts** are due to the disturbance of habitats within the powerline servitude and the tower footprints. Mitigation measures should take the form of preventing construction of towers in / on ecologically sensitive areas. Furthermore, ensure disturbance sources such as machinery and personnel movement are kept to a restricted construction area.
- **Avifauna impacts** are as a result of collisions of birds with powerlines and habitat destruction during construction phase. To minimise this impact would require marking the earth wires of the proposed powerline with a suitable anti-collision marking device. These markers must be no more than 20m apart on each earth wire and must be placed along the full length of the earth wire.
- **Wetland impacts** are as a result of changing the sediment amount entering water resources and loss of watercourse habitat due to infrastructure construction. Towers and construction camps should not be constructed within watercourses. This is by maintaining “no disturbance buffer zones” (50m from the watercourses).
- **Agricultural impacts** are caused by the transmission powerline constructed on agricultural potential land. This results in loss of agricultural land. Mitigation measures should take the form of minimizing the footprint to ensure that as little physical disturbance as possible occurs during the construction phase.
- **Visual impacts** are as a result of construction activities on the desolate sense of place and the farming land use that primarily utilises the natural landscape. Construction camps will cause unsightly views during the construction phase. Mitigations should take the form of avoiding natural landscapes that are considered scenic and contributes to the aesthetic value of the visual resource. Such features include any rocky outcrop, ridge or hill. Do not locate the construction camps within 1km from any residential area or visually sensitive area. Clearly demarcate the construction site to limit the area of disturbance.
- **Heritage site impacts** are caused by disturbance or destruction during construction phase. Mitigation measures should take the form of isolating known sites and declare them as no-go zones with sufficient associated buffer zones around them for protection. The SAHRA would have to be notified to this regard.

- **Social impacts** are as a result of disturbance on land use and hence affecting adjacent landowners. As a mitigation measure, the final route must avoid crossing areas of value such as agriculture farms properties and tourism. In addition, during the construction phase, the workers must be requested to respect the peacefulness and quiet of the area so as not to disturb the rural nature of the area. A positive impact would be the creation of temporary unskilled employment opportunities for local communities during construction phase.

Overall, the specialist impact assessments conducted have not found any significantly detrimental issues that could be caused by the proposed transmission powerline. The impacts could be successfully mitigated through the implementation of the management measures in this Environmental Management Programme (EMPr).

2. PURPOSE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME

This EMPr will deal with the environmental impacts associated with all aspects of this project and the mitigation measures required to prevent or minimize the potential impacts. The EMPr should be regarded as a guideline document to be strictly adhered to during all phases of the project including the construction and operational phase.

An Environmental Control Officer (ECO) will be appointed to monitor and audit the various phases of the project. An acknowledgement form should be signed by the various parties and / or Eskom as well as the Contractors. The acknowledgement form will be part of the contractual agreement between the Eskom and the contractors to ensure that all the conditions and requirements of the EMPr are complied with.

A comparative assessment was carried out of published EMPr's, whilst site-specific conditions and new information that has come to light were also incorporated. The aim of this EMPr is to integrate environmental planning, design, construction, and operational activities for the proposed development.

Compliance with the EMPr will be monitored by an ECO, who will keep a record of the audits and any important information that can be produced on request.

The objectives of the EMPr are to:

- Provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project; and
- Ensure that the safety recommendations are complied with.

This EMPr, which forms an integral part of the contract documents, informs the project developer and the land owner as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction and operational activities associated with the project. This is to include any rehabilitation and landscape processes work which is needed post-construction and which would be carried out by the contractor who may be appointed

to do such rehabilitation work. The provisions of the EMPr are binding on the Contractor during the contract period and Eskom in the operational phase.

Any environmental issues that are identified during or after construction will be addressed in consultation with the environmental consultant. As such it should be viewed as a dynamic document that may require updating or revision where necessary.

All activities and earthworks associated with construction and reticulation of services will be undertaken in accordance with SABS 1200 standards, which deal with guidelines for civil engineering and general construction works.

3. PARTIES INVOLVED

Project Manager (PM - Eskom)

The Project Manager is appointed by Eskom to oversee the work of all consultants, contractors, residents and visitors.

Contractor (C)

This refers to the main contractor(s) appointed by Eskom for the construction of the Project, or portion of the Project. The main contractor(s) are required to adhere to the EMPr and are responsible to ensure that all sub-contractors, suppliers and staff appointed by them also adhere to the EMPr.

Environmental Liaison Officer

The Environmental Liaison Officer (ELO) will be appointed by the contractor to monitor activities on site on a daily basis. The ELO will be the ECO's representative on the site and will report back on all audit trips. The ELO must report any major incidents immediately to the ECO

All Staff

All workers employed by the contractor or Eskom, persons involved with activities related to the project, or persons present or visiting the construction area, including permanent, contract, or casual labour and informal traders.

Environmental Control Officer (ECO)

An individual nominated by Eskom to act on behalf of a Contractor in matters concerning the day-to-day implementation of the EMPr, and for liaison with: Department of Environmental Affairs; Municipalities; Provincial departments; and other relevant stakeholders such as the public and owners or managers of properties affected by the powerline construction project.

An ECO must be appointed in terms of the NEMA EIA Regulations of 2014, as amended. The ECO will inspect this development on a regular basis during the construction and rehabilitation phases, and will advise the DEA and anyone acting in accordance with the Environmental Authorisation (e.g. Eskom, contractors, amongst others). In addition, anyone acting in accordance with the Environmental Authorisation (e.g. Eskom, contractors, amongst others) would have to comply with the EMPr. Furthermore, anyone acting in accordance with the Environmental Authorisation (e.g. Eskom, contractors, amongst others) would need to sign an acknowledgement form, which will form part of the contractual agreements between individuals acting in accordance with the Environmental Authorisation (e.g. Eskom and the contractors) to ensure compliance with the conditions and requirements of the EMPr.

DEA

The Compliance Officer appointed by the National Department of Environmental Affairs to this project.

Local Community

People residing or present in the region and near the construction activities, including the owners and / or managers of land affected by construction, workers on the land, and people in nearby towns and other settlements.

Public

Any individual or group concerned with or affected by the Project and its consequences, including: the local community; local, regional, and national authorities; investors; workforce; customers; consumers; environmental interest groups; and the general public.

4. RECORD KEEPING

Copies of any Authorisation and EMPr's required for specific construction activities shall be kept on site and made available for inspection by visiting officials from the employer or relevant environmental departments.

The Project Manager will monitor the Contractor's adherence to the approved impact prevention procedures and shall issue the Contractor a notice of non-compliance whenever transgressions are observed. The Contractor must document the nature and magnitude of any non-compliance in a designated register, the action taken to correct the non-compliance, the actions taken to mitigate its effects and the results of those actions. Any non-compliance shall be documented and reported to the Project Manager in a monthly report.

The Contractor shall also record all complaints received regarding activities on the construction site pertaining to the environment, and the response noted with the date and the action taken. These records shall also be submitted to the Project Manager in the monthly report.

All monthly and quarterly reports produced by the ECO should be submitted to both the construction manager and Eskom project manager. These reports should be kept in a file on site at all times.

5. COMPLIANCE AND PENALTIES

The duration, over which the Contractor's controls shall be in place, cover the construction period of the project as well as the limited time after the contract completion in the General Conditions of Contract, and the project specifications, as the defects liability period.

The Applicant / Contractor are deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- Environmental damage occurs due to negligence;

- The contractor fails to comply with corrective or other instructions issued by the Project Manager or Engineer or Environmental Control Officer within a specified time frame; and
- The contractor fails to respond adequately to complaints from the public or local community.

The Contractor shall act immediately after a notice of non-compliance is received, and correct the cause for the issuing of the notice. Application of a penalty clause will apply for incidents of non-compliance. The imposition of such a penalty shall not preclude the relevant provincial authority from applying an additional penalty in accordance with statutory powers.

Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as deemed fit. The polluter-pays principle applies.

The “polluter-pays” principle provides that “the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimizing further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment. NEMA imposes a duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment is authorised by law or cannot reasonably be avoided, NEMA requires that the pollution must be minimised and rectified.

Furthermore, NEMA makes provision for damages to be awarded by the courts where loss or damage has occurred as a result of a contravention of certain environmental statutes. For example, offences under the National Water Act No. 36 of 1998 and the Environmental Conservation Act No. 73 of 1989 may result in penalties being imposed in terms of NEMA. Importantly, NEMA provides for the liability on conviction of employees, managers, agents and directors for any offences resulting from the failure to take all the reasonable steps that were necessary under the circumstances to prevent the commission of an offence.

6. AMENDMENTS TO THE EMPr

Any major issues not covered in the EMPr as submitted, will be addressed as addend to this EMPr, and submitted for approval prior to completion.

The EMPr is a living document and is subject to change from time to time in consultation with the DEA. Any amendments to the EMPr will require approval from DEA. A confirmation letter from the DEA approving the amendments to the EMPr will be attached as addenda.

7. ENFORCING THE EMPr

The Applicant / Contractor have a responsibility to ensure that all those people involved in the project are aware of and familiar with the environmental requirements for the project (this includes sub-contractors, casual labour, amongst others). The EMPr shall be part of the terms of reference for all contractors, sub-contractors and suppliers. All contractors, sub-contractors and suppliers have to give some assurance that they understand the EMPr and that they will undertake to comply with the conditions therein. All senior and supervisory staff members shall familiarise themselves with the full

contents of the EMPr. They shall know and understand the specifications of the EMPr and shall be able to assist other staff members in matters relating to the EMPr. On completion of construction, the EMPr shall be part of the terms of reference for the applicant and shall be made available to all ongoing contractors entering the property.

8. SIGNING OF THE EMPr

The acknowledgement form provided in **Annexure B** is to be signed by the Applicant (Eskom) and all the Contractors. All the Contractor's employees, especially the machine and equipment operators, are to be made aware of the conditions as contained in the EMPr and the contractual conditions relating to the environment, as contained in the contract document.

9. CONCLUSION

It is the view of the Environmental Assessment Practitioner that the preferred alternative corridor for the proposed power line will not have any significant negative geophysical, biophysical or socio-economic environmental impacts provided the recommendations regarding the mitigation and rehabilitation measures presented in this EMPr are adhered to.

Please note: No construction work shall commence until the final EMPr is authorised by the Department of Environmental Affairs.

10. PROCEDURE

10.1 PRE-CONSTRUCTION PHASE

The requirements of the EMPr will be discussed at professional team meetings in order to understand the environmental content of the document. The requirements of the EMPr must be incorporated into any tender / contract documents by way of specific clauses that convey the impact and mitigation required. These clauses are to be agreed between the responsible professional members of the team and the environmental consultant.

10.2 THE CONSTRUCTION PHASE: RESPONSIBILITIES AND GENERAL MATTERS

Miscellaneous environmental matters and the relationships between the Contractors, ECO and the other members of the professional team are outlined in the following sections.

10.2.1 The Contractor

The Contractors must comply at all times with the requirements of the EMPr and must acknowledge in writing by signing the acknowledgement form that they will abide by the contents of EMPr.

10.2.2 The Applicant

Eskom (owning registered servitude of the powerline) must be in overall charge of the contract, the contractor/s and the adjudication of the EMPr requirements. Eskom can delegate the daily controls on site to a project manager or similar responsible person, when necessary.

10.2.3 The Environmental Control Officer (ECO)

Eskom must appoint an independent ECO for the purpose of ensuring that the environmental conditions as outlined in this EMPr are implemented by the Contractor.

Other environmental site-related issues will be monitored and reported on by the ECO as and when they may arise. The ECO is to have access to the site at all times, for the purpose of inspections to ensure that the environmental conditions of the EMPr are being implemented and adhered to.

10.2.4 Reporting Structure

Both the ECO and Contractor are obliged to report any incidents and non-compliance to the Eskom Project Manager at agreed intervals. The Environmental Liaison Officer (ELO) is responsible for advising and reporting to the Contractor during the construction process. Open communication between the ELO and ECO (Figure 3) should be encouraged so as to ensure that incidents identified are reported and rectified timeously.



Figure 2: Communication channel between ECO, ELO, C and Eskom PM

10.3 ENVIRONMENTAL MANAGEMENT DURING PROJECT PHASES

The following tables (Pre-Construction Phase; Construction Phase; and Operational Phase) form the core of this EMPr for the construction and operational phases of the project. These tables should be used as checklists on site, especially during the construction phase. Compliance with this EMPr must be audited daily or weekly depending on construction phase activities. After completion of construction, this must be followed up with annual audits for a period of two years during the operational phase.

Table 2: Table of abbreviations used below

Abbreviation	Meaning
C	Contractor
ELO	Environmental Liaison Officer
E	Engineer
PM	Project Manager
ECO	Environmental Control Officer

11. PRE-CONSTRUCTION PHASE

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Legislation, permits and agreements	Site Owner, Developer, Service Providers, Contractors and Project Managers must remain in compliance with relevant local and national legislation. The supreme law of the land is “The Constitution of the Republic of South Africa” which states: “Every person shall have the right to an environment which is not detrimental to his or her health or well-being”. Laws applicable to protection of the environment in terms of Environmental Management include but are not restricted to those discussed in Chapter 4 in the Environmental Impact Report.	All	Prior to moving onto site, during construction and during operation.
	A copy of the EMPr must be kept on site during the construction period.	ECO, C & PM	At all times.
Access to site	Routing		
	a. The Contractor will have to ascertain the existing condition of the access roads and repair accordingly should damage occur due to construction.	C & PM	Prior to moving onto site and during construction.
	b. Access route must be clearly defined with white stakes / painted rocks and disturbance outside these areas is not permitted.		
	c. Choice of access routes must take into account minimum disturbance to existing developments and farm properties neighbouring the site.		
	d. New access roads and tracks should be located outside of watercourses as far as possible.		
Haulage Roads			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>a. All roads for construction access must be planned and approved by the Engineer and ECO ahead of construction activities. They must not be created on an ad-hoc basis.</p> <p>b. Roads must follow natural contours to reduce storm water runoff.</p> <p>c. Haulage roads must follow existing or proposed roads wherever possible. Routes must be clearly defined with white stake/painted rocks. Disturbance outside these areas is not permitted.</p> <p>d. Roads must have as little cut and fill as possible.</p> <p>e. Road widths and radii of curves are to be reduced to minimum requirements.</p> <p>f. No trees / shrubs / groundcover may be removed or vegetation stripped without prior permission of the Engineer / Project Manager or ECO.</p> <p>The removal of plants will require authorisation (permit) from the provincial conservation authorities. The ECO must confirm that these permits are available prior to construction.</p> <p>g. Turning points will be marked out on the site for easy identification by contract workers. No turning manoeuvres other than at designated places shall be permitted.</p> <p>h. Contractors shall construct formal drainage on all temporary haulage roads in the form of side drains and mitre drains to prevent erosion and point source discharge runoff.</p> <p>i. Haulage roads must allow for the natural flow of water where required. Road surfaces must be permeable to allow infiltration of rainwater. A gravel surface is recommended on all slopes < 10%, grassblock on slopes > 10%. This must</p>	E / PM / C / ECO	Prior to moving onto site and during construction.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY	
	ameliorate edge effects and channelling of water and subsequent scouring along roadsides.			
	j. Any natural veld along the proposed powerline route must be stripped to a soil depth of 150mm, and immediately translocated to a conservation area identified for rehabilitation. Material stripped from roads must be translocated five days post tillage.			
	Survey Points			
	a. Marking of survey points must be done with the Engineer and Project Manager's approval.	E / PM	During surveys and preliminary investigations.	
	b. Vegetation clearing and disturbance must be kept to a minimum during the survey operations, taking into account the high sensitivity areas of the site.	PM / ECO		
c. A protective 200m buffer from any vulnerable and important vegetation should be respected, and include features such as quartz patches and rocky outcrops.	ECO			
Site Establishment (set up living quarters, site office, assembly area and workshops)	Layout & Location			
	a. Choice of site for the Contractor's camp requires the Project Manager's permission and must take into account the location of local residents and ecologically sensitive areas. A site plan must be submitted to the Engineer for approval.	E / C / PM / ECO	During surveys and preliminary investigations and prior to moving onto site.	
	b. Do not locate the construction camp or laydown yards within 1km from any residential area or visually sensitive area, unless it can be completely screened from sensitive viewpoints.			
	c. Construction camps should be located in a dedicated construction camp near a built-up area or in an area that is already disturbed.			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>A number of such areas exist:</p> <ol style="list-style-type: none"> 1. At the Paulputs Substation where the immediate area surrounding the substation is disturbed; 2. Near the KaXu Solar One power plant; 3. In the construction camp that is located in the town of Aggeneys; and 4. The Aggeneis Substation has a fenced area surrounding it, which could theoretically also serve as a laydown yard and construction camp site. 		
	<p>d. If the Contractor chooses to locate the camp site on private land, he must get prior permission from both the Project Manager and the landowner.</p>		
	<p>e. The size of the construction camp must be minimized (especially where natural vegetation or grassland has had to be cleared for its construction).</p>		
	<p>f. The construction camp must be properly fenced and secured. It must be kept in a clean and orderly state at all times. This will deter rodents and other fauna from entering the camp.</p>	E / C / PM	During site establishment and ongoing weekly inspections.
	<p>g. The construction camp must be located on a level area at least 50m from any watercourse / riparian zones. The position of the camp must be ratified by the Engineer and Environmental Control Officer.</p>	E / C / PM / ECO	During site establishment.
	<p>h. The Contractor's camp may not be situated in a flood plain or on slopes greater than 1:3.</p>		
	<p>i. fencing must be erected around the construction camp areas where material is stored to prevent access to sensitive and adjacent environs.</p>		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	The construction camp must be fenced with a 1.8m high bonnox (or similar type) fence.		
	j. The Contractor must attend to the drainage of the campsite to avoid sheet erosion and / or standing water.	E / C / PM / ECO	During site establishment.
	Ablutions		
	a. Where water borne sewage is not available, temporary chemical toilets must be provided by a company approved by the Project Manager. These toilets must be made available to all staff, and must be no closer than 50m from any watercourses. Such facilities, which shall comply with local authority regulations, shall be maintained in a clean and hygienic condition. Their use shall be strictly enforced. They shall be positioned in an appropriate place.	PM / C / ECO	During set-up.
	b. The construction of a “long-drop” is forbidden.	PM / C	Ongoing.
	c. There shall be a minimum of 1 toilet for every 20 workers and these must be situated no further than 100m from the work front.		
	d. Under no circumstances may open areas or the surrounding bush or degraded and built up area be used as a toilet facility.		
Set up of Waste Management	Waste Management		
	a. The contractor is responsible for the internal collection of refuse and for transporting it to a registered landfill site once every week; unless a service agreement is entered into between the contractor and the local municipality.	C / ELO	During site set up.
	b. Bins and / or skips shall be provided at convenient intervals for the disposal of waste within the camp. The bins must be covered to prevent wind-blown rubbish and scavenging by people and animals.	PM / C / ECO	During site set-up and ongoing.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>c. Bins should have liner bags for efficient and safe disposal of waste.</p> <p>d. The excavation and use of rubbish pits is forbidden.</p> <p>e. Burning of waste is forbidden².</p> <p>f. A fenced area must be allocated for waste sorting and storage prior to removal.</p> <p>g. Individual skips for different types of waste (e.g. 'household' type refuse, building rubble, etc.) must be provided.</p> <p>h. At least three rubbish bins must be located at the construction camp for the collection of waste.</p> <p>i. Recycling and the provision of separate waste receptacles for different types of waste should be encouraged. Where possible, plastics, paper, glass and cans should be separated from other domestic waste for recycling. If waste is to be recycled, appropriately labelled waste receptacles must be made available.</p> <p>j. Any potentially hazardous containers must be punctured or disabled prior to disposal.</p>		
<p>Establishing Equipment Lay-Down & Storage Areas</p> <p>Storage areas can be hazardous, unsightly and can cause environmental pollution if not designed and managed carefully. Hazardous substances are those that are</p>	<p>General Substances and Materials</p> <p>a. Choice of location for equipment lay-down and storage areas must take into account prevailing winds, distances to water bodies, general on-site topography and water erosion potential of the soil. These areas must be located within previously disturbed areas as possible for this project. Impervious surfaces must be provided where necessary.</p> <p>b. Fire prevention and fire fighting facilities must be present at all storage facilities.</p>	<p>PM / E / C / ECO</p>	<p>During site set-up.</p>

² A possible exception to this may be that the alien invasive vegetation which is removed from the site should be burned to prevent the spread of the plants and seeds.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY	
<p>potentially poisonous, flammable, carcinogenic, or toxic. Some examples are: diesel, petrol, oil, bitumen, cement, solvent based paints, lubricants, explosives, drilling fluids, pesticides, herbicides, LPG.</p>	<p>c. Storage areas must be secure so as to minimise the risk of crime. They must be safe from access by animals.</p>			
	<p>d. Equipment lay-down and storage areas must be designated, demarcated and fenced.</p>			
	<p>Hazardous Substances and Materials</p>			
	<p>a. It is very important that the proximity of other developments is taken into account when deciding on storage areas for hazardous substances or materials. The areas must be suitably signed, fenced and access controlled.</p>	<p>PM / E / C / ELO / ECO</p>	<p>During site set-up.</p>	
	<p>b. Proper storage facilities for the storage of oils, paints, grease, fuels, bitumen, chemicals and any hazardous materials to be used must be provided to prevent the migration of any spillages into the ground and groundwater regime around the temporary storage areas.</p>		<p>During site set-up and ongoing.</p>	
	<p>c. Fuel tanks must meet relevant specifications and be banded to 110% of their capacity and elevated so that leaks are easily detected.</p>			
	<p>d. Residents living adjacent to the construction site must be notified of the existence of the hazardous storage area.</p>			
<p>e. These storage facilities must be on an impermeable surface that is protected from the ingress of stormwater from surrounding areas to ensure that accidental spillage does not pollute local soil or water resources. The Contractor shall submit a method statement to the Engineer / Project Manager and ECO for approval.</p>				
<p>f. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on</p>	<p>Ongoing.</p>			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>ecological impacts and measures to minimize negative environmental impacts during accidental releases or escapes.</p> <p>g. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training.</p> <p>h. Absorbent materials must be available at the construction site to clean any chemical, fuel or lubricant spills during construction. Empty packaging associated with the storage of hazardous chemicals, paints, solvents, lubricants (such as tins, 210 litre drums) is to be returned to the supplier where possible or alternatively be recycled (e.g. to a drum recycling company). If neither of these options is feasible then the packaging should be disposed of in a suitable landfill.</p>		
<p>Education of site staff on general and environmental conduct</p> <p>These points need to be made clear to all staff on site before the project begins</p>	<p>Education</p> <p>a. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics to be covered must include:</p> <ul style="list-style-type: none"> • What is meant by “environment”; • Why the environment needs to be protected and conserved; • How construction activities can impact the environment; 	C / ELO / ECO	During staff induction and ongoing.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; • Social responsibility during construction e.g. being considerate to local residents. <p>It is the contractor's responsibility with the help of the Environmental Liaison Officer to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.</p>		
	<p>b. Staff that will be operating equipment shall be adequately trained and sensitised to any potential hazards associated with their tasks.</p>	<p>PM / ELO / C / ECO</p>	<p>During staff induction, followed by ongoing monitoring.</p>
	<p>c. Translators are to be used where necessary.</p>		
	<p>d. The Engineer / Project Manager / Environmental Control Officer must be on hand to explain more difficult / technical issues and to answer questions which may be raised.</p>		
	<p>e. Construction workers must be made aware that they are not to make excessive noise e.g. shouting and hooting.</p>		
	<p>f. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered.</p>		
	<p>g. Use should be made of environmental awareness posters on site.</p>		
	<p>h. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Management.</p>		
	<p>i. All employees must undergo the necessary safety training and wear the necessary protective clothing at all times.</p>		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>j. The need for a “clean site” policy also needs to be explained to the construction workers.</p>		
	<p>Worker Conduct on Site</p> <p>a. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following rules:</p> <p>1. The Eskom staff, contractor and construction crew must be educated about the sensitivities involved along the route as well as the potential sensitive species they could encounter.</p> <p>Construction workers may not tamper or remove flora/ plants and neither may anyone collect seed from the plants without permission from the local authority.</p> <p>2. No alcohol / drugs to be present on site; no vehicles or machinery are to be operated whilst under the influence of alcohol or drugs.</p> <p>3. Prevent excessive noise to minimise disturbances to adjacent landowners.</p> <p>4. No firearms allowed on site or in vehicles transporting staff to / from the site (unless used by security personnel).</p> <p>5. No unsocial behaviour will be permitted.</p> <p>6. Bringing pets onto site is forbidden.</p> <p>7. Construction staff are to make use of facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is strictly forbidden)</p> <p>8. No fires to be permitted on site. Encourage the use of gas operated cookers for preparation of food on site</p>	<p>PM / C / ELO</p>	<p>During staff induction, followed by ongoing monitoring.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>9. Trespassing on private / commercial properties adjoining the site is forbidden.</p>		
	<p>10. Only <i>pre-approved</i> security staff and workers shall be permitted to live on the construction site.</p>		
	<p>11. No worker may be forced to do work that is potentially dangerous or for what he / she is not trained to do.</p>		<p>Prior to moving onto the site and ongoing.</p>
	<p>12. The staff conduct rules are described in a separate table of Rules (Annexure A of this EMPr). This is aimed at providing staff with the basic information regarding worker conduct on site.</p>		
<p>Social Impacts</p> <p>It is important to take notice of the needs and wishes of those living or working adjacent to the site. Failure to do so can cause disruption to work and increase cost in the form of delays.</p>	<p>Public Participation</p>	<p>PM / C / ELO</p>	<p>Prior to moving onto the site and ongoing.</p>
	<p>a. All Interested and Affected Parties (I&APs) must be contacted in order to inform them of the starting date of construction and the proposed duration. I&APs must be notified of the construction process and the manner to which it will be implemented via public notices.</p>		
	<p>b. Open liaison channels must be established between the landowner, the developer, operator, the contractors and I&APs such that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s). These people would usually have been identified by the environmental consultant that was assigned to the project (during Scoping and EIA Phase). If this was not the case, the I&APs can be identified as those that live close by the site, work close to the site, will have their services / infrastructure affected by the project, have a general interest in the project, and / or the ward Councillor in which the construction is taking place.</p>	<p>PM / C / ELO</p>	
	<p>c. Should the construction staff be approached by members of the public or other stakeholders, they must assist them in</p>	<p>C / PM / ELO</p>	<p>Ongoing.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY	
	locating the Project Manager / Contractor, or provide them with a number on which they may contact the Project Manager / Contractor.			
	d. The conduct of the construction staff when dealing with the public or other stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Engineer.		Ongoing monitoring.	
	e. Adequate designated parking must be provided for site staff and visitors.	C / PM	Prior to moving onto site.	
	f. A complaints register must be kept on site. I&APs need to be made aware of the existence of the complaints book and the method of communication available to them. Details of complaints must be incorporated into the audits as part of the monitoring process.	C / ECO	Ongoing.	
	Visual impacts on people			
	a. Storage facilities, elevated tanks and other temporary structures on site must be located such that they have as little visual impact on local residents, tourists and motorists as possible.	PM / C / ECO	Ongoing – more frequently during dry and windy conditions.	
	b. Lighting on the construction site must be pointed downwards and away from oncoming traffic and adjacent landowners.	PM / C / ECO	During set up and ongoing.	
c. Special attention must be given to the screening of highly reflective materials on site.	PM / E / C / ECO	During site set up.		
Dust / Air / Light Pollution	a. Vehicles travelling along access roads must adhere to speed limits to avoid creating excessive dust.	PM / C	Throughout the duration of the project.	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Establishment of the camp site, and related temporary works can reduce air quality	b. Camp construction / haulage road construction – areas that have been stripped of vegetation must be dampened periodically to avoid excessive dust.	ECO / C / E	During site set up.
	c. The Contractor must make alternative arrangements (other than fires) for cooking and / or heating requirements. LPG gas cookers may be used provided that all safety regulations are followed.	PM / C	Throughout the duration of the project.
Soil Erosion The stripping of vegetation during preliminary activities on site greatly increases the risk of soil erosion. This also includes erosion in watercourses.	Conservation of Valuable Soil Resources		
	a. Wind screening and stormwater control must be undertaken to prevent soil loss from the site. It is recommended that gabion mattresses are placed at culvert inlets and outlets as erosion control measures.	E / PM / C / ECO	During set up phase and throughout the duration of the project.
	b. Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase, i.e. topsoil is to be conserved while providing access to the site and setting up the camp.		
	c. Topsoil stripped from the construction camp and other construction areas must be stockpiled away from any potential disturbances.		
	d. Stockpiled topsoil must be either vegetated or with indigenous grasses or covered with suitable fabric to prevent erosion and invasion by weeds.		
	e. Efforts should be undertaken during the planning phase and proposed walk down phase to avoid infrastructure overlap between individual towers and watercourses as far as possible. This includes the use of existing access roads.		
All unavoidable overlap between individual towers and watercourses, and new or upgraded watercourse road			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	crossings will require a Water Use License (WUL) in order to be allowable.		
<p>Stormwater</p> <p>Serious financial and environmental impacts can be caused by unmanaged stormwater.</p>	<p>Stormwater Damage Prevention</p>		
	<p>a. To prevent stormwater damage, the increase in stormwater runoff resulting from the construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings.</p>	E / ECO / PM	During surveys and preliminary investigations.
	<p>b. During site establishment, stormwater culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer.</p>	E / PM	During site establishment.
<p>c. Stormwater should be diverted away from the road early and often, so as to reduce the catchment area of the road.</p> <p>The use of drains, such as table drains and cut-off drains, should not be used in any of the watercourse crossings. These types of drains typically have concentrated high-velocity flows and can frequently form channels within the watercourse. These channels provide an easy pathway for sediment to reach streams and adversely impact on water quality.</p> <p>Alternative options for stormwater control should therefore be considered. These include the use of:</p> <ul style="list-style-type: none"> ○ Vegetated swales. ○ Entrenched rock (rip rap) aprons. 	ECO / E / PM	During site set up and during construction phase.	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> ○ Sediment traps, such as hay bales or silt traps. These structures do, however, require maintenance. ○ Vegetated buffer/ filter strips. The use of vegetation in the watercourse, especially downstream of unsealed road surfaces, will help to provide soil stability and reduce sediment input. It is important to use local and indigenous plant species. 		
	<p>d. The stormwater drainage system must not be contaminated by other sources; therefore must be separated from other waste water drainage systems. The stormwater management plan must ensure that flow from the development does not result in negative impacts on downstream properties or watercourses (See point c above).</p>	E/ ECO / PM	During surveys and preliminary investigations.
	<p>e The relevant municipalities must be consulted prior to the commencing of the project if any of the waste water from the project will be disposed at the Municipal Waste Water Treatment Work (WWTW). It must also be ensured that the Municipal WWTW have got adequate capacity to treat additional effluent.</p>	PM	
<p>Water Quality</p> <p>Incorrect disposal of substances and materials and polluted run-off can have serious negative effects on groundwater quality.</p>	<p>Maintenance of Water Quality</p>	E / PM / ECO	During site set up.
	<p>a. Storage areas that contain hazardous substances must be bunded with an approved impermeable liner which can contain 110% of the storage tank capacity.</p> <p>b. Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity.</p>	E / ECO / C / PM	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>c. A designated, bunded area is to be set aside for vehicle washing and maintenance. Materials caught in this bunded area must be disposed of to a suitable waste disposal site or as directed by the Engineer.</p>		
	<p>d. Provision must be made during set up for all polluted runoff to be treated to the Engineer's approval before being discharged into the stormwater system. Any waste which cannot be treated to acceptable standards on site must be treated and disposed by a licensed treatment company.</p>		<p>During site set up, to be monitored weekly.</p>
	<p>e. Facilities for sanitary convenience, fuel storage or any substance which cause or is likely to cause pollution of a water resource should not be placed within the 1:50 year flood-line of any watercourse or estuary.</p>		
<p>Conservation of the Natural Environment</p> <p>Alien plant encroachment is particularly damaging to natural habitats and is often associated with disturbance to the soil during construction activities. Care must be taken to conserve existing plant and animal life on and surrounding the site considering the site's high ecological sensitivity.</p>	<p>Potential increase in invasive vegetation</p> <p>a. All alien seedlings and saplings must be removed as they become evident for the duration of construction.</p> <p>However, no vegetation may be cleared without prior permission from the Environmental Control Officer / Project Manager</p> <p>b. All construction vehicles and equipment, as well as construction material should be free of plant material. Therefore, all equipment and vehicles should be thoroughly cleaned prior to access on to the construction areas. This should be verified by the ECO.</p> <p>c. Monitoring of the site is required to identify any alien species that may establish within the servitude and adjacent areas. These alien species should be eradicated according to CARA. The stumps of the alien plants should be treated with herbicides registered as agro-chemicals. The use of</p>	<p>PM / ECO</p> <p>ECO / C / ELO</p>	<p>During site set up, and ongoing.</p> <p>During site set.</p> <p>Ongoing monitoring.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	herbicides shall be in compliance with the terms of The Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act 36 of 1947). Please note: The Vegetation specialist recommends that manual / mechanical removal should be preferred to chemical control.		
Cultural Environment	Protection of Cultural Environment / Heritage Sites		
	a. Prior to the commencement of construction, all staff needs to know what possible archaeological or historical objective of value may look like, and to notify the Contractor should such an item be uncovered.	ECO / C	During site set up and ongoing.
	b. It is recommended that the final tower positions in key locales should be inspected by a Heritage Specialist prior to construction phase.	PM / C	During site set oncer final tower positions are in place.
Safety and Security	Fencing / Demarcation		
	a. Potentially hazardous areas such as trenches / storage areas are to be demarcated and clearly marked.	PM / C / ECO	During site set and ongoing.
	Lighting		
	a. Lighting on the construction campsite is to be set out to provide maximum security and to enable policing of the site, without creating a visual nuisance to local residents.	PM / C / ECO	During site set and ongoing.
	Risks Associated with Materials on Site		
a. Material stockpiles or stacks, such as cables and other transmission line equipment must be stable and well secured to avoid possible injury to site workers / local residents.	PM / C / ECO	During site set and ongoing.	
b. Flammable materials must be stored as far as possible from adjacent residents / developments.			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>c. Fire fighting equipment must be present on site at all times as per OHSA.</p> <p>d. Obstruction to drivers' line of sight due to stockpiles and stacked materials must be avoided, especially at intersections and sharp corners.</p> <p>e. No materials are to be stored in unstable or high-risk areas such as in watercourses or on steep slopes.</p> <p>f. All I&APs must be notified in advance of any known potential risks associated with the construction site and the activities on it.</p> <p>Examples of these are stringing of power lines, blasting, earthworks / earthmoving machinery on steep slopes above infrastructure and risk to residences along haulage roads / access routes.</p>		

12. CONSTRUCTION PHASE

This pertains to all environmental impacts associated with construction and is not limited to the land on which the Project is to be located. It includes the tower footprints, construction campsites, access roads and tracks, as well as any other area affected or disturbed by construction activities. The EMPr (particularly the specifications for rehabilitation) is relevant for all areas disturbed during construction. Furthermore, the EMPr must take into account all secondary impacts on the local community and the public. *(It is recommended that any disturbances, which may take place, commence only after the first spring flush so that any indigenous vegetation can be relocated for rehabilitation.)*

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Access to the site	Maintenance of the access		
	a. The access to the site will need to be upgraded to an acceptable standard during construction (i.e. such that large amounts of dust are not generated and there is no unwarranted damage caused to construction vehicles).	PM / E	Initial set up and ongoing.
	b. Contractors shall ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damages as soon as these develop.	E / C / ECO	Establish at setup.
	c. There needs to be adequate drainage of water underneath the access roads (both during construction & in operation). This can be done through a culvert / water diversion system.	PM / E / ECO	When necessary.
	d. During construction, any dirt access roads could potentially be surfaced with a compacted gravel layer (shale) to allow for the increase in vehicular traffic on these roads. A chemical stabilizer could be added to assist with the surface binding and reduce the dust produced by vehicular traffic on the road.	PM / C	When necessary.
e. Unnecessary compaction of soil by heavy vehicles must be avoided. Construction vehicles must be restricted to demarcated access, haulage routes and turning areas.	PM / C / ELO / ECO	Ongoing, and specifically after heavy rains	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>f. Machine / vehicle operators must receive clear instructions to remain within demarcated access routes. Movement of heavy-duty vehicles and vehicles not connected with work in progress must be restricted to the construction zone in order to control related impacts such as damage in the construction zone, compaction of soil, damage to vegetation and noise pollution.</p>	ECO / C / ELO / PM	Ongoing, and specifically after heavy rains
	<p>g. Person and vehicle access must be restricted during construction so as to control access to otherwise potential dangerous excavations and materials.</p>	ECO / PM / C / ELO	Ongoing, and specifically after heavy rains.
	<p>Prohibit vehicular or pedestrian access into natural areas beyond the demarcated boundary of the construction area.</p>		
	Haulage Roads		
	<p>a. Contractors shall ensure that all side and mitre drains as well as V Drains and scour check walls on access and haul roads are functioning properly and are well maintained.</p>	C / PM / E / ECO	Ongoing, and specifically after heavy rains.
Maintenance of Construction Camp	Surfaces		
	<p>a. The Contractor must monitor and manage drainage of the camp site.</p>	PM / C / ECO	Weekly inspection.
	<p>b. Runoff from the camp site must not discharge into adjacent landowners' properties.</p>		
<p>c. Runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil (Esler <i>et al</i>, 2006 in Eyssell, 2016, Vegetation Report for this project). Pitter basins work well on fine textured soil and must be orientated and shaped to face upslope. The basins trap seeds, organic matter and water which could lead to rapid colonisation after rains (Esler, <i>et</i></p>			

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<i>a</i> , 2006 in Eyssell, 2016, Vegetation Report for this project). Locally collected seeds of <i>Stipagrostis</i> grass and <i>Salsola</i> species could be used to hasten establishment.		
	Ablutions / Sewage		
	a. Chemical toilets are to be maintained in a clean state on a regular basis and must be moved to ensure that they adequately service the work areas.	PM / ECO / ELO	Ongoing.
	b. The Contractor is to ensure that open areas or the surrounding bush are not being used as a toilet facility.	ELO / C / ECO	Weekly.
	Camp Waste Disposal		
	a. The Contractor shall ensure that all litter is collected from the work and camp areas daily. The construction area must be cleared of litter, debris (e.g. Cement packets, bitumen residues, amongst others) and other domestic waste on completion of the day's work.	PM / C / ELO / ECO	Ongoing.
	b. Bins and / or skips must be emptied regularly and waste must be disposed of at a registered landfill site. Waybills for all such disposal are to be kept by the Contractor for review by the ECO.	C / ECO	Daily.
	c. A registered chemical waste company is to be used to remove waste from chemical toilets on site.	C / ELO / ECO	Weekly / As needed.
	Eating Areas		
	a. Eating areas must be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.	ELO / ECO / C	Weekly monitoring.
	b. All litter throughout the site must be picked up on a daily basis and placed in the bins provided.		Daily / Ongoing monitoring.
	Housekeeping		
	a. The Contractor shall ensure that his camp and working areas are kept clean and tidy at all times.	C / ELO	Ongoing.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Staff Conduct	Environmental Education and Awareness		
	<p>a. The Contractor must monitor the performance of the construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear.</p>	C / ECO	Ongoing.
	Worker Conduct on Site		
	<p>a. A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the rules outlined under the “Per-construction Phase” on page 25 above.</p>	PM / C / ELO / ECO	Ongoing.
Dust / Air Pollution Main causes of air pollution are dust particles from vehicle movements and stockpiles, vehicle emissions and fires	Dust & Air Pollution		
	<p>a. Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. A speed limit of 30 km/h must be adhered to on the construction site.</p>	ECO / C / PM	As directed by Engineer / Project Manager
	<p>b. Limiting construction operational hours from 07h00 and 17h00 will reduce congestion and disturbance in surrounding areas and minimize road deterioration and consequent dust creation.</p>	ECO / C / PM	As directed by Engineer / Project Manager.
	<p>c. Access points and other cleared surfaces must be dampened whenever necessary and especially in dry and windy conditions to avoid excessive dust.</p>	PM / C / ELO	Ongoing.
	<p>d. Vehicles and machinery are to be kept in good working order and to meet the manufacturer’s specifications for safety, fuel consumption etc. Should excessive emissions be observed, the Contractor is to have the equipment seen to as soon as possible.</p>	PM / C / ECO	Ongoing.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	e. Stockpiles may cause dust and so must be managed in accordance with the guidelines in Materials Management.	PM / C / ELO	Ongoing.
	f. If dust is unavoidable, screening will be required utilising wooden supports and shade cloth.	PM / C	Ongoing.
	h. Dust must be suppressed on access roads and construction sites during dry periods by the regular application of water or a biodegradable soil stabilising agent. Eskom will need to arrange with the close by municipalities for water supply, which will need to be delivered to the construction sites in containers.	PM / C	Ongoing.
Soil Erosion	Topsoil Stripping and Stockpiling		
	a. Excavated soil must be deposited in a landfill site. Soil disturbance will be minimized by establishing the extent of the construction site (pre-construction phase) and clearly demarcating this on the site layout plans. No construction personnel or vehicles may leave the demarcated areas except when authorised to do so by the Project Manager.	PM / C / ECO	As each section of the activity is completed.
	b. Where topsoils need to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation. Never mix topsoils with subsoils or other spoil materials.		
	c. Erosion prevention measures must be implemented: Berms, sand bags and hessian sheets may be used to contain all sediment whilst energy dissipaters must be constructed at all outflow points.	E / PM / C / ECO	Ongoing.
	Exposed Surfaces		
a. As an avoidance mitigation measure: leave as much natural vegetation as intact as possible during construction.	ECO	Ongoing.	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>b. Side tipping of soil and excavated materials shall not be permitted – all spoil material shall be exposed of as directed by the Engineer.</p>	E / C / PM	As directed by the Engineer / Project Manager
	<p>c. Stormwater control and wind screening must be undertaken to prevent soil loss from the site.</p>	E / ECO / PM / C	
	<p>d. There must be no offsite impacts of stormwater. A general rule is that the stormwater velocity eddies on the site must be the same as the predevelopment area.</p>	E / ECO / PM / C	
	<p>e. In areas where steep slopes are excavated, erosion control measures need to be initiated and these may include seeding, brush packing and stone packing.</p>		
	<p>f. Appropriate cambers and v-drains must be constructed on the access roads in order to dissipate surface water runoff and sheet erosion.</p>	E / ECO / PM	
	<p>g. The Storm Water Management Plan must be developed, provided and implemented by the Engineer. Drainage must be controlled to ensure that runoff from the access road will not lead to erosion and offsite pollution of any water resources along the road. The stormwater drainage system must not be contaminated by other waste sources generated during construction phases of the development.</p>	PM / E / C / ECO	Ongoing and as directed by the Engineer / Project Manager
	<p>h. The temporary toilet facilities must not be allowed to enter the storm water drainage system. Waste from these facilities must be collected by the service provider and disposed of at a permitted waste disposal site. These facilities must be regularly serviced and would be managed according to the service plan developed by the Engineer.</p>		
	<p>i. All embankments, unless otherwise directed by the Engineer, shall be protected by a cut off drain to prevent</p>	E / C / ECO	Directed by the Engineer / Project Manager

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	water from cascading down the face of the embankment and causing erosion.		
<p>Stormwater</p> <p>Construction activities frequently result in diversion of natural water flow resulting in concentration of flow and an increase in the erosive potential of the water.</p>	<p>General Principles</p>		
	<p>a. The Contractor shall not in any way modify nor damage the banks or beds of streams, rivers, wetlands, other open water bodies and drainage lines adjacent to or within the designated area, unless required as part of the construction project specification. Where such disturbance is unavoidable, modification of water bodies must be kept to a minimum in terms of: removal of riparian vegetation; and opening of the stream channel (A Water Use License must be obtained).</p>	E/ PM / ECO	As surface becomes exposed.
	<p>b. Earth, stone and rubble is to be properly disposed of so as not to obstruct natural pathways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.</p>	E / PM / ECO / C	Regular monitoring Ongoing.
	<p>c. Stormwater outfalls must be designed to reduce flow velocity and avoid stream bank and soil erosion.</p>	E / PM	
	<p>d. The Contractor is to ensure that impediments to natural water flow is avoided during construction, or is temporarily diverted.</p>	E / PM / ECO / C	
	<p>e. There must be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.</p>		
	<p>Un-channelled Flow</p>		
	<p>a. During construction un-channelled flow must be controlled to avoid soil erosion.</p>	PM / C / E / ECO	Ongoing monitoring.
	<p>b. Where surface runoff is concentrated (e.g. along exposed tracks), flow must be slowed by contouring.</p>	E / ECO / PM	
	<p>c. Rock Bolsters are to be placed across the invert of drains susceptible to erosion for every 2m vertical drop.</p>	PM / C / E / ECO	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>Channelled Watercourses</p> <p>Permanent crossing structures across channelled watercourses can include unvented fords that are constructed of riprap, gabions, or concrete to provide a stream crossing without the use of pipes. Water will periodically flow over the crossing structure.</p> <p>Unvented fords are best suited for ephemeral or intermittent streams (streams that are dry most of the year). Unvented fords may also be used across some shallow, low velocity perennial streams.</p> <p>Other important best management practices associated with ford design, construction, operation and maintenance that should be adhered to as far as possible, include (Anon 2006 in Grobler, 2016 in the Wetland Report of this project):</p> <ul style="list-style-type: none"> ○ Where possible locate crossings on straight channel segments (avoid meanders). ○ To the extent possible align crossings perpendicular to the stream channel. ○ Minimize the extent and duration of the hydrological disruption. ○ Use appropriate energy dissipaters and erosion control at the outlet drop. ○ Minimize impact to riparian vegetation during construction. ○ Prevent excavated material from running into water bodies and other sensitive areas. ○ Use appropriate sediment barriers (silt fence and hay bales). ○ Dewater prior to excavation. 	E / C / PM	Directed by the Engineer / Project Manager.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> ○ Check construction surveys to ensure slopes and elevations meet design specifications. ○ Use appropriately graded material (according to design specifications) that has been properly mixed before placement inside the structure. ○ Compact bed material. ○ Tie constructed banks into upstream and downstream banks. ○ Evaluate structure stability. 		
Water Management	Water Quality	PM / E / C / ECO	Ongoing monitoring / as the work progresses.
	a. Every effort must be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.		
	b. Drip trays should be used when working with generators within watercourses or within a 50 m buffer around them.		
	c. Care must be taken to ensure that runoff from vehicle or plant washing does not enter surface or ground water. Vehicles and machinery may only be cleaned at a designated place at the construction camp.		
	d. No refuelling of construction vehicles should occur within 50 m of demarcated watercourses.		
	e. Hydrocarbons should not be stored within 50 m of watercourses.		
	f. Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface.		
	g. Contaminated wastewater must be managed by the site manager to ensure existing water resources on the site are not contaminated. All wastewater from general activities in	PM / C / ECO	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.		
	Water Supply		
	a. During heavy rainfall, when there is existence of water in adjoining riparian zones, the use of water for water provision is strictly prohibited.	PM / ECO / ELO	Ongoing.
	b. Ensure that the existing potable water source is maintained for domestic use during construction. Eskom will need to arrange with Khai Ma municipality for water supply, which will need to be delivered to the construction sites in containers.	ECO / ELO / PM	
Conservation of the Natural Environment	Biodiversity		
	a. The Contractor is to check that vegetation clearing has the prior permission of the PM / ECO. Vegetation that is removed is to be replanted and excavation is to be kept to a minimum. Please note: The removal of plants will require authorisation (permit) from the provincial conservation authorities.	ECO / C / PM	Ongoing monitoring / as the work progresses.
	b. Ideally, an on-site ecologist should be present when excavation takes place to ensure that any uncovered species are protected from destruction. Note that threatened, endemic and some protected species are cryptic and could be dormant until favourable climatic conditions arise.		
	c. Limit clearing of indigenous vegetation to tower footprint positions as far as possible.		
	d. Implement a Plant Rescue and Rehabilitation Plan: Where the plants of conservation concern are deemed to be		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>under threat from the construction activity and the impact cannot be avoided, the plants should be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation after the construction (Note, these plants may only be removed with the permission of the provincial authority). These plants could also be relocated to other suitable and conserved habitats.</p>		
	<p>e. A diversity of plant species, resembling the composition prior to disturbance should be attained during rehabilitation. Even in the event of good rains, annual pioneer plants are short-lived and therefore an effort must be made to keep as many shrubs in place as possible or to replace these as part of rehabilitation.</p> <p>Rehabilitation should take place continuously, as a section of line is completed.</p>		
	<p>f. The final route alignment should be flexible within the 2km corridor to avoid sensitive habitats such as quartz patches with a high diversity and threatened, endemic or protected species.</p>	ECO / PM	Ongoing monitoring along the route alignment.
	<p>g. A protective 200m buffer from any vulnerable and important vegetation should be respected, and include features such as quartz patches and rocky outcrops</p>		Ongoing along the route alignment.
	<p>h. Construct towers on disturbed areas as far as possible to limit disturbance that may occur to fauna.</p>		Ongoing monitoring / as the work progresses
	<p>i. To minimise collision of birds: the new powerline must be installed with the very latest and most effective Eskom approved line marking devices available at the time of construction. These should be fitted on the earth wires, with</p>		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>100% of each span marked (not the middle 60% of each span previously stipulated in Eskom Transmission guidelines). This installation should include the following at least:</p> <ul style="list-style-type: none"> ○ markers must alternate between a light and dark colour to provide contrast against a dark and light background respectively; ○ These markers must be no more than 20m apart on each earth wire; and ○ The markers must be placed along the full length of the earth wire (not only the middle two-thirds as done previously). <p>j. To minimise destruction of bird habitats:</p> <ul style="list-style-type: none"> • No towers should be placed within 100m of red dunes and water sources (drinking troughs, wind mills, reservoirs). • The red dunes have been digitised as far as possible off Google Earth (See Annexure C). • No vehicle or human traffic should be allowed through these areas either. • Towers should be spaced to avoid these areas and accessed during construction from either side, not continuously along the servitude. <p>k. To avoid / minimise disturbance of birds:</p> <p>The avifaunal walk through must include an assessment of any nests in the area, particularly on the other powerlines existing in the area.</p>		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>No construction activities for the new line should take place within 1km of the Martial Eagle nest (coordinates of the tower where the Martial Eagle was seen nesting at the time in 2016, are: 28 54' 32.30"S 19 32' 53.21"E) on the existing 220kV powerline during breeding season.</p> <p>The exact timing of breeding season will need to be confirmed just prior to construction, but is likely to be approximately March to September.</p> <p>I. Alien vegetation encroachment onto the site as a result of construction activities must be controlled during construction. (See the section on "Potential increase in invasive vegetation" under "Pre-Construction Phase", page 31 above)</p> <p>Immediate re-vegetation of stripped areas and removal of aliens by weeding must take place.</p>		
	<p>Geology</p> <p>a. In the event of excavation, the material that is removed must be separated into topsoil and subsoil. The top 150mm would be considered topsoil and must be stockpiled separately.</p> <p>b. Where topsoils need to be removed, store such in a separate area where such soils can be protected until they can be re-used for post-construction rehabilitation. Never mix topsoils with subsoils or other spoil materials.</p> <p>c. In the event of infilling, replacement of subsoil must precede the topsoil replacement, and all material must be well compacted.</p>	PM / C / ECO	Ongoing monitoring

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
<p>Powerline Visual Impacts</p>	<p>a. The powerline should avoid crossing over or through ridges, rivers, wetlands or any natural features that have visual value. This also includes centres of floral endemism and areas where vegetation is not resilient and takes extended periods to recover.</p>	<p>PM / C / E</p>	<p>Ongoing as construction progresses.</p>
	<p>b. The tower types used for the powerline should be the most permeable and create an extremely low degree of visual obstruction.</p>		
	<p>c. Avoid changing the alignment's direction too often in order to minimise the use of the self-supporting strain tower. This tower type is the most visually intrusive as the steel lattice structure is more dense than other tower types, hence creating more visual obstruction.</p>		
<p>Materials Management</p>	<p>Stockpile Management</p>		
	<p>a. Stockpiles must not be situated such that they obstruct natural water pathways.</p>	<p>PM / C / ECO</p>	<p>Ongoing monitoring.</p>
	<p>b. Stockpiles must not exceed 2m in height unless otherwise permitted by the Engineer / Project Manager or be left for longer than 3 months.</p>	<p>PM / C / ECO / E</p>	
	<p>c. If stockpiles are exposed to windy conditions or heavy rains, they must be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</p>		
	<p>d. Stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding.</p>		
	<p>Handling of Hazardous Materials</p>		
<p>a. Cement, bitumen and other potential environmental pollutants must be mixed on an impermeable surface with special provisions for stormwater management.</p>	<p>E / PM / C / ECO</p>	<p>Ongoing.</p>	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>b. All empty containers must be removed from the site for appropriate disposal at a licensed commercial facility.</p> <p>c. No vehicles transporting concrete or bitumen to the site may be washed on site.</p> <p>d. Lime and other powders must not be mixed during excessively windy conditions.</p> <p>e. All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.</p> <p>f. Hazardous substances / materials are to be transported in sealed containers or bags.</p> <p>g. Spraying of herbicides / pesticides must not take place under windy conditions and must comply with OHSAs specs and other chemical handling laws.</p> <p>h. The Contractor is to outline a method statement for the dealing of accidents / spillages of hazardous materials.</p>		
<p>Waste Management</p> <p>Definition; "Refuse" refers to all construction waste (such as rubble, cement, bags, timber, cans, amongst others.)</p>	<p>On-Site Waste Management</p> <p>a. The Contractor shall ensure that all refuse is collected from the camp and work areas daily.</p> <p>b. All material used for construction and maintenance must be removed from the site after construction or maintenance work.</p> <p>c. Refuse must be placed in the designated skips / bins which must be regularly emptied. These must remain within demarcated areas and must be covered to prevent wind-blown rubbish.</p> <p>d. In addition to the waste facilities within the construction camp, provision must be made for waste receptacles to be placed at intervals along the work front.</p>	<p>PM / ECO / ELO / C</p>	<p>Monitored weekly.</p> <p>Ongoing.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	e. Littering on site is forbidden and the site shall be cleared of litter at the end of each working day.		
	f. Recycling is to be encouraged by providing separate receptacles for different types of waste and making sure that staff are aware of their uses.		
	Waste Disposal		
	<i>Non – hazardous waste</i>		
	a. All waste must be removed from the site and transported to a registered landfill site.	ELO / PM / ECO	At least 24hours prior to the activity taking place.
	b. Waybills proving disposal at each site shall be provided by the Project Manager.	PM / C / ECO	Ongoing.
	c. Any construction rubble shall be disposed of at registered disposal sites.	PM / C / ECO	
	d. Waste from chemical toilets must be disposed of regularly and in a responsible manner by a registered waste contractor. Care must be taken to avoid contamination of soils and water, pollution and nuisance to adjoining areas.	PM / ECO / C	
	<i>Hazardous Waste</i>		
	a. Contaminated water associated with construction activities must be contained in separate bermed areas and must not be allowed to enter into the natural drainage system.	PM / C / ECO	Ongoing.
	b. Chemical waste must be stored in appropriate containers and disposed of at licensed disposal facilities.	PM / C	
	c. Soil that is contaminated with, e.g. cement, bitumen, petrochemicals or paint must be disposed of at a registered hazardous landfill site.	PM / ECO / C	Ongoing.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>d. A sump must be created for concrete waste. This is to be de-sludged regularly and the cement waste is to be removed to a tip site as approved by the local authority.</p>	E / PM / ECO	At least 24 hours prior to the activity taking place.
<p>Social Impacts</p> <p>Regular communication between the Contractor and the I&APs is important for the duration of the contract.</p>	<p>Disruption of Infrastructure and Services</p>		
	<p>a. Contractors activities and movement of staff is to be restricted to designated construction areas.</p>	PM / C	Ongoing.
	<p>b. Should the construction staff be approached by members of the public or other stakeholders, they must assist them in locating the Engineer / Project Manager or Contractor, or provide a number on which they may contact the Project Manager or Contractor.</p>	E / PM / C / ELO	Monthly
	<p>c. The conduct of the construction staff when dealing with the public or stakeholders shall be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Project Manager.</p>	E / PM / C	
	<p>d. Disruption of access for local residents must be minimised and must have the consent of the Engineer / Project Manager.</p>	E / PM / ECO	
	<p>e. The Contractor is to inform adjacent landowners in writing of disruptive activities at least 24 hrs beforehand. This can take place by way of leaflets placed in the post boxes giving the Project Manager and Contractor's details or other method approved by the Project Manager.</p>	PM / C / ECO / ELO	
	<p>f. Construction vehicle drivers must exercise care when travelling to and from the site specifically when travelling through villages – a maximum speed limit of 30 - 40km/h must be adhered to. The drivers must be considerate of other road users. They are to be especially careful at narrow</p>	PM / C	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	sections and water crossings or where livestock is being herded.		
	Visual Impacts		
	a. Lighting on the construction site must be pointed downwards and away from oncoming traffic and nearby houses.	E / PM / ECO	Ongoing / as required.
	b. The site must be kept clean to minimise the visual impact of the site.	PM / C / ECO	As required.
	c. If screening is being used, this must be moved and re-erected as the work front progresses.		
	d. Enhance screening of the construction camps by erecting a temporary fence with a 3m high shade cloth to limit the intrusive nature of such a site.		
	Noise		
	a. Machinery and vehicles are to be kept in good working order for the duration of the project to minimise noise nuisance to neighbours.	PM / C / ECO	Ongoing.
	b. Notice of particularly noisy activities must be given to residents adjacent to the construction site. Examples of these include: noise generated by jackhammers; blasting; and drilling.		
	c. Noisy activities must be restricted to the times given in the Project Specification or General Conditions of Contract.	PM / C	
	Communication with I&APs		
	a. The Engineer and Contractor are responsible for ongoing communication with those people that are interested / affected by the project.	PM / C / ECO / ELO	Ongoing
	b. A complaints register must be housed at the site office. This must be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>Contractor. This register is to be tabled during monthly site meetings.</p> <p>c. I&APs need to be made aware of the existence of the complaints book and the methods of communication available to them.</p> <p>d. Queries and complaints are to be handled by:</p> <ul style="list-style-type: none"> • documenting details of such communications; • submitting these for inclusion in the complaints register; • bringing issues to the Project Manager's attention immediately; and • taking remedial action as per Project Manager's instruction. <p>e. Selected staff is to be made available for formal consultation with I&APs to explain the construction process and answer questions.</p>		
Cultural Environment	Protection of Cultural Environment / Heritage sites		
	<p>a. Should any archaeological sites or items of historical significance including old stone foundations, tools, clay ware, jewellery, remains, fossils, graves etc. be uncovered during construction, their existence must be reported to the ECO. The ECO must notify SAHRA for comment.</p>	ECO / PM / C	Ongoing
	<p>b. If any artefacts or graves are uncovered during construction, all work on site is to cease and the ECO must notify SAHRA for comment. Construction may only commence once approval by SAHRA is granted.</p>		
Safety and Security	Signage		
	<p>a. Any potentially hazardous areas such as excavated trenches/pits or chemical storage areas are to be demarcated and clearly signed in English and Afrikaans.</p>	C / PM	During site setup and as

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	Sidewall protection (e.g. shoring) to be erected for deep trenches as per the requirements of the Occupational Health and Safety Act of South Africa (OHSA).		construction progresses.
Risks Associated with Materials on Site			
	a. Fire fighting equipment must be present on site at all times.	C / ECO / PM	Ongoing
	b. No materials are to be stored in unstable or high-risk areas such as in floodplains or on steep slopes.		Ongoing with monitoring
General Safety			
	a. The construction camp is to be securely fenced and locked when not in use. No unauthorised access is to be allowed to members of the public and people not associated with the construction process.	C / PM	Ongoing
	b. Construction personnel is to be issued with suitable PPE (e.g. safety shoes, hard hats) free of charge and PPE for construction areas are to be defined prior to the activity commencing.		Before any construction or earthmoving activities occur and ongoing.
	c. All procedures and equipment on site must be used in accordance with the occupational Health and Safety Act regulations of South Africa (OHSA), Act No. 85 of 1993).		Ongoing

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • Manual / mechanical removal is preferred to chemical control. • Where possible, destroy seeding material of weeds and invasives by piling and burning (in designated areas or suitable containers). • Rehabilitate disturbed areas as soon as possible, preventing infestation by invasive species. • Only indigenous plant species naturally occurring in the area should be used during the rehabilitation of the areas affected by the construction activities. • Do not import soil from areas with alien plants. <p><i>Maintenance:</i></p> <ul style="list-style-type: none"> • Monitor all sites disturbed by construction activities for colonisation by exotics or invasive plants and control these as they emerge. 		

14. PLANT RESCUE AND PROTECTION PLAN

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
<p>PLANT RESCUE AND PROTECTION PLAN</p>	<p><i>Prior to construction:</i></p> <ul style="list-style-type: none"> • It is imperative that a walk down of the final route should be undertaken within the growing period of plant species in the area and after good rains, prior to commencement of construction. • The walk down should focus on identifying localised sensitivities and protected plant species that must be avoided (in situ conservation is preferred) or relocated. The walk down should also identify sensitive habitats such as quartz patches with a high diversity and threatened, endemic or protected species that should be circumvented. • Record the following as a minimum: <ul style="list-style-type: none"> ▪ Protected and red data species that will be affected by the development, indicating the red-data and protection status of each species observed (what red-data classification, which legislation); ▪ Location of protected plant species within the footprint area – either individually mapped or approximate areas of occurrence, especially dense patches (alternatively, for linear structures, between which structures or other markers); ▪ Identification of the affected species by providing a representative photo record that enables EO/ECOs and contractors to identify such plants; 	<p>Eskom and appointed botanist</p>	<p>Prior to construction and final placement of pylon positions</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> ▪ How many specimens per species may be affected –estimate based on random transect surveys; ▪ Which species can be successfully relocated, which and how many will have to be destroyed; and ▪ Map quartz patches that must be avoided and indicate pylon numbers that must be moved. <ul style="list-style-type: none"> • The final route alignment should thus be flexible within the corridor to avoid sensitivities as identified during the walk-down. • A protective 200m buffer from any vulnerable and important vegetation should be respected, and include features such as quartz patches and rocky outcrops. • Ideally, an on-site ecologist should be present when excavation takes place to ensure that any species not identified during the EIA phase, or the final walk down are protected from destruction. Note that the species could be dormant for some time until favourable conditions arise. • Implement a Plant Rescue and Rehabilitation Plan, based on the findings of the walk-down. Where the plants of conservation concern are deemed to be under threat from the construction activity and the impact cannot be avoided, the plants should be removed by a suitably qualified specialist and replanted as part of vegetation rehabilitation after the construction (Note, these plants may only be 	<p>Eskom / appointed contractor</p> <p>Eskom contractor and ECO</p> <p>Ecologist / botanist</p>	<p>Construction</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<p>removed with the permission of the provincial authority). These plants could also be relocated to other suitable and conserved habitats.</p> <ul style="list-style-type: none"> • Obtain permits for protected plant removal and relocation prior to commencement of any activity related to this development <p>Construction:</p> <ul style="list-style-type: none"> • Limit clearing of indigenous vegetation to pylon positions only. • Aim to minimise the destruction of indigenous large trees. • Ideally, an on-site ecologist should be present when excavation takes place to ensure that any uncovered species are protected from destruction. Note that threatened, endemic and some protected species are cryptic and could be dormant until favourable climatic conditions arise. 		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • Grass species, along with forb species, can be removed as sods and stored for use in rehabilitation. Sods or runners can be stored within transformed vegetation – remove alien invasive vegetation from the sods, prior to removal of sods. • Plants (bulbs, shrubs and trees-if present in the footprint or areas to be impacted) can removed and bagged (using soil from where the plants were removed) until such time that it can be replanted as part of rehabilitation. Or the plants can be transplanted to non-impacted, transformed areas near the site, for later use. • Smaller shrubs, trees and bulbs could also be removed and used for rehabilitation. The plants must preferably be removed during the winter months and be replanted by latest springtime. Aloes and bulbous plants may be transplanted at any time of the year, although the winter months are preferred. • Note the following: Plants for rehabilitation should only be removed from areas that are going to be cleared for construction. Perennial grasses, shrubs, succulents and geophytes are all potentially suitable to remove and transplant as part of rehabilitation preferably, re-plant these plants from the areas that they were removed from rescued plant material must remain on site and not transported to off-site areas. <p>Post construction:</p>	<p>Eskom contractor and ECO</p>	<p>During and immediately after completion of construction</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • Prior to re-vegetation the soil should be stabilised and optimised for establishment of vegetation. This phase should be undertaken as soon as possible after construction and within a short timeframe to prevent soil being exposed to erosion and infestation by alien invasive plant species. • A diversity of plant species, resembling the composition prior to disturbance should be attained during rehabilitation. Timeous rehabilitation is imperative. Even in the event of good rains, annual pioneer plants are short-lived and therefore an effort must be made to keep as many shrubs in place as possible or to replace these as part of rehabilitation. As a start, runoff water needs to be trapped by either the mechanical breaking of the soil surface to trap water, packing of stones, tyres or brush along contours to trap mulch, slow down water movement and reduce the impact on bare soil (Esler, et al, 2006). Pitter basins work well on fine textured soil and must be orientated and shaped to face upslope. The basins trap seeds, organic matter and water which could lead to rapid colonisation after rains (Esler, et al, 2006). Locally collected seeds of <i>Stipagrostis</i> grass and <i>Salsola</i> species could be used to hasten establishment. • Geophytic plants shall be planted in groups or as features in selected areas • During transplanting care shall be taken to limit or prevent damage to roots 		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> Plants should be watered immediately after transplanting to help bind soil particles to the roots (or soil-ball around rooted plants) and so facilitate the new growth and functioning of roots 		

16. AVIFAUNA MANAGEMENT PLAN

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
AVIFAUNA MONITORING AND MANAGEMENT PLAN	Identification of high collision risk sections of line through avifaunal walk through.	Eskom/Avifaunal specialist	During site specific EMP
	Installation of suitable anti bird collision line marking devices.	Eskom/ECO	During construction, asap after earth wire stringing
	Identification of high sensitivity habitat along line through avifaunal walk through.	Eskom/Avifaunal specialist	During site specific EMP
	Monitoring of adherence to above.	ECO	During construction
	Identification of exact Martial Eagle breeding status and season prior to construction.	Eskom/ Avifaunal specialist	During site specific EMP
	Monitoring of no construction within 1km of Martial Eagle nest during breeding season.	ECO	During construction
	Annual patrol of full line for monitoring of effectiveness and durability of line marking mitigation for bird collision.	Eskom	Operational phase of power line

17. STORMWATER MANAGEMENT PLAN

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
<p>STORMWATER MANAGEMENT PLAN</p>	<ul style="list-style-type: none"> • Management of roadside drainage is the most effective way of controlling sediment runoff from unsealed roads that are expected to be constructed. To minimise sediment load, an unsealed road network should have an emphasis on slowing drainage flows and dispersing them more frequently. • Stormwater should be diverted away from access roads early and often, so as to reduce the catchment area of the road. • The use of drains, such as table drains and cut-off drains, should not be used in any of the watercourse crossings. These types of drains typically have concentrated high-velocity flows and can frequently form channels within the watercourse. These channels provide an easy pathway for sediment to reach streams and adversely impact on water quality. • Alternative options for stormwater control should be considered. These include the use of: <ul style="list-style-type: none"> ○ Vegetated swales. ○ Entrenched rock (rip rap) aprons. ○ Sediment traps, such as hay bales or silt traps. These structures do, however, require maintenance. ○ Vegetated buffer/ filter strips. The use of vegetation in the watercourse, especially downstream of unsealed road surfaces, will help 	<p>Contractor teams and their environmental officers (construction phase)</p> <p>Contractor/ Eskom (operational phase)</p>	<p>The stormwater management plan, specifically around access roads/tracks, should be implemented and maintained during the entire construction phase and operational phase of the project. Monitoring and maintenance during wet seasons are more important, especially after rainfall events.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	to provide soil stability and reduce sediment input. It is important to use local and indigenous plant species.		

18. MEASURES TO PROTECT HYDROLOGICAL FEATURES

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
<p>MEASURES TO PROTECT HYDROLOGICAL FEATURES</p>	<ul style="list-style-type: none"> • Restrict the construction of infrastructure in watercourses as far as possible. • Tower construction in watercourses should only be allowed in exceptional circumstances where these areas cannot be spanned. • The smallest possible footprint should be utilized and positioned as close to the boundary of the affected watercourse in cases where tower construction in a watercourse is unavoidable. • Tower construction activities in these areas should be completed in the shortest possible time and preferably during the dry season. • Towers in watercourses should not be located on steep slopes, channels or other surfaces with visible erosion features. • All unavoidable overlap between individual towers (pylons) and watercourses, and new or upgraded watercourse road crossings will require a Water Use License (WUL) in order to be allowable. Efforts should therefore be undertaken during the planning phase and proposed walk down phase to avoid infrastructure overlap as far as possible. This includes the use of existing access roads, which is highly recommended. • New access roads and tracks should also be located outside of watercourses as far as possible 	<p>Contractor teams and their environmental officers.</p>	<p>During the entire construction phase, maintenance and monitoring is more important in the wet season, especially after rainfall events.</p>

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • Road crossings should make provision for dispersed flow and energy dissipation. Refer to the abovementioned recommendation regarding pylon (tower) construction in watercourses. • Permanent crossing structures across channelled watercourses can include unvented fords that are constructed of riprap, gabions, or concrete to provide a stream crossing without the use of pipes. Water will periodically flow over the crossing structure. Measures therefore need to be incorporated into the design to protect downstream watercourse habitat from scour erosion during flow events. This is more important in large watercourses, such as ephemeral rivers. • If the construction of a crossing is unavoidable make sure that substrate continuity in the watercourse is maintained within upstream and downstream portions of the channel bed. • Unvented fords are best suited for ephemeral or intermittent streams (streams that are dry most of the year). Unvented fords may also be used across some shallow, low velocity perennial streams. • Other important best management practices associated with ford design, construction, operation and maintenance that should be adhered to as far as possible, include (Anon 2006): <ul style="list-style-type: none"> ○ Where possible locate crossings on straight channel segments (avoid meanders). 		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> ○ To the extent possible align crossings perpendicular to the stream channel. ○ Minimize the extent and duration of the hydrological disruption. ○ Use appropriate energy dissipaters and erosion control at the outlet drop. ○ Minimize impact to riparian vegetation during construction by reducing the width of the construction servitude where construction activities have to occur in watercourses. ○ Prevent excavated material from running into water bodies and other sensitive areas. ○ Use appropriate sediment barriers (silt fence and hay bales). ○ Check construction surveys to ensure slopes and elevations meet design specifications. ○ Use appropriately graded material (according to design specifications) that has been properly mixed before placement inside the structure. ○ Compact bed material. ○ Tie constructed banks into upstream and downstream banks. ○ Evaluate structure stability ● Specific watercourse road crossing designs should be informed by site conditions and recommendations from the engineering team. ● No refuelling of construction vehicles should occur within 50 m of demarcated watercourses. 		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	<ul style="list-style-type: none"> • Hydrocarbons should not be stored within 50 m of watercourses. • Stockpiles should not be located within 50 m of watercourses. • Temporary toilets should not be located within 50 m of watercourses. • Drip trays should be used when working with generators within watercourses or within a 50 m buffer around them. 		

19. POST-CONSTRUCTION PHASE

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
<p>Construction Camp</p>	<p>Construction Camp Rehabilitation</p>	<p>PM / C / ECO</p>	<p>Project completion.</p>
	<p>a. All structures comprising the construction camp are to be removed from site.</p>		
	<p>b. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint and fuels, etc. and these must be cleaned up.</p>		
	<p>c. All hardened surfaces within the construction camp area must be ripped, all imported materials removed, and the area shall be top-soiled.</p>		
<p>Avifauna</p>	<p>Collision of Birds</p>	<p>PM</p>	<p>Project completion</p>
	<p>Mark the line with anti-collision marking devices and night markings on the earth wire to increase the visibility of the line and reduce likelihood of collisions.</p>		
	<p>The markers must be no more than 20m apart on each earth wire and must be placed along the full length of the earth wire.</p> <p>The sections of the line that pose concerns and require marking are to be finalised by EWT in an “avifaunal walkthrough” once final route is decided and final positioning of towers.</p>		
	<p>Nesting of Birds on Towers</p>		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	Any intervention with nesting once the line is operational must be subject to national and provincial legislation and Eskom nest management guidelines.		
Vegetation	Landscaping		
	<p>a. All disturbed areas or areas which have been engineered for the purpose of the development are to be rehabilitated with indigenous vegetation which must be sourced from surrounding areas where possible. This will aid in preventing erosion within the site.</p> <p>However, due to the dry climate, natural colonisation will take a long time, in which vegetation may degrade further. In addition, relying on the seed bank in the soil will be bias towards short lived annuals instead of long-lived, succulent perennials. Therefore, these species should be included in rehabilitation, preferably collected from the site prior to disturbances.</p>	E / PM / C / ECO	Project completion.
	Tower Footprint Area		
	a. Rehabilitate disturbed areas around tower footprint as soon as practically possible after construction. This should be done to restrict extended periods of exposed soil.	PM / C / ECO	Project completion.
Land Rehabilitation	Land Rehabilitation		
	<p>a. Excavated soil and soil disturbance:</p> <p>Excavated soil not used in the development must be disposed of in a landfill site. Soil disturbance will be minimized by establishing the extent of the construction site (pre-construction) and clearly demarcated in on-site layout plans. No construction personnel or vehicles may leave the</p>	E / PM / C / ECO	Project completion.

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	demarcated areas except when authorised to do so by the Project Manager.		
	<p>b. Rehabilitation must be executed in such a manner that surface runoff will not cause erosion of disturbed areas during and after rehabilitation.</p> <ul style="list-style-type: none"> • Mulch and brush also reduces the force of raindrops, limiting the dispersion of clay and the extent of mineral crusting. It also traps dust, sand and seeds to ensure plant establishment (Esler <i>et al</i>, 2006 in Eyssell 2016, Vegetation Report for this project). • Shred all woody material cleared and use the chips as mulch for dust and erosion control. 		
	<p>c. All areas to be vegetated that comprise surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</p>	PM / C / ECO	
	<p>d. All rubble is to be removed from the site to an appropriate disposal site as approved by the Project Manager.</p> <p>Burying of rubble on site is prohibited.</p>		
	<p>e. The site is to be cleared of all litter.</p>	E / PM / ECO	
	<p>f. All embankments are to be trimmed, shaped and replanted to the satisfaction of an Engineer and suitably qualified botanist.</p>		
	<p>g. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Project Manager.</p>		
	<p>h. All trimmed and / or compacted areas must be left rough to facilitate binding of topsoil and vegetation.</p>	PM / C	
	<p>i. The Contractor is to check that all watercourses are free from building rubble, spoils materials and waste materials.</p>	PM / C / ECO	

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Materials and Infrastructure	Removal of Barriers, Remediation of Damage		
	a. All material used for construction and maintenance of the Transmission Line must be removed from site after construction / maintenance.	PM / C / ECO	As completed
	b. All leftover construction materials must be removed from the site.	PM / C / ECO	On completion
	c. The Contractor must repair any damage that the construction works has caused to adjacent areas.	PM / C / ECO	Continually as necessary
	d. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Project Manager.	PM / E / C	On completion
	e. All residual topsoil stockpiles must be removed to registered landfill sites or spread on site as directed by the Engineer / Project Manager.		
General	General Remediation		
	a. Temporary road works must be closed and access across these blocked.	E / PM / C / ECO	On completion of the construction and maintenance phases
	b. A meeting is to be held on site between the Project Manager, Environmental Control Officer and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer / Project Manager and ECO.		

20. OPERATIONAL PHASE

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Vegetation / Landscape Management	a. All rehabilitated areas will need to be maintained and re-seeded with local indigenous vegetation where necessary on a regular basis.	Eskom Transmission	Ongoing.
Transmission Line: Avifauna Impacts	a. Install Bird Guards on towers on the lines, as per Eskom Transmission Guidelines. This should deter birds from perching in the high risk areas of towers.		
b. Avifauna walk through is required to identify towers requiring Bird Guards (also during post-construction phase).			
c. Should any breeding sites be encountered, activity in the vicinity of the site must be halted and the Endangered Wildlife Trust (EWT) must be consulted for further advice.			
d. The nests must be left alone as far as possible Nests should be monitored closely and if they begin to pose problems then EWT should be consulted for recommendations on how best to manage them. Nest management recommendations may include nest removal in cases where no other species are breeding on the same nest, for example Pygmy Falcons and other assorted raptors.			
Birdlife Recommendations for Eskom	All new powerlines should be marked with static bird flight diverters along their entire length. This needs to be established as a standard part of the engineering and costing for each new line.		
Storm Water Management	a. All stormwater attenuation measures must be monitored on an annual basis through a general environmental audit.		

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
Solid Waste / Refuse Removal	<p>a. Waste removal generated through maintenance must be undertaken by the Local Municipality waste removal services as and when required. However, the following measures must form part of the general management of the site:</p> <ul style="list-style-type: none"> • Monitoring of solid waste removal; and • Disposal of hazardous substances (i.e. paint) in an approved manner. 		
Sewerage	<p>a. Portable toilet facilities must be provided for maintenance workers and serviced and maintained as and when necessary by a registered waste disposal company.</p>		
Management of Servitudes	<p>Fire Management</p> <p>The aim is not to control the spread of fires and to prevent the bush fires by conducting vegetation maintenance for the purpose of maintaining safe clearances between conductors and vegetation.</p> <p>This maintenance generally is confined within the easement area and may include the following:</p> <ul style="list-style-type: none"> > Removal of tall growing species; > Trimming of trees; > Slashing and mulching of easements; and > Regrowth control using herbicides. <p>Nonetheless, any fire fighting or fuel reduction activities to be carried out in the vicinity of Eskom powerlines shall be in consultation with Eskom, either through a liaison person on site or by communication facilities. Eskom will have field staff that are involved in Bush Fire Management</p>	Eskom Transmission	Ongoing

ACTIVITY	MANAGEMENT / MITIGATION	RESPONSIBILITY	SCHEDULE / FREQUENCY
	Committees and provide advice in relation to transmission line assets.		

21. DECOMMISSIONING PHASE

The objective of providing guidelines during the decommissioning phase is to prevent structures from being left to deteriorate and look unsightly. It is imperative that non-functional structures be removed as soon as possible, and that the site is rehabilitated as soon as possible. If non-functional structures are not needed anymore, and not removed, it must be maintained that they will be used to prevent the environmental degradation of the site.

Eskom is responsible for ensuring the Aggeneis-Paulputs 400kV transmission power line is properly maintained at all times.

ANNEXURE A

STAFF CONDUCT CONTROL AND INFORMATION SHEET

	<u>ALL STAFF MUST OBEY THE FOLLOWING RULES:</u>
1	DO NOT leave the construction site untidy and strewn with rubbish that will attract animal pests.
2	DO NOT bring your pets to the construction site.
3	DO NOT trespass on private properties not linked to the project.
4	DO NOT carry a weapon on the construction site or in the vehicles transporting workers to and from the construction site.
5	DO NOT set fires unnecessarily.
6	DO NOT cause any unnecessary disturbing noise at the construction camp/site or at any designated worker collection/drop off points.
7	DO NOT drive a construction-related vehicle under the influence of alcohol.
8	DO NOT exceed the national speed limits on public roads or exceed the recommended speed limits in this management plan (where applicable) whilst driving a construction vehicle.
9	DO NOT drive a vehicle that is generating excessive noise (noisy vehicles must be reported and repaired as soon as possible).
10	DO NOT litter along the roadsides, including both public and private roads.
11	DO NOT remove or destroy vegetation at the construction camp/construction site without the prior consent of the Project Manager and Environmental Control Officer.
12	DO NOT tamper with, destroy or remove vegetation from any areas that have been fenced off or marked.

ANNEXURE B

ACKNOWLEDGEMENT FORM

Record of signatures providing acknowledgment of being aware of and committed to complying with the contents of this Environmental Management Programme (EMPr), which relates to the environmental mitigation measures for the project outlined above, and the environmental conditions contained in the civil and other construction contract documents.

PROJECT NAME:

**DEA REF: 14/12/16/3/3/2/1012
THE PROPOSED AGGENEIS-PAULPUTS 400KV TRANSMISSION POWERLINE
AND SUBSTATIONS UPGRADE, NORTHEN CAPE PROVINCE**

PROPONENT:

Signed: Date:

PROJECT MANAGER:

Signed: Date:

CONTRACTOR:

Signed: Date:

ENVIRONMENTAL CONTROL OFFICER

Signed: Date:

ANNEXURE C: SENSITIVE AREAS MAP

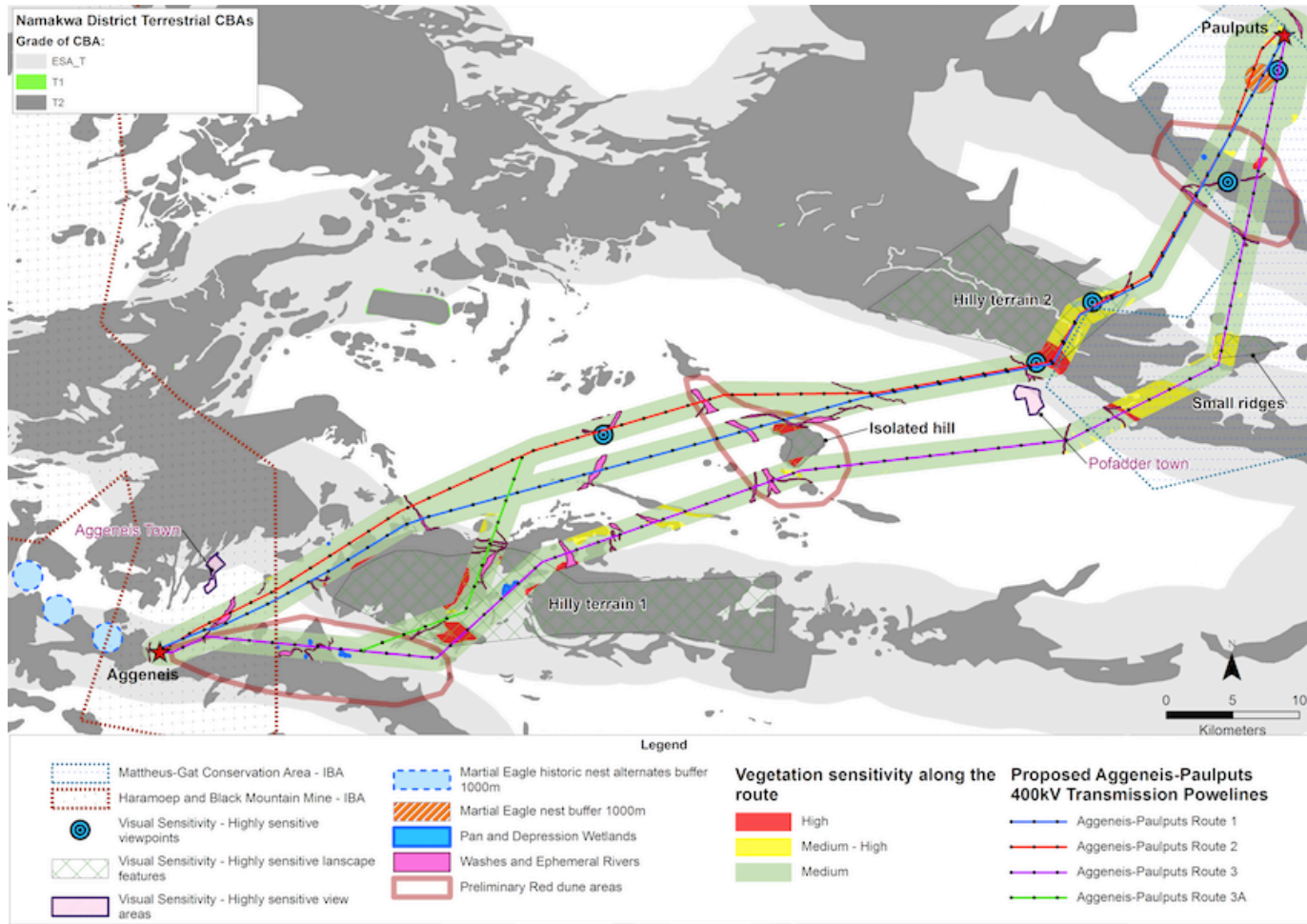


Figure 3: Sensitive features in the Aggeneis Paulputs 400kV powerline study area