APPENDIX I: ENVIRONMENTAL MANAGEMENT PROGRAMMES

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FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

for

Development of the Kiwano Solar Photovoltaic Facility and Battery Energy Storage System, including associated substation and 132kV loop-in loop-out powerlines

Report No : 21139-46-Rep-002-Kiwano Solar PV FEMPr-Rev0

Submitted to:

Department of Forestry, Fisheries and the Environment
Environment House,
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South Africa

03 February 2023 21139

Additions and amendments undertaken to this document has been underlined in the text for ease of reference

DOCUMENT CONTROL SHEET

Project Title: **FINAL EMPr for the Development of the Kiwano Solar Photovoltaic Facility and Battery Energy Storage System, including associated substation and 132kV loop-in loop-out powerlines**

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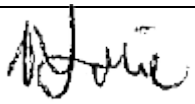
DOCUMENT APPROVAL

ACTION	DESIGNATION	NAME	DATE	SIGNATURE
Prepared	Senior EAP	Ms. Natasha Lalie	14/01/2023	
Reviewed/ Approved	Project Manager	Dr. Mathys Vosloo	30/01/2023	

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LIST OF ACROYNYMS

Acronym	Description
AC	Alternating Current
BA	Basic Assessment
BAR	Basic Assessment Report
BBB-EE	Broad Based Black Economic Empowerment
BESS	Battery Energy Storage System
CA	Competent Authority
CBA	Critical Biodiversity Area
DC	Direct Current
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EN	Endangered
EO	Environmental Officer
EPC	Engineering, Procurement and Construction
ESA	Ecological Support Area
GA	General Authorisation
GNR	Government Notice Regulation
LC	Least Concern
LM	Local Municipality
MS	Method Statement
MSA	Middle Stone Age
MSDS	Material Safety Data Sheet
MW	Megawatt
MWh	Megawatt per Hour
NEMA	National Environmental Management Act 107 of 1998 (as amended)
NEMBA	National Environmental Management: Biodiversity Act, 2004
NEMWA	National Environmental Management Waste Management Act 59 of 2008
NHRA	National Heritage Resources Act 25 of 1999
NLEPDS	Non-Lethal Energised Perimeter Detection System
NWA	National Water Act 36 of 1998
OEM	Original Equipment Manufacturers
OHS	Occupational Health and Safety Act 85 of 1993

Acronym	Description
AC	Alternating Current
ONA	Other Natural Areas
O&M	Operation and Maintenance
PAIA	Promotion of Access to Information Act 2 of 2000
PM	Project Manager
POC	Points of Connection
PPE	Personal Protection Equipment
PPP	Public Participation Process
SACNASP	South African Council of Natural and Scientific Professions
SANRAL	Spatial Planning & Land Use Management
SAHRA	South African Heritage Resources Agency
SCC	Species of Conservation Concern
RAM	Risk Assessment Matrix
REDZ	Renewable Energy Development Zone
WULA	Water Use License Application
ZoR	Zone of Regulation

GLOSSARY OF TERMS

Term	Description
Alien species	A species that is not indigenous to the area or out of its natural distribution range.
Alternatives	Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.
Alternatives	Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.
Ambient sound level	Background noise level already present in the environment (in the absence of noise generated by any other proposed development).
Assessment	The process or collecting, organising, analysing, interpreting and communicating information which is relevant.
Commencement	The start of any physical activity, including site preparation and any other activity on site resulting in the furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.
Commissioning	Commissioning commences once construction is completed. Commissioning covers all activities including testing after all components of the power station are installed.
Construction	Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity. Construction begins with any activity which requires Environmental Authorisation.
Construction Activity	A Construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the Construction process.
Contractor	Any legal entity or consortium contracted to undertake the activity associated with the proposed project.
Decommissioning	Means to take out the active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.
Development	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthwork or borrow pits, that is necessary or for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Development footprint	Means any evidence of physical alteration as a result of the undertaking of any activity.
Environment	Environment means the surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
Environmental Aspect	Element of an organization's activities or products or services that can interact with the environment.
Environmental Control Officer (ECO)	The person to be appointed by the Contractor, with the approval of the Engineer, to oversee the construction activities and to ensure that all environmental specifications and EMPr obligations are met during these

Term	Description
	phases. The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the EMPr by the Contractor.
Environmental Assessment Practitioner	Individual responsible for the planning, management, coordination or review of Environmental Impact Assessments, Strategic Environmental Assessments, Environmental Management Programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Impact	Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects.
Habitat	The place in which a species or ecological community occurs naturally.
Hazardous waste	Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment (Van der Linde and Feris, 2010; pg 185).
Heritage	That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000
Indigenous	All biological organisms that occurred naturally within the study area prior to 1800
Interested and Affected Party	Interested and Affected Party for the purposes of Chapter 5 of the NEMA and in relation to the assessment of the environmental impact of a listed activity or related activity, means an interested and affected party contemplated in Section 24(4)(a)(v) of the NEMA and which includes - a) Any person, group of persons or organisation interested in or affected by such operation or activity; and b) Any organ of stale that may have jurisdiction over any aspect of the operation or activity.
Maintenance	Means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.
Pollution	Pollution means any change in the environment caused by - (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Pre-construction	The period prior to the commencement of construction, which may include activities (e.g. geotechnical surveys) which do not require Environmental Authorisation.
Significant impact	An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.
Waste	Any substance, whether or not that substance can be reduced re-used, recycled and recovered; that is surplus, unwanted, rejected, discarded, abandoned or disposed of which the generator has no further use for the purposes of production. Any product which must be treated and disposed of, that is identified as waste by the minister of Environmental affairs (by notice in the Gazette) and includes waste generated by the mining, medical or other sectors, but: A by-product is not considered waste, and portion of waste, once re-used, recycled and recovered, ceases to be waste.

1 INTRODUCTION AND BACKGROUND

Eskom Holdings SOC Limited ("Eskom") is proposing to develop, construct and operate a 58 Megawatt (MW) Solar Photovoltaic (PV) facility and a Battery Energy Storage System (BESS) with an envisaged capacity of 40 MW / 200 Megawatt Hour (MWh). The development further includes construction of the 132kV Kiwano substation with 5 feeder bays and a single Twin-Tern 132 kV overhead powerline on a double circuit support structure connecting Kiwano substation to the Upington substation. A pipeline and an access road are proposed on site. The proposed development occurs on the remainder of the Farm Keimoes 1080 in Upington, Northern Cape.

The project location is situated approximately 27 km southwest of the town of Upington in the Northern Cape Province. The project will be located within Ward 8 of the Dawid Kruiper Local Municipality (LM) and within the jurisdiction of the Z F Mgcawu District Municipality (DM). Refer to Figure 1-1. The project site can be accessed off the N14, southwest of Upington.

Two site alternatives have been assessed in the Basic Assessment Report (BAR) i.e. Site Alternative A and Site Alternative B. Site Alternative B is the preferred site for the proposed development, as per the findings of the Basic Assessment (BA) process. Refer to Figure 1-1 for the location of the site alternatives.

This Environmental Management Program (EMPr) details the specifications and requirements identified for the proposed development.

Refer to the standalone Generic EMPr for the proposed construction of a 132kV single twin-turn overhead powerline connecting the Kiwano substation to the Upington substation in Appendix 2.

Refer to the standalone Generic EMPr for the proposed on-site substation in Appendix 3.

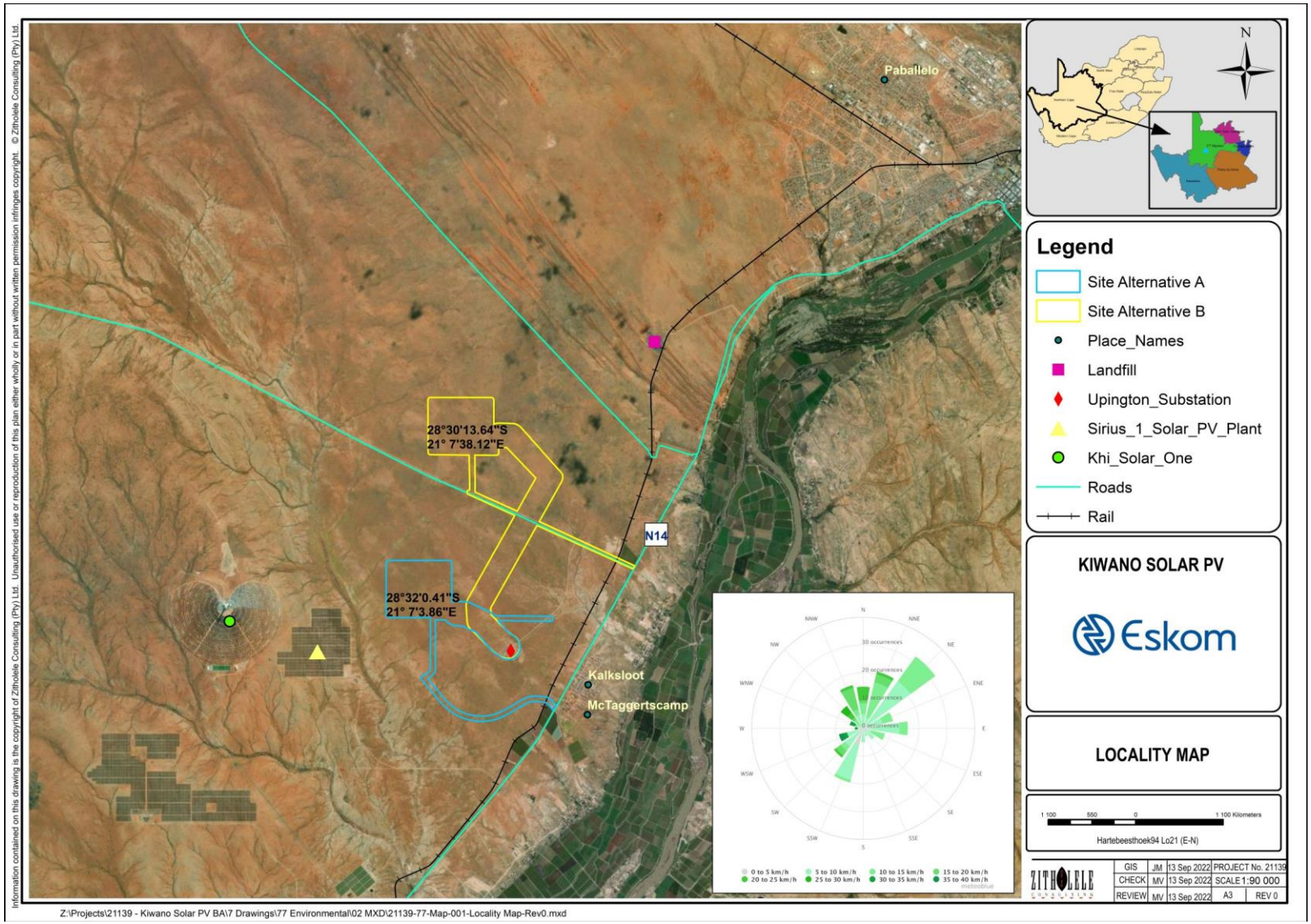

Figure 1-1: Locality Map

1.1 Need and desirability

The usage of renewable energy to generate electricity has become essential in reducing the emissions of greenhouse gases and to provide additional energy capacity to South Africa's energy grid. It has become a global trend to develop technologies that are sustainably friendly to the environment and also efficiently generating enough electricity that can power businesses and households. Eskom has invested in renewable energy technologies in their commitment to diversify their energy mix and also play their part in reducing the carbon emissions produced by their existing power generation fleet. The construction of the substation and powerline is intended to support the operation of the solar PV plant and BESS facility, which will be connected to Eskom's existing energy grid.

Electricity generation from renewable sources are limited by the intermittency and variability of wind and solar resources, i.e. when wind blows and sun shines. Energy storage allows for the storing of electricity for later use even when the renewable resource is unavailable. The process involves the conversion of electrical energy into another form of energy such as chemical or kinetic energy, store it temporarily and then converted back to electrical energy, therefore giving the utility considerable flexibility and control.

Eskom further proposes the development and operation of the BESS to provide ancillary support in terms of enhanced frequency control of the network, reactive power support and improved quality of supply performance near existing Distributed Generation Renewable Energy plants. The Battery Storage technology may enable the immediate levels of constraint to be addressed and provide continued access to potential customers to these networks. The battery storage technology will also improve the quality of supply and mitigate voltage related concerns on the networks.

1.2 General objectives and purpose of EMPR

Eskom (Applicant) together with the Contractors appointed to undertake the development and installation activities will be required to do the following:

- Manage and operate their activities with due care and diligence;
- Avoid and/or limit any adverse impacts they may have on the environment by the proper design and construction of the proposed development;
- Control predicted impacts that may occur, so as to meet acceptable standards, both as a legal and a moral responsibility to the environment within which they operate; and
- Ensure transparency in their operation and environmental management of the site.

This Final Environmental Management Programme (EMPr) serves as a stand-alone document to be issued to and used by Eskom (Applicant), the Contractor/s, sub-consultants and Project Managers (PMs) / Supervisors during the construction and operational phases of

the project. By its very nature, the EMPr is a dynamic document and updating may be required over the life of the development.

1.3 Details and expertise of Environmental Assessment Practitioner

In terms of the National Environmental Management Act, (Act 107 of 1998) as amended (NEMA) and EIA Regulations (2014), the proponent/developer must appoint an Environmental Assessment Practitioner (EAP) to undertake a BA and/or Public Participation Process (PPP) for listed activities regulated in terms of the aforementioned act. In this regard, Eskom has appointed Zitholele Consulting (Pty) Ltd as the EAP on this project to undertake the BA process for the proposed project, in accordance with the aforementioned regulations.

Zitholele is an empowerment company formed to provide specialist consulting services primarily to the public sector in the fields of Water Engineering, Integrated Water Resource Management, Environmental and Waste Services, Communication (public participation and awareness creation) and Livelihoods and Economic Development.

Zitholele Consulting has no vested interest in the proposed project and hereby declares its independence as required by the EIA Regulations (2014, as amended).

This EMPr report has been compiled by the following persons who have the relevant expertise and experience in environmental management (see attached CV in **Appendix A**):

Table 1-1: Details of EAP on this project

Name and Surname	**Ms. Natasha Lalie (EAP and Technical Reviewer)**
Highest Qualification	MSc (Environment and Society)
Professional Registration	Environmental Assessment Practitioners Association of South Africa (EAPASA) - Registration No: 2021/3611
Company Represented	Zitholele Consulting (Pty) Ltd
Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand
Postal Address	P O Box 6002, Halfway House, 1685
Contact Number	011 207 2060
Facsimile	086 674 6121
E-mail	natashal@zitholele.co.za
Name and Surname	**Dr. Mathys Vosloo (Project Manager, Project Consultant)**
Highest Qualification	PhD Zoology
Professional Registration	Pr.Sci.Nat. (400136/12)
Company Represented	Zitholele Consulting (Pty) Ltd
Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand
Postal Address	P O Box 6002, Halfway House, 1685
Contact Number	011 207 2079
Facsimile	086 674 6121
E-mail	mathysv@zitholele.co.za
Name and Surname	**Jessica Morwasehla (EAP and author of the EMPr)**
Highest Qualification	BSc Environmental and Resource Studies
Professional Registration	SACNASP Candidate. (121840)
Company Represented	Zitholele Consulting (Pty) Ltd

Physical Address	Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand
Postal Address	P O Box 6002, Halfway House, 1685
Contact Number	011 207 2060
Facsimile	086 674 6121
E-mail	jessicam@zitholele.co.za

1.4 Specialist Teams

Various Specialists were appointed by Zitholele to undertake the relevant assessments to identify and assess impacts, and propose appropriate mitigation and management measures for the identified impacts. The following specialists were commissioned:

- Terrestrial Biodiversity Impact Assessment – Ms. Leigh-Ann de Wet (Pr Sci Nat) of The Biodiversity Company
- Heritage Impact Assessment – Mr. Jaco van der Walt MA (Archaeology) of HCAC
- Wetland Baseline and Risk Assessment – Mr. Ivan Baker (Pr Sci Nat) of The Biodiversity Company
- Visual Impact Assessment – Mr. Leo Quayle (Pr Sci Nat) of Geonest GIS and Environmental Advisory

1.5 Details of project proponent

The details of the project proponent/Developer are provided in Table 1-2 below.

Table 1-2: Proponent's details

Applicant name:	Eskom Holdings SOC Ltd
Company Registration number:	2002/015527/06
Contact person:	Ms. Nondwe Khanye
Responsible position:	Officer : Environmental Management
Physical address:	Eskom Distribution, DSC Building, Ground floor (C Block), 69 Memorial Road, Monument Heights, Kimberley, 8301
Telephone:	053 830 5924
Cell:	064 532 9525
Fax:	n/a
E-mail:	khanyen@eskom.co.za

1.6 Document Roadmap

The Final EMPr document has been structured and collated to conform to Section 19(4) read with Appendix 4 of the National Environmental Management Act 107 of 1998 (NEMA) (as amended) Environmental Impact Assessment (EIA) Regulations of 2014. The relevant document parts which address each of the aspects provided in Appendix 4 of the NEMA EIA Regulation 2014 is provided in Table 1-3. This has been done to ensure that the Competent

Authority (CA) (i.e. DFFE) is provided with a comprehensive document that can be translated into a working / dynamic document during the Construction and Operational Phases of the proposed project.

Table 1-3: Document Roadmap

Relevant regulation, stipulation or condition			Relevant Document Part
Appendix 4			
1. An EMPr must comply with section 24N of the Act and include-			
(a)	details of -		
	(i)	the EAP who prepared the EMPr; and	Section 1.3
	(ii)	the expertise of that EAP to prepare an EMPr, including curriculum vitae;	Section 1.3 and Appendix A
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;		Section 2
(c)	prepared map at an appropriate scale which superimpose the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;		Section 2
(d)	assessment description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-		
	(i)	Planning and design;	Section 6
	(ii)	Pre-construction activities;	Section 6
	(iii)	Construction activities	Section 6
	(iv)	Rehabilitation of the environment after construction and where applicable post closure; and	Section 13
	(v)	Where relevant, operational activities	Section 6
(e)	a description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);		Section 6
(f)	a description of the proposed impact management actions, identifying the manner in which the impact management outcomes and outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to-		.
	(i)	Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 6 & 11
	(ii)	Comply with any prescribed environmental management standards or practices;	Section 3 & 11
	(iii)	Comply with any applicable provisions of the Act regarding closure, where applicable; and	Not applicable
	(iv)	Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Not applicable
(g)	the method of monitoring the implantation of the impact management actions contemplated in paragraph (f);		Section 11, 12 and 13
(h)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);		Section 11
(i)	an indication of the persons who will be responsible for the implementation of the impact management actions;		Section 4, 5 & 11
(j)	the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;		Section 11

Relevant regulation, stipulation or condition			Relevant Document Part
(k)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);		Section 11
(l)	a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;		Section 12
(m)	an environmental awareness plan prescribing the manner in which-		
	(i)	The applicant intends to inform his or her employees of any environmental risk which may result from their work; and	Section 9
	(ii)	Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 11
(n)	any specific information that may be required by the competent authority		Not Applicable
(2)	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.		As per Government Notice Regulation (GNR) No. 435 of 22 March 2019, the generic Environmental Management Programme, contemplated in Regulations 19(4), 23(4) and Appendix 4 to the Environmental Impact Assessment Regulations, 2014, as amended has been used. Refer to the Generic EMPr for the proposed powerline associated with the solar PV plant. Refer to the Generic EMPr for the proposed substation associated with the solar PV plant.

2 PROJECT DESCRIPTION

2.1 Study Area

2.1.1 Description of the Study Area

Two site alternatives have been assessed for the proposed development. i.e. Site Alternative A and Site Alternative B.

The study area for Site Alternative A is depicted by the blue polygon outline in Figure 2-1, while the study area for Site Alternative B is depicted by the yellow polygon outline in the same figure.

The straight-line distance between the approximate centre points of Site Alternative A and B is approximately 4km and 4.3km northwest of the N14 National Road, respectively. As is evident from the map, the study areas wholly include all the proposed infrastructure for the Kiwano Solar PV and BESS development.

Alternative Site B is the preferred site for the proposed development and this EMPr provides the mitigation and management measures for Alternative Site B.

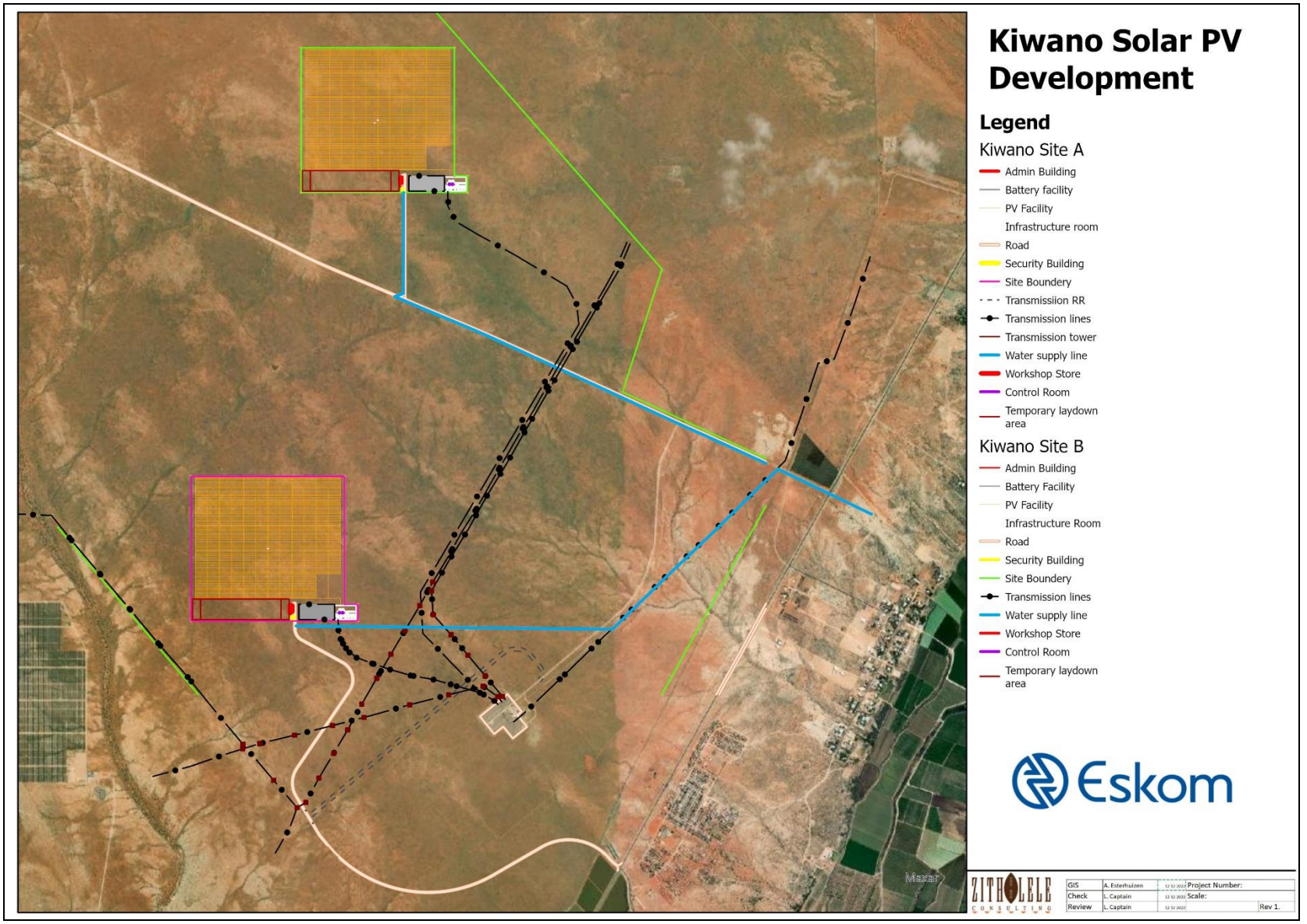

Figure 2-1: Kiwano Site Layout Alternatives

2.2 Environmental Site Sensitivity

The preferred site, i.e. Site Alternative B for the proposed solar PV facility, occurs within a medium ecological sensitivity area consisting of Karroid grassland. Several drainage lines occur across the central portion of the site. There are five stone age scatter sites located on the site and has low heritage significance.

The proposed pipeline and the proposed access road also consist of medium ecological sensitivity and consists of Karroid grassland. A possible grave marked by an oval cairn of river pebbles, measuring ~ 1.3 meters in diameter, is located some distance from the proposed pipeline. This grave has high social significance. Site B can be developed, if mitigation measures proposed are implemented around the potential burial site (K10), namely demarcation and avoidance with a 30m buffer. No adverse impact on heritage resources is expected by the project and it is recommended that the project can commence on the condition that the recommendations (Section 15) are implemented as part of the EMPr and based on approval from SAHRA.

Refer to the composite sensitivity map in Figure 2-2.

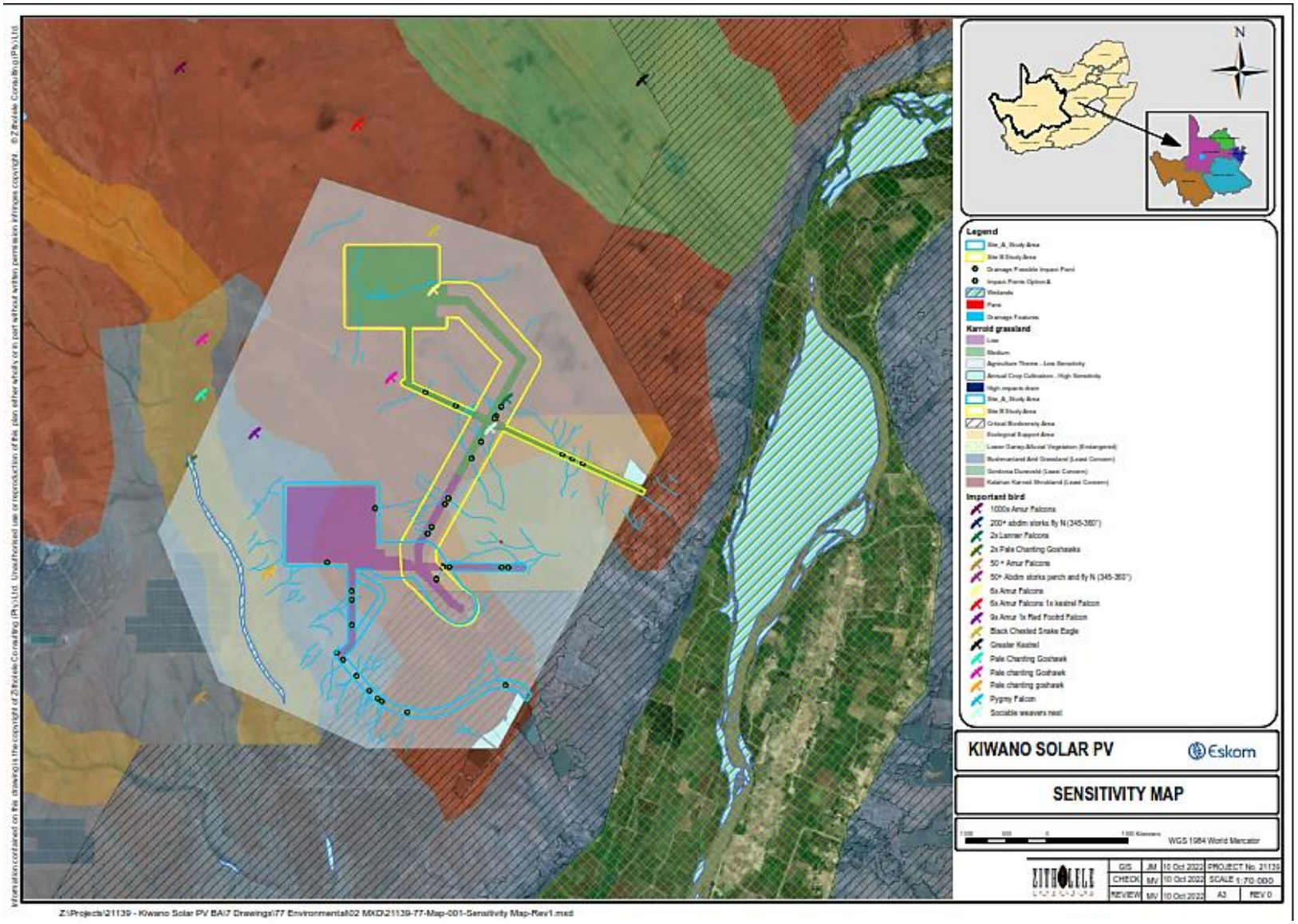

Figure 2-2: Composite Sensitivity Map

2.3 Project Activities

Eskom proposes to install a Solar PV plant, grid-scale battery storage, substation, powerline, pipeline and an access road on the remainder of the Erf 1080 Olyvenhouts Drift Settlement (Gordonia) in Upington in Northern Cape. The proposed development aims to give an opportunity an Eskom to move to renewable energy, and storing energy to support the grid in any circumstance. The proposed development will also include the following infrastructure:

The proposed Kiwano BESS and PV facility will comprise of the following:

- PV installation with envisaged capacity of 58 MW.
- BESS installation with envisaged capacity of 40 MW / 200 MWh.
- Kiwano 132 kV substation with 5 feeder bays.
- Single Twin-Tern 132 kV overhead line on a double circuit support structure, connecting Kiwano substation to Upington substation.

The total site area envisaged for the PV installation will measure up to approximately 1 150 000m^2 (115 hectares). The Solar PV facility will include the following infrastructure:

- Two (2) x 40 MVA 132/22 kV transformers with associated 22 kV switchgear and control plant

- Solar PV plant with the output rating of 58 MW

- Establishment of the PV plant POC on the 132 kV between the PV plant and Kiwano 132kV busbar

- Separate statistical metering points to be commissioned for the BESS plant and the PV plant

- The BESS and solar PV plant are to be positioned and configured in isolation of each other, in terms of connections and dependency

The envisaged area for the solar PV modules, which will convert solar radiation directly into electricity, is expected to cover an area of approximately 450 000 m^2. The solar PV modules will be elevated above the ground, and will be mounted on either fixed tilt systems, or tracking systems (comprised of galvanised steel and aluminium). The Solar PV modules will be placed in rows in such a way that there is allowance for a perimeter road and security fencing along the site boundary, and access roads in between the PV module rows.

2.3.1 Solar PV Plant

The Solar PV Plant generates electrical power by converting solar radiation through a process known as the photovoltaic effect. The Solar PV Plant consists of the following

components and configurations that will be further explored at conceptual design and specified in the functional specification:

- PV modules that are connected in series to form strings. These strings are further combined in parallel via combiner boxes to form PV arrays.

- PV ground mounting structures and foundations are used to fix the PV modules to the ground at the appropriate orientation to the sun.

- Inverter and transformer cabins which house the inverters that converts DC electricity from the PV arrays to AC electricity at grid frequency, and transformers to step-up the voltage as determined by the selected point of connection.

- Solar PV plant power collection switchgear, auxiliary transformers, and battery tripping units.

- AC cabling that will connect the Solar PV plant to the selected point of connection.

- Control and instrumentation equipment to monitor and configure plant operations.

- Infrastructure and associated utilities such as roads, storm water infrastructure, security fence, buildings, and meteorological measuring stations.

2.3.2 BESS Facility

The BESS facility will be located in the south-eastern section of the development site (Figure 2-1) and will integrate at the proposed Kiwano substation together with the Solar PV facility. The BESS facility will include the following infrastructure:

- 2 x 40 MVA 132/22 kV transformers with associated 22 kV switchgear and control plant, and connect at Kiwano 132kV busbar

- Establish the BESS POC on the 132 kV between the BESS plant and Kiwano 132 kV busbar

- Build the BESS plant with an output rating of 40 MW / 200 MWh

The use cases for Kiwano BESS are ancillary services support and energy support. The custodian of ancillary services and energy support service is the System Operator. The BESS will have capability to charge from the proposed PV as well as from the grid. The dispatching of the BESS will be under the custodianship of the System Operator.

Generally, the BESS will be expected to charge during the low load period at night (23h00 to 04h59) and be available to provide ancillary and energy services during the day (05h00 to

22h59). The BESS is required to have flexibility for the System Operator to dispatch it for ancillary services and energy as and when required, for the good of the grid. The charging power will be limited by the capacity of the 2 x 40 MVA 132/22 kV transformation at Kiwano Substation. Thus the maximum charging rate of 80MW may not be exceeded (Eskom, 2020). It must be noted that the BESS must also be capable of charging outside the stated period when required by the System Operator.

To cater for the BESS round trip efficiency, the storage will be allowed to charge for durations longer than 5 hours to ensure that the required and contracted power and energy output of 40 MW / 200 MWh is available at the Points of Connection (POC). From the network capacity perspective, the assessments will be done such that the BESS is capable of discharging at any given time of the day via the Distribution network when dispatched to do so. The required BESS discharge capacity is 40 MW / 200 MWh for the Kiwano BESS.

In terms of the size requirements for the BESS facility, 63 m^2 containers are used to store BESS infrastructure within the plant. After the BESS densities per 63 m^2 container for a number of manufacturers were considered, the minimum BESS density per 63 m^2 container was found to be 2 MWh. Assuming the worst-case density of 2 MWh per 63m^2 container and 2 m spacing between containers, the required space for the 40 MW / 200 MWh BESS plant is 10 620 m^2.

2.3.3 Kiwano 132 kV substation

Eskom proposes to construct a 132 kV substation with 5 feeder bays on the eastern extent of the development site. This substation will be known as the Kiwano 132 kV substation and will include the following infrastructure:

- 132kV Double Bus-Bar
- 132kV Bus-Coupler
- 132kV incomer feeder bay
- Establish 2 x 132 kV feeder bays for the BESS connection
- Establish additional 2 x 132 kV feeder bays for the PV integration
- Spatial provision for a minimum of additional 4 x 132 kV feeder bays for future use

Kiwano Substation will be a dedicated substation to integrate the proposed BESS and PV projects into the network. No known local constraints that would prevent Kiwano BESS and PV from being able to export the 40 MW BESS and 58 MW PV were identified at the Kiwano site (Eskom, 2020).

It is further proposed that adequate space be allowed at Kiwano substation to accommodate additional 132kV line bays for future developments, should a need arise. It is envisioned that a total energy storage capacity of 340 MW / 1 360 MWh can be deployed at the proposed Kiwano substation without any additional network capacity upgrade on the Distribution

network through future upgrades as capacity requirements increase with future renewable energy developments.

For the substation site requirements, the dimensions of the neighbouring Upington MTS site were assumed for Kiwano substation. Upington MTS is a 300 m x 300 m substation, therefore the Kiwano substation site is proposed to be 90 000 m^2 (9 ha).

2.3.4 Single Twin-Tern 132 kV overhead line

The solar PV and BESS facility will include the construction of a 132kV single twin-turn overhead powerline on a double circuit support structure connecting the Kiwano substation to the Upington substation in order to evacuate power generated at the facility. Tower structures that will be utilised include S/C Angle Strain Structure at bend points along the powerline alignment, and S/C Suspension Structure for inline structures- between bend points. This line is rated at 408 MVA at 70°C templating.

The proposed line will be utilised in future to facilitate additional generation connections in the area from future and currently approved renewable projects and the Kiwano substation will be a collector substation. This will assist in avoiding having many lines running to and accessing Upington MTS which could lead to physical space constraints in future. Moreover, Upington/Kiwano 132kV line will accommodate future Kiwano BESS expansions. As such, a 132kV double circuit structure design with the provision of stringing only one circuit for the commissioning of Kiwano BESS and PV is proposed. The 2nd circuit is to be strung in future when the demand for more capacity at Kiwano materialises.

The powerline alignment has been proposed to follow existing infrastructure as closely as possible and to cover the shortest distance between the Kiwano and Upington substation as is technically feasible.

2.3.5 Access, perimeter and internal roads

The development will require the following roads to be constructed to service the solar PV and BESS facility:

- Access road from the nearest existing road to the facility. Where possible, existing roads that provide access to the Kiwano site will be used, upgraded, and extended as necessary. For Site A, an access road, approximately 6 m wide and estimated up to 5 km long, will be required to provide access to the PV site. For Site B, a new access road from the existing D3276 road to the site will be required, approximately 6 m wide and estimated up to 1 km long. The existing D3276 road will require upgrading, approximately 6 m wide and estimated up to 4 km long (from N14 to site access road).
- A perimeter road around the site, approximately 5 m wide and 4.5 km in length.

- Internal roads for access to the Inverter stations, approximately 5 m wide and 18 km total length.
- Internal roads/paths between the Solar PV module rows, approximately 2-3 m wide, to allow access to the Solar PV modules for operations and maintenance activities.

2.3.6 Infrastructure associated with the solar PV and BESS facility

Supporting infrastructure is required to ensure effective operation of the solar PV and BESS facility. The associated infrastructure required include:

- Inverter stations: Each inverter station will occupy a footprint of up to approximately 30 m^2, with up to 60 Inverter stations proposed to be installed on the site. Each Inverter station will contain an inverter, step-up transformer, and switchgear. The Inverter stations will be distributed on the site, located alongside its associated Solar PV module arrays. The Inverter station will perform conversion of direct current (DC) to alternating current (AC), and step-up the LV voltage of the inverter to 22 kV, to allow the electricity to be fed into the Kiwano substation. Inverter stations will connect several arrays of Solar PV modules and will be placed along the internal roads for easy accessibility and maintenance.
- Below ground electrical cables: Below ground electrical cables will be required to connect PV arrays, Inverter stations, Operational and Maintenance buildings, and 132kV Kiwano substation. Trenching will be required to excavate the trenches which will house the below ground electrical cables, before being closed and rehabilitated.
- Foundations and mounting structures: Adequately designed foundations and mounting structures will be required to support the Solar PV modules and Inverter stations.
- Operational and maintenance infrastructure: Infrastructure required for the operation and maintenance of the Kiwano Solar PV Plant will include:
    - Meteorological Station
    - Operation and Maintenance (O&M) Building, which will comprise a control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities (including sewage infrastructure).
    - Spares Warehouse and Workshop
    - Hazardous Chemical Store
    - Security Building
    - Parking areas

2.3.7 Laydown area during construction

A temporary laydown area occupying a footprint up to 100 000 m^2 (10 hectares) will be demarcated to the south of the Solar PV facility and west of the proposed BESS facility. The laydown area will be used during construction for the storage and handling of construction equipment and material. The laydown area will also accommodate water storage tanks or lined ponds, which is estimated to store- water for construction purposes measuring

approximately 815 kl/month for the first 3 months and 408 kl/month for the remaining 21 months, until construction is completed. The temporary laydown area will be rehabilitated once construction has been completed.

A temporary concrete batching plant will also be required and will occupy a footprint up to 10 000 m^2 (1 hectare). The concrete batching plant area will be used during construction and rehabilitated thereafter.

A temporary site construction office area, occupying a footprint up to 10 000 m^2 (1 hectare), will be constructed within the temporary laydown area footprint. This area will accommodate the offices for construction contractors during construction and rehabilitated thereafter.

2.3.8 Fencing

It is recommended that the BESS area receive maximum physical protection in light of the fact that the site will be a target as a result of the batteries that will be stored on site. The following standards and standard drawings shall apply to the construction of the substation site perimeter and BESS perimeter barriers:

- All wire mesh fences shall be constructed in compliance with the Standard for High Security Mesh Fences (240-76368574).
- Energized fence to comply with the Standard for Non-lethal energized perimeter detection system (NLEPDS) for protection of Eskom installations and its subsidiaries (240-78980848)

The Substation perimeter barriers (3-tier) shall be constructed as follows:

- Outer perimeter:
    - The outer perimeter shall be constructed of a Category 2 High Security mesh Fence,
    - Fence height at 2.4m with double-V overhang with BTC installed at 600mm in diameter,
    - Access gate to match fence construction,
    - Anti-burrowing plinth as per standard (100mm wide by 600mm deep),
    - Galvanized coating as per standard,
    - Connected to station earth mat,
    - Pedestrian access gate to be provided with high security, all weather padlocks installed in protective sleeve (Sleeve required to prevent lock tampering).
- Energized fence:
    - Free standing 24 strand energized fence,
    - Fence height at 2.4m above ground level,
    - Gate to match fence construction and be energized with suitable contactor(s),
    - Minimum energy output at end-of –line to match 5 Joule,

  - Zones to be setup on the four sides, i.e. eastern side – Zone 1, southern side – Zone 2, western side – Zone 3, northern side – Zone 4,
  - Remote arming/disarming and alarming of the fence system with GUI for control room operator,
  - T-plinth installed under fence at 600mm wide by 100 high top slab with 100mm wide by 600mm deep anti burrowing plinth as per specification,
  - System integration with site PSIM.
  - Pedestrian access gate to be provided with high security, all weather padlock installed in protective sleeve (Sleeve required to prevent lock tampering),
  - Connected to station earth mat,
  - Energizer(s) to be installed in lockable enclosure within control room
- Inner perimeter:
  - Fence height at 2.4m above ground level with V overhang with BTC installed at 600mm in diameter,
  - Pedestrian access gate to be provided with high security, all weather padlock installed in protective sleeve (Sleeve required to prevent lock tampering),
  - Foundation of concrete wall to cater for integrated sleeve for network infrastructure with appropriately positioned draw boxes and draw wires installed,
  - Connected to station earth mat,
- Additional single-tier Category 1 High Security Fences will be constructed within the site to separate the BESS area and Solar PV area from the normal Substation. The fences shall be constructed as follows:
  - Category 1 High Security Mesh Fence,
  - Fence height at 2.4m
  - Vehicle Access Gates to match fence construction,
  - Galvanized coating as per standard,
  - Connected to station earth mat,
- Gate access points
  - All gate access points to have required sleeves installed for electrical and communications services with construction to match security device positions.

2.4 Description of Project Component

2.4.1 Pre-Construction and Construction process for the proposed development

It is estimated that approximately 150-250 construction workers will be required on the site. Most of the unskilled labour will be sourced from the local towns nearby the site, and will be transported daily to site during construction.

The pre-construction and construction of the proposed development will be undertaken in the following steps:

- Undertaking and completion of proposed development concept. Eskom will execute the project utilising an Engineering, Procurement and Construction (EPC) Contractor. The final detailed designs, layout, and construction of the PV and BESS facility will be performed by the selected EPC Contractor.
- Obtain the relevant permits and siting approval (Undertake the BA Process, Water Use License Application (WULA/General Authorisation-GA), obtain permits from local authorities, landowners, fire department, etc.);
- Pre-construction site work, such as geotechnical investigations;
- Undertaking of, and compliance with pre-construction activities and conditions in terms of the Environmental Authorisation;
- Site preparation: Vegetation and topsoil will be cleared for the footprint of the infrastructure, as well as for the access roads to the solar PV site, internal roads and the laydown yard, etc. The topsoil removed will be stored for rehabilitation purposes of the site.
- Transportation of equipment: All equipment will be transported to site by means of national, provincial and district roads. This includes but is not limited to transformers, solar PV modules, inverters, excavators, towers, graders, trucks, compacting equipment, construction material, amongst others.
- Site Establishment Works: The site will have temporal laydown areas and offices for the construction contractors. This will include the contractor's chosen electricity supply infrastructure, e.g. use of generators and fuel storage, that will be required to conform to acceptable measures to ensure no harm to the environment. The laydown area will also be used for assembling of solar PV modules and structures. A concrete batching plant may also be required as part of the site establishment works.
- Construction of the Solar PV Facility and BESS: Trenches would need to be excavated for underground cabling to connect Solar PV arrays and Inverter stations. Foundations for the solar PV array mounting structures and Inverter stations will need to be excavated, with the final extent depending on the Geotechnical studies that will be conducted. The Geotechnical studies will determine the type of foundations that can be utilised at the PV site. Construction of access, perimeter, and internal gravel roads may require material to be imported from licenced material sources or a permitted quarry.
- Construction and/or installation of water supply and storm water management infrastructure.

- Construction and installation of underground electrical interconnection cables, connecting the Solar PV facility to the 132 kV Kiwano substation.

The construction phase for the proposed project will take approximately 2 years.

2.4.2 Rehabilitation activities

Once all the construction activities are completed, the site will be rehabilitated where possible and practical. All temporal structures and facilities will be removed from site and the area will be rehabilitated.

2.4.3 Operational activities

After the installation and commissioning, the responsibility for safe operation and asset management will be transferred to the operation team. The solar PV plant has a minimum design life of 25 years. Operational and maintenance activities associated with the Solar PV and BESS facility include:

- Normal maintenance of all electrical and mechanical components of the plant will occur during the life of the Solar PV facility.
- Periodic cleaning and washing of the solar PV modules will be required. This PV module cleaning will be performed when required, and it is estimated to occur 2-4 times a year, or when the reference cells show a difference greater than 50 W/m^2 between the clean and soiled cells.

A plan for systematic maintenance and function testing should be kept on location showing in detail how components and systems should be tested and what should be observed during testing. Visual periodical and mandatory services should be kept in place. Maintenance may be performed manually or automated. In case of manual maintenance, a higher level of safety precautions needs to be undertaken.

2.4.4 Decommissioning activities

The Solar PV plant has a minimum design life of 25 years. The extension of the life of the plant will be considered when assessing the plant's economic viability to remain operational after its end of life. The decommissioning of the plant will have similar activities to those that are performed during construction. The decommissioning activities anticipated once the facility reaches its end of life are as follows:

- Disassembling of the components of the facility, including but not limited to Solar PV modules, structures, foundations, inverters, cabling, etc.
- Site preparation, removal of all equipment for disposal and re-use.
- Site rehabilitation to acceptable level as per EMPr guidelines.

3 LEGISLATIVE FRAMEWORK

3.1 Legislative Requirements for the EMPr

In terms of Section 19(4) read with Appendix 4 of the Environmental Impact Assessment Regulations, 2014 as amended (EIA Regulations); the EMPr must comply with Section 24N of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) as amended and include.

The implementation of the EMPr for the proposed activity is a requirement by the NEMA EIA Regulations (2014) and is likely to similarly be a condition in the Environmental Authorisation (assuming such), issued by the DFFE. As such, failure to comply with this EMPr will constitute an offence and the client and their Contractor may be liable to penalties and/or legal action. Therefore, it is important for all the responsible parties to understand their duties and undertake them with duty and care.

3.2 Applicable Legislation

The Applicant is responsible for compliance with the provisions for duty of care and remediation of damage in accordance with Section 28 of NEMA and its obligations regarding the control of emergency incidents in terms of Section 30 of NEMA. Accordingly, the DFFE must immediately be notified of an incident as defined in subsection 30(1) (a) of NEMA.

Environmental legislation in South Africa was promulgated with the aim of, at the very least, minimising and, at the most, preventing environmental degradation. The Acts and Regulations applicable to the proposed solar PV facility, BESS and associated infrastructure, are summarised in Table 3-1.

The list below was compiled to ensure that the Applicant is aware of their legal responsibilities and liabilities during the construction and operation of the proposed solar PV plant and associated infrastructure.

Eskom, and any agents or Contractor's acting on its behalf, should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation, and in terms of the additional conditions to the general conditions of contract that pertain to this project. Non-compliance to the National Water Act, 1998 (Act No. 36 of 1998) and applicable environmental laws are a criminal offence and if prosecuted, Eskom will be liable for any environmental damage incurred.

Various environmental legislation and policies relate to the proposed activities, including the following listed in Table 3-1.

Table 3-1: List of Applicable Legislation

Name of Act	Act No. and Year	Notes/remarks
The Constitution of the Republic of South Africa	108 of 1996	Includes the Bill of Rights, Environmental rights, Rights to property, administrative justice and Access to information, *inter alia*.
National Environmental Management Act	107 of 1998	List of activities and competent authorities identified in terms of Sections 24 and 24D. NEMA Environmental Impact Assessment (EIA) Regulations 2014 (GN R.982), as amended in April 2017 (published in Government Notice No. R.326).
National Environmental Management: Protected Areas Act	57 of 2003	Provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes.
National Environmental Management: Biodiversity Act	10 of 2004	Strategy for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory.
National Heritage Resources Act (NHRA)	25 of 1999	The NHRA serves to introduce an integrated and interactive system for the identification, assessment and management of the heritage resources of South Africa. The NHRA promotes good governance and the empowerment of civil society to preserve their heritage for future generations and states the principles of heritage resource management while making provision for legislation protecting national heritage.
National Environmental Management: Air Quality Act	39 of 2004	Control of dust, noise and offensive odours.
Hazard Substances Act, and Regulations	15 of 1973 of	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Conservation of Agricultural Resources Act (CARA)	43 of 1983	To provide for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
The Promotion of Administrative Justice Act	3 of 2000	• Definitions (Section 1); • Procedural Fairness (Section 3, 4 and 6); • Right to Reasons for Decisions (Section 5); and • Judicial Review (Section 6 and 8).
Occupational Health and Safety Act	85 of 1993	Prescribes health and safety measures necessary to adhere to for all construction workers
Promotion of Access to Information Act	2 of 2000	Right of access to any information held by the State or by another person and that is required for the exercise or protection of any rights
National Water Act, and regulations	36 of 1998	Prevention of effects of pollution, control of emergency incidents, and water use and licensing.
National Veld and Forest Fire Act	101 of 1998	While no permitting or licensing requirements arise from this legislation, this act will find application during the operational phase of the project. Due to the fire prone nature of the area, it must be ensured that the developer proactively manage risks associated with veld fires and provide cooperation to the local Fire Protection Agency.
National Building Regulations and Building Standards	103 of 1997	To promote the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities for the prescribing of

Name of Act	Act No. and Year	Notes/remarks
		building standards and for matters connected therewith.
National Road Traffic Act (NRTA)	93 of 1996	To provide for road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.
All other National and Provincial Legislation and any relevant Ordinance, Regulation, By-laws and relevant National Standards and Norms.		
All relevant Provincial and Municipal bylaws. The Dawid Kruiper Local Municipality may have certain requirements in terms of bylaws and trade permits, and a few of these may be applicable to this project: Water and Sanitation Bylaw Waste Management Bylaw Municipal Health Bylaw		
National Noise Control Regulations as outlined in the Environmental Conservation Act, 1989 (Act No. 73 of 1989).		
Construction Regulations of 2003, which applies to any persons involved in construction work and are therefore applicable to the construction phase. The regulations provide guidelines for safe operation during construction.		
Hazardous Chemical Substance Regulations of 1995, which stipulates the requirements for storage and handling of hazardous chemical substances and provide guidelines for the training of staff.		

3.3 List of activities associated with the project

The activities that are associated with the proposed project trigger activities listed in Government Notice No. R.983 (2014) as amended. As set out in Regulations 19 of the National Environmental Management Act (NEMA) Environmental Impact Assessment Regulations, 2014, the proposed project is subjected to a BA Process (Government Notice No. R.982). Zitholele Consulting (Pty) Ltd has therefore been appointed as the independent EAP to undertake the BA Process for the proposed Project.

The BAR will be submitted to the DFFE for licensing of the listed activity triggered as indicated in Table 3-2 below:

Table 3-2: Detailed description of the listed activity associated with the project

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts. excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is— (a) temporarily required to allow for	Eskom proposes the construction and operation of a new on-site 132 kV substation with 5 feeder bays substation to facilitate the connection of the facility to the national grid. The development area is located outside of an urban area. Eskom further propose to develop 132kV loop-in loop-out powerlines from the Solar PV and BESS facility substation to the existing Upington substation. The powerline associated with Site Alternative A will be approximately 1 330m in length, while the powerline associated with Site Alternative B will be approximately 5 568m in length. The infrastructure for the distribution of electricity that will

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
	maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	be included in the proposed development is NOT considered bypass infrastructure that is temporarily required for maintenance, within an existing transmission line servitude, nor will it be removed within 18 months of the commencement of the development. The exclusion applicable to Regulation 11 of Listing Notice 1 is therefore NOT APPLICABLE to this proposed development.
12	The development of (ii) infrastructure or structures with a physical footprint of 100 square meters or more; where such development occurs (a) within a watercourse or (c) within 32 meters of a watercourse, measured from the edge of a watercourse; - excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.	The development of the Solar PV and BESS facility will require the establishment of solar PV panels and other associated infrastructure within natural drainage lines and within 32m of natural drainage lines identified within the study area. The solar PV panel area will be approximately 103.5 ha in extent, situated within the proposed development site of 136.9 ha. The natural drainage features, although not strictly defined as a wetland or pan, is classified as a watercourse since it does channel water along its alignment during some periods of the year. Considering the exclusions included with Regulation 12 of Listing Notice 1, the development of infrastructure of 100 m^2 or more within a watercourse or within 32m of a watercourse: • Will not occur within a harbour • Is not associated with the development of a new harbour • Does not trigger activity 14 in Listing Notice 2 or 3 • The activity does not occur within the urban boundary of the town of Upington • The activity does not occur within existing roads, road reserves or railway line reserves, nor • Will the infrastructure be removed within 6 weeks of the commencement of development and indigenous vegetation will be cleared. The exclusion applicable to Regulation 12 of Listing Notice 1 is therefore NOT APPLICABLE to this proposed development.
14	The development and related operations of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 m3.	The development of the BESS plant will include the installation of batteries that will contain substances and materials classified as dangerous goods. This listed activity was included due to the fact that one of the BESS alternatives propose the use of Solid State batteries. Some solid state batteries mentioned in the FBAR contain Sulfuric acid and Nickel Cadmium (NiCd). Sulfuric acid is listed in terms of SANS 10234:2008 and is highly

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
		corrosive and when overcharged the battery generates hydrogen which presents an explosion risk. Sulphuric acid is also toxic to freshwater fish and invertebrates at certain dosages. Nickel Cadmium (NiCd) solid state batteries, on the other hand, contain Cadmium and various Cadmium chemical combinations of which several are listed in terms of SANS 10234:2008. Vanadium Redox Flow Batteries contain Vanadium pentoxide, Hydrochloric acid and Sulfuric acid. Vanadium pentoxide is listed in SANS 10234:2008 (023-001-00-8), and although Vanadium is a nontoxic chemical, the electrolyte is caustic and poses corrosive and environmental hazards similar to lead-acid batteries. Although the EPC contractor that is still to be appointed to develop and construct the BESS facility will confirm construction methods relating to the installation of the chosen battery technology, it is accepted that in some instances the shipping and storage of large quantities of electrolyte, especially for flow battery technologies, will occur on site prior to filling as described on page 62 of the FBAR. Components of the battery storage units for Solid State batteries will be pre-assembled prior to delivery on site, however in the case of flow battery technologies assembly of the battery units will occur on site. The development further includes the construction and use of a Hazardous chemical store with a 24m^2 footprint size where chemicals will be stored. The chemical store will include oils and lubricants which will be required for the operation and maintenance of plant and machinery, and other industrial applications during the construction and operation phase of the proposed development. Collectively, the combined capacity of all the battery units and content of the chemical store will be more than 80m^3.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse. but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a	The construction of the access road to Site Alternative A and B, as well as trenching associated with the construction of the potable water pipeline, will require dredging and construction across non-perennial drainage lines located within the development property. These non-perennial drainage lines are classified as watercourses by the Department of Water and Sanitation (DWS). The construction and installation of the Solar PV panels and BESS facility will result in a cumulative volume of infilling or dredging of more than 10 m^3 within the non-perennial drainage lines located across the development site. Considering the exclusions included with Regulation 19 of Listing Notice 1, the proposed infilling, depositing,

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
	maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	dredging, excavation, removal or moving: • Will not occur behind a development setback • Is not associated with maintenance undertaken in accordance with a maintenance management plan, • Does not fall within the ambit of activity 21 of Listing Notice 1, • Does not occur within existing ports or harbours, • Nor is related to the development of a new port or harbour. The exclusion applicable to Regulation 19 of Listing Notice 1 is therefore NOT APPLICABLE to this proposed development.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare, excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The proposed development is considered an industrial use and is proposed on land that was previously used for agricultural purposes, occurs outside of an urban area and will cover an area of more than 20 ha on land zoned for agriculture. Considering the exclusions included with Regulation 28 of Listing Notice 1, the proposed development site was used for agricultural purposes and has NOT been developed for residential, mixed, retail, commercial, industrial or institutional purposes and any point. The exclusion applicable to Regulation 28 of Listing Notice 1 is therefore NOT APPLICABLE to this proposed development.
Activity No(s):	**Basic Assessment activities as set out in Listing Notice 3 (GN R985) of the EIA Regulations, 2014, as amended.**	**Applicability of listed activities to the proposed development**
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. **g. Northern Cape:** ii. Outside urban areas: (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	The proposed development of Site Alternative A will require construction of an access road from the National Road (N14) to the boundary of the development property. This access road, which goes through a Critical Biodiversity Area (CBA) as identified in the Northern Cape Critical Biodiversity Areas of 2016, will be tarred and will be greater than 4m in width.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is	The proposed development of Site Alternative A will require construction of an access road from the National Road (N14) to the boundary of the development property. This access road alignment goes through a Critical

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
	required for maintenance purposes undertaken in accordance with a maintenance management plan. **g. Northern Cape** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;	Biodiversity Area (CBA) as identified in the Northern Cape Critical Biodiversity Areas of 2016 and will result in the clearance of more than 300m^2 of indigenous vegetation. The construction of the potable water pipeline for Site Alternative A and B will require trenching that will result in the clearance of more than 300m^2 of indigenous vegetation. The proposed Project is located outside an urban area and will not occur on existing infrastructure but on vacant land. Considering the exclusion included with Regulation 12 of Listing Notice 3, the clearance of indigenous vegetation is NOT required for maintenance purposes undertaken in accordance with a maintenance management plan. The exclusion applicable to Regulation 12 of Listing Notice 3 is therefore NOT APPLICABLE to this proposed development.
Activity No(s):	**Scoping and EIR activities as set out in Listing Notice 2 (GN R984) of the EIA Regulations, 2014, as amended.**	**Applicability of listed activities to the proposed development**
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more, excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs — (a) within an urban area; or (b) on existing infrastructure.	Eskom is proposing to develop a 58 MW Solar PV facility as well as a 40 MW / 200 MWh BESS facility. In terms of section 3 of GN 114 of 2018, Solar projects that falls within a REDZ are exempted from following a full EIA process and may follow a Basic Assessment Process. Considering the exclusion included with Regulation 1 of Listing Notice 2, the development of facilities or infrastructure for the generation of electricity from a renewable resource will not occur within an urban area, nor on existing infrastructure. The development will occur outside the urban edge of the town of Upington. The exclusion applicable to Regulation 1 of Listing Notice 2 is therefore NOT APPLICABLE to this proposed development.
15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed Solar PV development areas for Site Alternative A and B are approximately 103.5 ha, while the BESS development site is approximately 3.4 ha in extent. Although not all areas with the development footprint will be cleared, cumulatively the combined clearance of more than 20 ha of indigenous vegetation will occur during the development of the facility. The proposed Project is located outside an urban area and will not occur on existing infrastructure but on vacant land. Considering the exclusion included with Regulation 15 of Listing Notice 2, the clearance of indigenous vegetation is

Activity No(s):	Basic Assessment activities as set out in Listing Notice 1 (GN R983) of the EIA Regulations, 2014, as amended	Applicability of listed activities to the proposed development
		NOT required for the undertaking of a linear activity, nor for maintenance purposes undertaken in accordance with a maintenance management plan. The exclusion applicable to Regulation 15 of Listing Notice 2 is therefore NOT APPLICABLE to this proposed development.

4 ORGANISATION STRUCTURE

The organisational structure identifies and defines the responsibilities and authority of the various role-players (individuals and organisations) involved in the project. All instructions and official communications regarding environmental matters shall follow the organisational structure shown in **Figure 4-1** below.

The organisational structure reflected in **Figure 4-1** has been developed to ensure that:

- There are clear channels of communication;
- There is an explicit organisational hierarchy for the integration project; and
- Potential conflicting or contradictory instructions are avoided.

In terms of the defined organisational structure reflected in **Figure 4-1** below, all instructions that relate to environmental matters will be communicated to the Contractor via the Environmental Officer (EO). The only exception to this rule would be in an emergency situation. An emergency is defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the Environmental Control Officer (ECO), result in unacceptable environmental degradation. In emergency situations instructions may be given directly to the Contractor. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in **Section 5**.

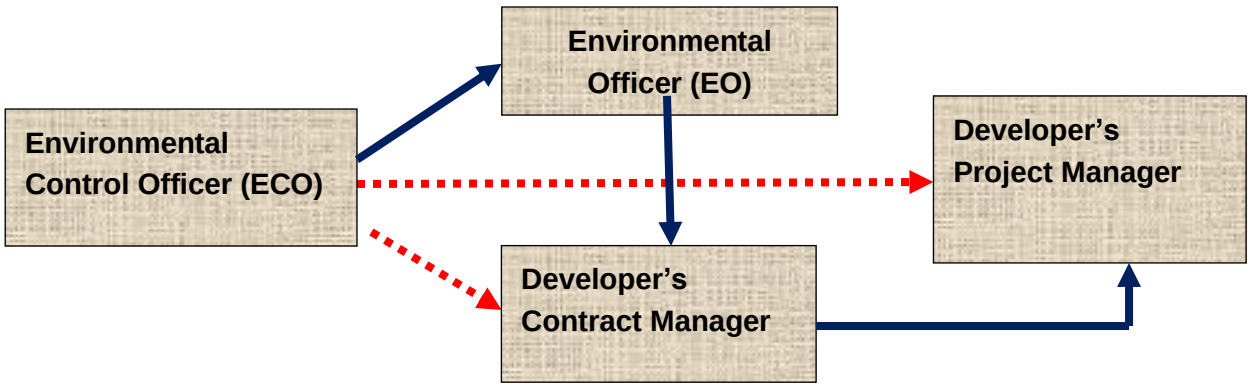

Figure 4-1: Organisation Structure for Environmental Reporting

5 ENVIRONMENTAL ROLES AND RESPONSIBILITIES

The Contractor, for the proposed development and installation, shall be responsible for ensuring compliance with the provisions contained in the EMPr, and shall be held accountable in terms of the EMPr. The detailed roles and responsibilities of each of these organisations are outlined below.

5.1 Department of Forestry, Fisheries and the Environment

As the Competent Authority (CA), the DFFE has the responsibility to ensure that the developer complies with the conditions of the EA for this proposed project (once received) as well as the requirements of the broader environmental legislation, specifically the NEMA. Compliance would be confirmed via the following mechanisms:

- Receipt and review of the environmental reporting required in terms of the EA; and
- *Ad hoc* and planned site inspection by the DFFE Compliance and Enforcement.

The successful implementation of this EMPr requires cooperation between the Developer (Eskom Holdings SOC Ltd.), project manager, the appointed contractors and the appointed ECO.

5.2 General roles and responsibilities

General roles and responsibilities have been outlined below (Table 5-1) and the project team is required to comply with the conditions defined herein.

Table 5-1: Roles and Responsibilities

Responsible Agent	Role/Responsibility
Monitoring Authority DFFE	The National Department of Forestry, Fisheries and the Environment (DFFE) is the designated authority responsible for authorising this EMPr. DFFE has overall responsibility for ensuring that the Applicant complies with the conditions of Environmental Authorisation and the EMPr. DFFE shall also be responsible for approving any amendments to the EMPr (if required). DFFE may also perform random site inspections to check compliance with the EMPr.
Developer	The Developer has overall responsibility for ensuring that its operations are undertaken in an environmentally sound and responsible manner, and in particular, reflects the requirements and specifications of the EMPr and recommendations from the relevant authorities. The responsibilities of the Project Developer will be to: • appoint or designate a suitably qualified PM to manage the implementation of the proposed development; • Establish and maintain regular and proactive communications with the designated/ appointed PM, Contractor(s) and ECO; and • Ensure that the EMPr is reviewed and updated as necessary. <u>Reporting Structure:</u> The Developer will liaise with and/or take instruction from the following: • Authorities; • ECO; and • General Public.
ECO	ECO should be a suitably qualified person and should: • Ensure that contractors receive copies of the EMPr, Environmental Authorisation and all agreed Method Statements; • Provide on-site guidance, surveillance and reporting commensurate with the project phase/progress; • Undertake frequent site visits and record key findings. This includes photographic monitoring of the construction site and an evaluation of the implementation, effectiveness and level of compliance of on-site construction activities with the EMPr and associated plans and procedures; • Attend monthly project meetings; • Instruct EO or Contract Manager or Eskom's appointed PM on actions or issues impacting on the environment and provide appropriate site instructions to address and rectify these matters; • Record and provide written documentation of non-

Responsible Agent	Role/Responsibility
	conformances with the EMPr and require Eskom to undertake mitigation measures to avoid or minimise any adverse impacts on the environment or report required changes to the EMPr; • Review corrective and preventative actions to ensure implementation of recommendations made from audits and site inspections; • Order the Contractor to suspend part or all of the works if the Contractor and/or any sub-contractors, suppliers, etc. fail to comply with any aspect of either the EMPr or Environmental Authorisation (EA); • Identify possible areas of improvement; • Ongoing assessment of the suitability or effectiveness of the EMPr and make concomitant recommendations; • Submit monthly environmental audit reports to DFFE (or as per conditions of EA) during the construction phase; • Monitor and record the processing of public complaints and their resolution relating to the construction activities; and • Ensure that updates to the EMPr (as necessary) are implemented.
Construction Contractor (CC) / Appointed EO	The Construction Contractor must: • Appoint a EO to interpret the EA and EMPr on behalf of the Construction Contractor *inter alia* to ensure appropriate environmental awareness and training to achieve conditions of the EA and EMPr; • Ensure that all construction staff, sub-contractors, suppliers, etc. are familiar with, understand and adhere to the EMPr, EA and all agreed Method Statements (Environmental Awareness Plan) per their job function; • Ensure that all facets of the work undertaken are properly and competently directed, guided and executed during construction according to the EMPr; • Ensure construction of the facility to contractual environmental specifications; and • Adherence to laws and standards relevant to the construction of the facility.
PM	The primary role of the PM will to ensure that the Contractor and Developer comply with the environmental specifications in the EMPr. The PM shall further: • Oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications; and • Liaise between and with the Contractor (including EO) and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. In addition, the PM shall: • Designate or appoint a suitably qualified Environmental Manager (EM) that will manage all environmental aspects on behalf of the PM and the Developer;

Responsible Agent	Role/Responsibility
	• Assume overall responsibility for the effective implementation and administration of the EMPr; • Be familiar with the contents of the EMPr, and his role and responsibilities as defined herein; • Ensure that the EMPr is included in the Contractor's contract; • Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports; • In conjunction with the EO; undertake regular inspections of the Contractor's site as well as the installation works in order to check for compliance with the EMPr in terms of the specifications outlined therein. Inspections shall take place at least once a week during construction and copies of the weekly monitoring checklist will be contained in the file; • Issue site instructions giving effect to the ECO requirements where necessary; • Keep a register of all complaints and incidents (spills, injuries, complaints, legal transgressions, etc.) and other documentation related to the EMPr; • Report to the ECO any problems (or complaints) which cannot first be resolved in co-operation with the Contractor(s); • Implement recommendations of possible audits; • Implement Temporary Work Stoppages as advised by the ECO, where serious environmental infringements and non-compliances have occurred; • Facilitate proactive communication between all role-players in the interests of effective environmental management; and • Ensure that construction staff is trained in accordance with requirements of the EMPr. <u>Reporting Structure:</u> The PM will report to the Developer, as and when required.

6 ENVIRONMENTAL ISSUES IDENTIFIED

A number of Specialist Studies were undertaken, and the summary of the key findings are included in the paragraphs below:

6.1 Terrestrial Biodiversity Assessment

During the field survey conducted, several indigenous floral species were observed. Four (4) of the recorded flora species are protected by legislation. Therefore, these species are not allowed to be collected, unless a permit from the Department of Environment and Nature Conservation, Kimberly (Northern Cape Province) is granted for their removal, and damage to these species by anthropogenic activities must be avoided.

One invasive plant species (*Datura* sp.) was present within the general area but not within the proposed footprint. Invasive Alien Plant (IAP) species that may colonize the area in the future, must be controlled by implementing an Invasive Alien Plant Management Programme, in compliance with Section 75 of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA). The monitoring of the area throughout the process is crucial in order to prevent IAPs growing and spreading out of control, thereby threatening the occurrence of indigenous flora and fauna.

No amphibian species were recorded during the survey period, accounting for 0% of the expected species. The lack of species richness was attributed to the arid nature of the site and lack of suitable habitat within the project area. The species expected to occur within the assessment area are provided in Appendix B of the Terrestrial Biodiversity Impact Assessment.

Two reptile species, representing two families were recorded within the assessment area during the survey periods (see Table 6-1). This accounts for 11% of the total expected species. The lack of species richness was likely due to the combination of the inherent secretive nature of reptile species, and limited time available for fieldwork (*a true representative sample requires an extensive sampling period over several surveys*). The presence of suitable habitat suggests that the area supports a diverse reptile community.

Table 6-1*: Summary of reptile species recorded within the assessment area during the survey period. *LC = Least Concern*

Family	Scientific Name	Common Name	Conservation Status	
			Regional	Global
Agamidae	*Agama atra*	Southern Rock Agama	LC	LC
Lacertidae	*Pedioplanis lineoocellata*	Spotted Sand Lizard	LC	LC

Ninety-eight (98) species of avifauna were recorded within the assessment area during the survey period, with three of the species regarded as being of conservation concern (list the names of them from the Specialist). A considerable portion of the species are regarded as typical karoo species, with some species associated with human settlements.

A total of one (1) mammal species was recorded within the assessment area during the survey period (Table 6-2), accounting for 4% of the expected mammal species. It is considered highly likely that additional mammal species would be recorded from the site with extensive sampling.

Table 6-2: Mammal species recorded within the assessment area during the survey periods

Family	Scientific Name	Common Name	Conservation Status
			Regional
Bovidae	*Raphicerus campestris*	Steenbok	**LC**

Although the habitat types of each of the alternative sites are overall the same, with the same dominant species as well as many of the same species, the numbers of geophytic species recorded from Site Alternative B were much higher, indicating that this site is somewhat more sensitive from a floristic perspective. No difference was noted in terms of faunal composition between the two alternatives. In such cases, areas with high numbers of potentially conservation important species should be avoided in favour of the site with the least number of conservation important species. In addition, sites closer to existing infrastructure (such as site alternative A) are preferred as fragmentation is thus kept to a smaller overall area.

Without mitigation measures, the destruction of Protected plant species will be a moderately high impact. With mitigation, the impact will be reduced to a low impact.

The following impacts that have been identified during the construction phase, are moderate without mitigation:

- Destruction, further loss and fragmentation of the vegetation community (including a portion of an area classified as an CBA-irreplaceable and Ecological Support Area (ESA) as well as Endangered (EN) vegetation type;

- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (noise, dust and vibration).

With the implementation of mitigation measures, the impacts will be low.

The following impacts that have been identified during the operational phase, are moderately-high without mitigation:

- Continued encroachment and displacement of the vegetation community due to alien invasive plant species, particularly in previously disturbed areas.

With the implementation of mitigation measures, the impacts will be low.

The following impacts have been identified during the operational phase, are moderate without mitigation:

- Continued displacement and fragmentation of the faunal community due to ongoing anthropogenic disturbances (noise, traffic and dust);

- Loss of faunal species (road mortalities and/or poaching); and

- Habitat degradation (litter and alien vegetation encroachment).

6.2 Wetland Assessment

The wetland areas were delineated in accordance with the Department of Water Affairs and Forestry (DWAF) (2005) guidelines. Various drainage features and some more significant depressions/pans were identified throughout the 500m regulated area. None of these systems are characterised by hydromorphic signs of wetness, and therefore do not constitute wetland habitat. The drainage features are not characterised by riparian vegetation and grasses, and these systems represent bare surfaces with evidence of surface run-off. A large number of small drainage features were identified within the assessment area.

The following Zones of Regulation (ZoR) are applicable to the drainage features identified within the assessment area:

- A 32 m Zone of Regulation in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) should be assigned to the drainage lines; and
- A 100 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) should be assigned to the drainage lines.

Regardless, it is recommended that the depressions which bare some functionality as well as the drainage features be conserved throughout the construction and operational phase. Those drainage features and depressions which bare more relevance due to recent deposition and movement of water (therefore not smaller insignificant features) were delineated. The soils within these features are characterised by alluvial deposits rather than hydromorphic soils, which renders these systems non-wetland.

Site B, which is preferred for development, has multiple drainage systems running through the proposed PV facility area. The substation and BESS are located to the south of a drainage system and might have some indirect impacts on the system. The roads, pipeline and power line will have multiple crossings over the delineated drainage line, and will thus, have the highest impacts on the watercourses and in return have the most mitigation measure to adhere too (see Figure 6-1).

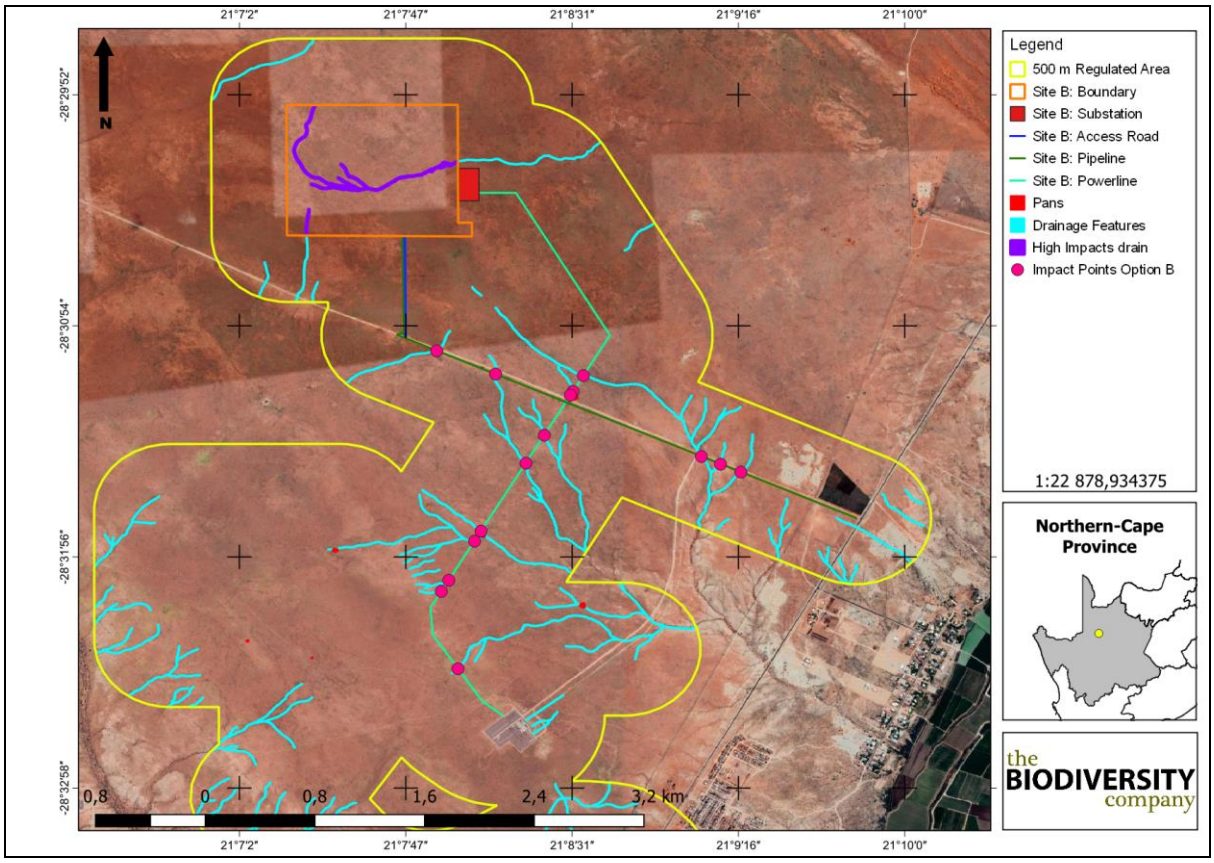

Figure 6-1: Possible points where impacts may occur during development at Site Alternative B

The following potential main impacts on the wetland were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact. The following potential impacts are anticipated during the construction phase:

- Destruction, further loss, and fragmentation of the watercourses;
- Clearing of vegetation;
- Removal of soils;
- Altering overland flows; and
- Dust suppressants.

Without mitigation, moderate risks were identified for the construction phase of the project, and these are largely attributed to the direct impact of these aspects on the watercourses. Implementation of the prescribed mitigation measures will reduce the level of risk posed by these aspects to low. The duration of these aspects is also expected to be short in duration.

The operational phase is the impacts of the daily activities when the development is functioning. These impacts are small impacts over a long-time frame. These impacts are associated with the movement of people to ensure that the facilities stay up to date. The

main impacts are thus the traffic through the project area. The following potential impacts are anticipated during the operational phase:

- Erosion within wetland due to overland flows;
- Water quality impairment;
- Drainage pattern changes; and
- Deposition of dust.

The erosion and water quality impairment impacts within the delineated watercourses are 'Low' pre-mitigation and 'Very Low' post-mitigation. To ensure that the water used to clean the PV panels does not impair the water quality, workers should use potable water without any chemicals.

All proposed activities are expected to be long term (> 15 years) and have been considered 'permanent' on this basis, which renders the decommissioning phase irrelevant.

As per the Risk Assessment Matrix (RAM) undertaken for the 500m regulatory area, the post-mitigation risks are low, and a General Authorisation (GA) is applicable for the proposed development.

6.3 Heritage Assessment

According to Beaumont *et al* (1995) "thousands of square kilometres of Bushmanland are covered by a low-density lithic scatter" and are referred to as background scatter (Orton 2016), generally of low heritage significance. Stone Age scatters and isolated finds of low heritage significance were recorded during Heritage Impact Assessments (HIA's) in the area (e.g., Gaigher 2013, Fourie 2014, van der Walt 2015 and 2018). Isolated finds that can be attributed to background scatter were recorded on the preferred site. The site is marked by a mantle of Aeolean sand on top of a calcrete substrata and finds are mostly found where the calcrete protrudes through the sand cover. Few formal tools were noted but artefacts are mostly dating to the Middle Stone Age (MSA) with facetted striking platforms. One feature (K10) that could be a possible grave was recorded close to (~40 meters) the proposed pipeline for Site B. Recorded features were given the prefix K for Kiwano. The distribution of recorded features is indicated in Figure 10-2 and briefly described in Table 6-3.

Table 6-3: Recorded features in the study area

LABEL	LONGITUDE	LATITUDE	DESCRIPTION	Field Rating and Heritage Significance
K4	21° 07' 44.4972" E	28° 29' 57.4188" S	Calcrete with miscellaneous flake and end scraper.	GP C Low Significance
K5	21° 07' 40.8361" E	28° 29' 57.2676" S	Multidirectional core	GP C Low Significance
K6	21° 07' 21.7164" E	28° 30' 00.4537" S	MSA point, broken flake and chunk on top of calcrete	GP C Low Significance
K7	21° 07' 20.8199" E	28° 30' 00.4824" S	Broken flakes with dorsal removals	GP C Low Significance
K8	21° 07' 20.9928" E	28° 30' 25.4087" S	Irregular core	GP C Low Significance
K9	21° 07' 33.8880" E	28° 30' 25.3009" S	Miscellaneous flakes on Banded Iron Stone	GP C Low Significance
K10	21° 08' 58.4485" E	28° 31' 24.4451" S	Possible grave marked by a oval cairn of river pebbles, measuring ~ 1.3 meters in diameter	GP A High Social significance

The following impacts were identified during the construction phase of the project and have a low significance rating without mitigation:

- Destruction of isolated Stone Age scatters in the project area; and
- Damage or destruction to the possible grave at K10.

With the implementation of mitigation measures, the significance will remain low.

No adverse impact on heritage resources are expected by the project, and it is recommended that the project can commence on the condition that the recommendations by the Archaeologist are implemented as part of the EMPr and based on approval from South African Heritage Resources Agency (SAHRA).

The overall impact of the project is considered to be low and residual impacts can be managed to an acceptable level through implementation of the recommendations made by the Archaeologist.

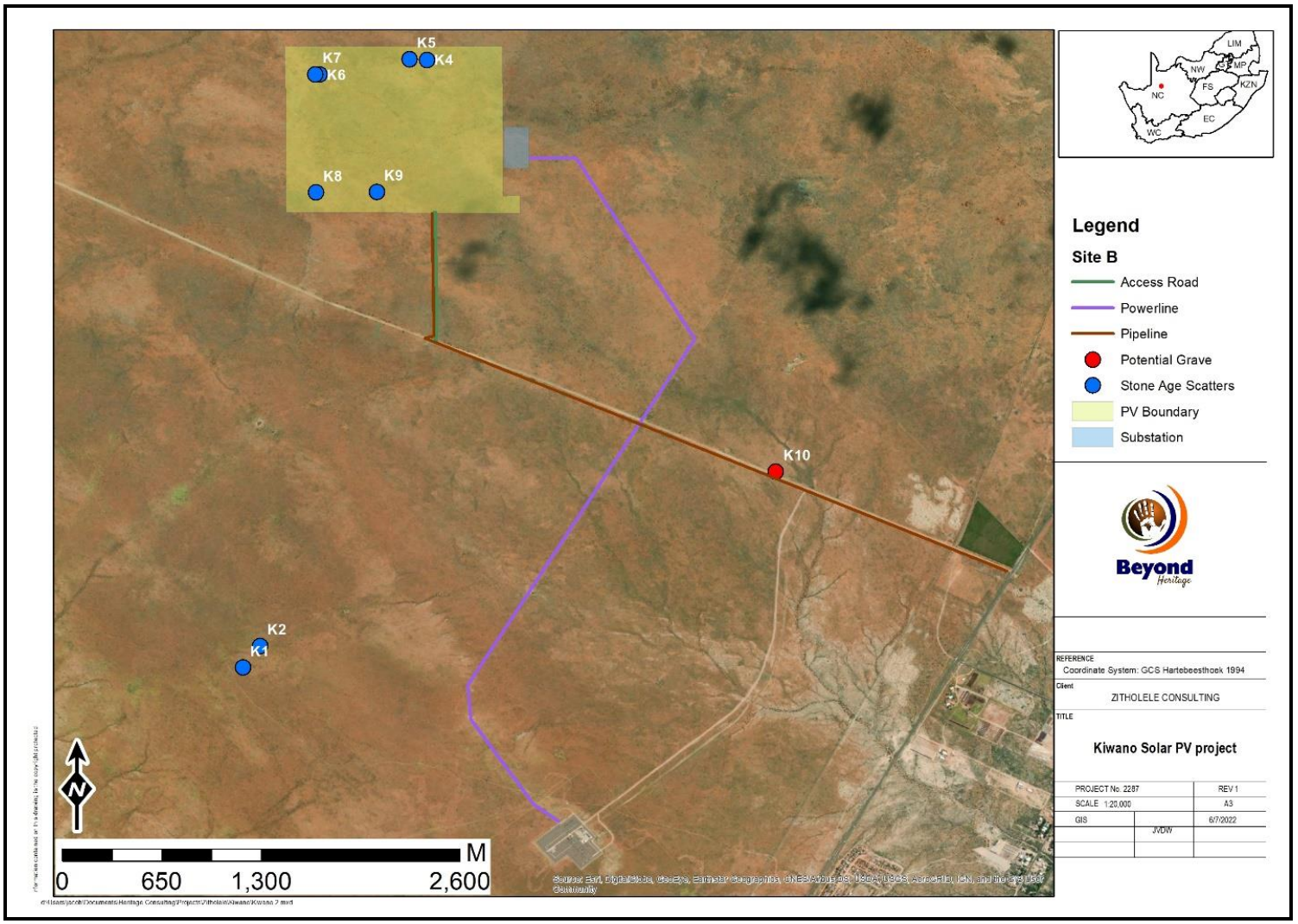

Figure 6-2: Recorded features in relation to Site B

6.4 Paleontological Assessment

The Paleontological Sensitivity Map the study area is of moderate paleontological significance. The study concluded that it is extremely unlikely that any fossils would be preserved in the aeolian sands of the Gordonia Formation, Kalahari Group (Quaternary). There is a very small chance that fossils may have been trapped in features such as palaeo-pans or palaeo-springs, and buried by the aeolian sands, but no such feature is visible in the satellite imagery. Nonetheless, a Fossil Chance Find Protocol should be implemented.

It is recommended that no further Palaeontological Impact Assessment is required unless fossils are found by the Contractor, Developer, Environmental Officer or any other designated responsible person, once excavations/ drilling activities have commenced. Since the impact is low, as far as the palaeontology is concerned, the project should be authorised.

6.5 Visual Impact Assessment

Whilst the landscape in the region of the proposed sites is potentially sensitive to visual impacts due to lack of visual contrast in the landscape and the lack of significant enclosure or relief, the specific sites chosen for the project, the limited number of visual receptors and sensitive views in the area and the low height and flat, linear nature of the development, mean that there will be limited impact on the visual and aesthetic environment. This is primarily due to the very subtle ridge of high lying ground located between the proposed sites and the N14 that screens the majority of receptors from any visual impacts.

During the design phase, the following impacts are applicable:

- Structures' colour and design potentially contrast vividly with the surrounding landscape enhancing visibility and increasing artificial contrast in the landscape. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- PV panels will be visible in the landscape and will interrupt and fragment the natural monochromatic landscape. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- Security and other operational lighting will introduce unnatural lighting into an unlit landscape. Without and with mitigation, the impact will be moderate.

During the construction phase, the following impacts are applicable:

- The construction activities may disturb the quiet sense of peaceful solitude of the Kalahari rangelands. This impact would be moderate to low given that there are few sensitive receptors. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- Construction activities, particularly noise and dust, heavy vehicles and abnormal load vehicles, may impact the experience of tourists to the region and result in impacts to tourist sentiment and tourism revenue. Without and with mitigation, the impact will be low.

- The construction activities related to the construction of the proposed development may negatively affect the expansive views of the Kalahari Rangelands from the N14, D3257 and other sensitive viewpoints by introducing unnatural elements, movement and contrast. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

During the operational phase, the following impacts are applicable:

- The presence of the proposed development may negatively affect the expansive views of the Kalahari Rangelands from the D3276 due to reflection, glare, night lighting and contrast of buildings in the monochromatic landscape. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- The presence of the proposed development may negatively affect the expansive views of the Kalahari Rangelands from the N14 due to reflection, glare and contrast of buildings in the monochromatic landscape. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- The presence of the proposed development facility may negatively affect the experience of tourists visiting the Orange River Vineyards and resorts along the N14 corridor. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- The presence of the proposed development facility may negatively affect the views and thus the quality of life of people in residential areas and businesses along the N14 corridor. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

- The presence of the proposed development facility may negatively affect the views and thus the quality of life of people in residential areas, tourist resorts and businesses on the opposite side of the Orange River. Without mitigation, the impact will be moderate and with mitigation, the impact will be low.

There are also a number of existing renewable energy facilities in the area which have asserted a change on the visual character of the area. The proposed development is in keeping with this character, and whilst further PV infrastructural development may be considered adding to the cumulative impact, the development is also consistent with local, regional and national planning policy.

The visual impact of this development is considered to be of low significance. Several mitigation measures are recommended by the Visual Specialist.

6.6 Soils and Agricultural Assessment

The most sensitive soil forms identified within the assessment area are the Hutton and Dundee soil forms. The land capability sensitivities (DAFF, 2017) indicate land capabilities with “Very low to Low” sensitivities, which correlates with the findings from the baseline assessment.

The assessment area is associated with non-arable lands, due to the type of soils in the area. The available climate limits crop production significantly. The harsh climatic conditions are associated with low annual rainfall and high evapotranspiration potential demands of the area, which consequently result into a very restricted choice of crops due to the heat and moisture stress. The area is not favourable for most cropping practices, which corresponds to the current agriculture (grazing) and renewable energy facilities activities.

It is the specialist’s opinion that the proposed project and associated infrastructure will have no impacts on the agricultural production ability of the land. However, with regard to crop fields with “High” sensitivity associated with Site B, the project layout should preferably be adjusted to avoid these areas. If these areas are actively cultivated and avoidance is not feasible, it is recommended that negotiations be facilitated for the suitable compensation afforded to the landowner.

Either of the two alternatives may be chosen as both are associated with land capabilities with “Very low to Low” sensitivities. Site A is preferred to Site B due to the presence of “High” sensitivity crop fields within the Site B pipeline corridor. It is the specialist`s recommendation that, the proposed project and associate infrastructure may be favourably considered.

6.7 Avifaunal Assessment

The assessment area consisted of one avifauna habitat; Karroid Grassland, these habitats were still mostly in a natural state with the exception of some areas that have been disturbed by livestock grazing. Habitats in the surrounding areas included drainage lines, the Orange River and associated vegetation and the cultivated areas surrounding the Orange River. Five species of conservation concern (SCC), Red-footed Falcon (*Falco vespertinus*), Abdim’s Stork (*Ciconia abdimii*), Lanner Falcon (*Falco biamircus*), Kori Bustard (*Ardeotis kori*) and Secretarybird (*Sagittarius serpentarius*) were confirmed in the assessment area. The Lanner Falcon breeds on cliff ledges it is thus less likely to have a permanent nest in the assessment area. The Red-footed Falcon and Abdim’s Stork are migratory birds that do not breed in the region. Based on the nesting behaviour and the habitat type in the assessment area, it can be said that two of the five SCCs are permanent residents in the assessment area: the Kori Bustard (*Ardeotis kori*) and Secretarybird (*Sagittarius serpentarius*).

The project will result in habitat loss and degradation of an area where five species of conservation concern are known to occur. Two of which have a very high likelihood of breeding in the assessment area. The development will lead to the clearing of vegetation

and an altering in the undeveloped/isolated nature of the area. Based on the medium receptor resilience and the high functional integrity, the assessment area was given a high site ecological importance (SEI).

The development will also lead to sensory disturbance, collision and electrocution risks. Even though the latter three impacts can be effectively mitigated, the loss of habitat cannot be mitigated. Considering the number of applications and current solar plant developments in the area the cumulative impact is also regarded as being high.

The mitigation hierarchy implemented in this report is as per the information provided in section 2(4)(a)(i) of NEMA as well as the overall policy on Environmental offsetting (Biodiversity Offset Guidelines, section 24 J of NEMA, Sept 2021). The mitigation hierarchy includes first avoiding the impact, then minimising it, then rehabilitation and then offsetting. Where the residual impact, even after mitigation is high, then should offsetting only be considered. In this case only one impact is Moderately High post mitigation, and it is the loss of and displacement of SCCs. This may require offsetting to be reduced to an acceptable residual impact, especially considering the number of solar facilities approved within the general area (within 10 to 22 kilometres of the study Area of Influence).

In order to avoid fragmenting the current ecosystem, it is recommended that site A is preferred as this site is located closer to existing facilities and concentrating these may reduce overall fragmentation of the ecosystem. It is, however, important that natural corridors between these developments are maintained. Minimisation measures have resulted in the reduction of most impacts to a Moderate or Low, which is considered within the limits of acceptable change. Site B is also considered developable if all mitigation measures are out into place.

The anticipated pre-construction impacts on avifauna are as follows:

- Temporary disturbance of avifauna due to increased human presence and possible use of machinery and/or vehicles. Without mitigation, the significance of the impact is low. With mitigation, the significance of the impact is absent.

The anticipated construction impacts on avifauna are as follows:

- Habitat Loss (Destroy, fragment and degrade CBA, ESA and Other Natural Area (ONA) habitat, ultimately displacing avifauna). Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is moderate.

- Sensory disturbances (e.g. noise, dust, light, vibrations) on avifaunal species. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is moderate.

- Collection of eggs and poaching by the construction crew may lead to a decline in avifaunal occurrence on site. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is low.

- Roadkill may lead to a decline in avifaunal occurrence on site. Without mitigation, the significance of the impact is moderate. With mitigation, the significance of the impact is low.

- Chemical pollution associated with dust suppressants may lead to a decline in faunal species on site. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is low.

- Construction activities may lead to a displacement or death of Species of Conservation Concern (SCC). Without mitigation, the significance of the impact is critical. With mitigation, the significance of the impact is moderately-high.

The anticipated operational phase impacts on avifauna are as follows:

- Continued Habitat Loss (Destroy, fragment and degrade CBA, ESA and ONA habitat, ultimately displacing avifauna). Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is moderate.

- Sensory disturbances (e.g. noise, dust, vibrations). Without mitigation, the significance of the impact is moderate. With mitigation, the significance of the impact is low.

- Collection of eggs and poaching (especially of SCCs). Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is low.

- Roadkill may lead to a decline in avifaunal occurrence on site. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is low.

- Electrocution by infrastructure and connections to PV. Without mitigation, the significance of the impact is high. With mitigation, the significance of the impact is moderate.

- Chemical pollution associated with measures to keep PV clean. Without mitigation, the significance of the impact is high. With mitigation, the significance of the impact is moderate.

- Fencing of PV site. Without mitigation, the significance of the impact is high. With mitigation, the significance of the impact is low.

The anticipated impacts on avifauna during the decommissioning phase are as follows:

- Habitat Loss (Destroy, fragment and degrade habitat, ultimately displacing avifauna). Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is low.

- Sensory disturbances (e.g. noise, dust, vibrations). Without mitigation, the significance of the impact is moderately. With mitigation, the significance of the impact is low.

- Roadkill. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is absent.

- Collisions with PV and associated infrastructure. Without mitigation, the significance of the impact is moderately-high. With mitigation, the significance of the impact is absent.

- Fencing of PV site, especially a risk for larger birds. Without mitigation, the significance of the impact is high. With mitigation, the significance of the impact is absent.

6.8 Socio-Economic Impact Assessment

The area towards the north and west of the proposed project site is undeveloped and used predominantly for livestock grazing. To the south-east, along the N14 and down towards the banks of the Orange River, livestock grazing, cultivation of grapes and other crops are the predominant land use. Settlement patterns in this area are characterised by a number of farmsteads, farm employee accommodation and farming related infrastructure. Inhabitants of the study area are therefore likely to rely primarily on agriculture to support their livelihoods. The closest human settlement to the proposed project site is the rural agricultural settlement of Kalksloot which is located approximately 3.5 km from the Site A alternative. Oranjevallei is the next closest settlement located approximately 4.7 km from Site A. Other settlements within close proximity of the proposed project site include Louisvale (8.4 km); Dysons Klip (8.3 km); Raaswater (9.5 km); and Bloemsmond (12 km).

The anticipated socio-economic impacts during the construction phase are as follows:

- Creation of employment, skills development, procurement and business opportunities (positive impact).

Without mitigation measures, the impact is low and with mitigation measures, the impact will be moderate (positive).

- Increased demand for low-cost housing and municipal services (negative impact)

Without and with mitigation measures, the impact is low (negative).

- Strain on community health & safety services (negative impact)

Without mitigation measures, the impact is high and with mitigation measures, the impact will be low (negative).

- Influx of jobseekers (negative impact)

Without and with mitigation measures, the impact is low (negative).

- Risk to livestock, crops, houses and farm infrastructure (negative impact)

Without mitigation measures, the impact is moderate and with mitigation measures, the impact will be low (negative).

- Impact on tourism (negative impact)

Without and with mitigation measures, the impact is low (negative).

- Loss of farmland (negative impact)

Without and with mitigation measures, the impact is low (negative).

The anticipated socio-economic impacts during the operational phase are as follows:

- Creation of employment, skills development, procurement and business opportunities (positive impact)

Without and with mitigation measures, the impact is low (positive).

- Strengthening energy supply (positive impact)

Without and with mitigation measures, the impact is moderate (positive).

- Strain on community health & safety services (negative impact)

Without mitigation measures, the impact is high and with mitigation measures, the impact will be low (negative).

- Creation of local employment opportunities associated with decommissioning activities (positive impact)

Without and with mitigation measures, the impact is low (positive).

- Loss of employment (negative impact)

Without and with mitigation measures, the impact is low (negative).

Table 6-4: Summary of Pre-Construction, Construction and Operation Phase Impacts

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
PRE-CONSTRUCTION				
Appointment of construction contractor	**4 – Moderate (+)**	• Ensure that unskilled labour required for the construction and installation of equipment are predominately South Africans from the surrounding communities.	**4 – Moderate (+)**	• No improvement on the unemployment conditions in the area and livelihood of the surrounding communities.
Poor communication about the project creates high expectations about the potential of job opportunities.	**3 – Low (-)**	• Caution with communication so as not to create the expectation of massive job creation	**2- Low (-)**	• Poor communication could lead to disappointment amongst community members, Labour and social unrest. While the project will create employment opportunities – the scale of the project means that not everyone will get employed
Damage to equipment or containers transportation	**3 – Low (-)**	• Making use of accredited hazardous goods transportation companies. • Equipment properly packaged in line with regulations to facilitate safe handling, transportation and placement. • Inspection of packaging for damage. • Risk assessment to be conducted. • Route planning and obtaining all relevant permits from the local authorities. • Adhere to OEM handling and transportation instructions. • Agreement / contract with HazMat company for first response, site clean-up and rehabilitation. • All MSDS available for the BESS.	**2 – Low (-)**	• This could lead to road accident caused by driver or 3rd party; cargo not being properly secured. • Spillage of electrolytes/ dangerous substances. • Contamination of the soil, ground water and flora.
Clearing of vegetation to accommodate infrastructure and services	**6 - Moderate**	• Limit the footprint to only areas necessary for the construction process. • Utilise single access roads only. • The footprint of the proposed development	**6 - Moderate**	• Vegetation stripping of the infrastructure footprint will be necessary to allow for the establishment of infrastructure.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		should be limited to the areas that already suffer transformation. • Rehabilitation of the areas that are impacted by the development outside of the ultimate infrastructure footprint will aid in abating the ecological impacts.		• This will have limited significance to the due to the site having already been historically subject to impacting features.
Loss of RDL floral species during site clearing.	**0.6 - Low**	• The occurrence of RDL floral species is highly unlikely due to the transformation of the associated habitat throughout the site.	**0.6 - Low**	• Site clearing will remove all vegetation to accommodate the infrastructure development. RDL or otherwise sensitive floral species may be included when vegetation is stripped, suffering loss of individuals. • This is highly unlikely due to the transformed nature of the footprint area and therefore thought insignificant to the project.
Loss and/or displacement of sensitive faunal species.	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services); • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas	**0.6 - Low**	• Site disturbances and vegetation (habitat) loss may lead to the loss of faunal species that are sensitive to disturbances. • Again, the transformed nature of the footprint area assumes that only highly adaptable and generalist species would inhabit the site and therefore thought insignificant to the project.
Destruction of nesting and/or roosting habitat for faunal species.	**4 - Moderate**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas.	**0.6 - Low**	• Site clearing will remove all vegetation to accommodate the infrastructure development. • The transformed nature of the footprint area assumes that only highly adaptable and generalist species would inhabit the site and therefore thought insignificant to the project.
Destruction of ground-	**0.6 - Low**	• Limit the footprint to only areas necessary	**0.6 - Low**	• Site clearing will remove all vegetation and

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
dwelling and/or sedentary fauna.		for the construction process. • Utilise single access roads only. • Avoid indiscriminate destruction of habitat.		habitat to accommodate the infrastructure development. Ground-dwelling fauna (e.g. Mygalomorph spiders) or ground-nesting birds may be included when vegetation is stripped, suffering loss of individuals. • Thought to have a low probability, however, due to the already-transformed nature of the proposed development site.
Destruction of sensitive habitat	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas.	**0.6 - Low**	• Association that the site has with CBAs and ESAs indicates that sensitive habitat units occur at the site. The proposed development site has already suffered ecological and physical transformation and therefore this is thought to be an insignificant impact.
Disturbance features that alter the vegetation structures	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas.	**0.7 - Low**	• Disturbances of soils will lead to altered state of vegetation structures. This will often lead to bush encroachment or establishment of exotic invasive species. • The infrastructure footprint will be permanently stripped of vegetation and maintained as such. A perimeter area will also be maintained to avert fire risks.
Habitat fragmentation resulting from infrastructure development.	**0.5 - Low**	• The habitat is already highly fragmented due to surrounding infrastructure development. The significance of this impact due to the proposed development is therefore insignificant.	**0.4 - Low**	• The proposed development site is embedded within an industrial area and therefore already suffers relatively ecological isolation. An open area occurs to the southeast, but access is hindered by a railway line. This is therefore not thought to be a significant ecological impact emanating from the proposed

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
				development.
Soil erosion.	**0.3 - Low**	• Topsoil stockpiles should be protected from erosion. • Compile and implement the Stormwater Management Plan and the Erosion Management Plan once detailed design of the facility has been undertaken.	**0.3 - Low**	• Soil erosion will take affect any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil. • Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses. • The site is relatively flat, so there will be limited risk of erosion. Stockpiled soils will, however, be at risk of dispersal.
CONSTRUCTION PHASE				
➢ **ECOLOGY**				
Damage to equipment or containers during storage and installation	**6-Moderate**	• Inspection of packaging for damage. • Risk assessment to be conducted. • Effective scheduling to limit onsite storage of equipment - site to be ready to readily accept BESS. • Proper supervision is required. • Adhere to OEM handling, transportation and storage instructions. • Agreement / contract with HazMat company for first response, site clean-up and rehabilitation. • All MSDS available for the BESS.	**0.6- Low**	• This could lead to road accident caused by driver or 3rd party; cargo not being properly secured. • Spillage of electrolytes/ dangerous substances. • Contamination of the soil, ground water and flora.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Clearing of vegetation to accommodate infrastructure and services	**6 - Moderate**	• Limit the footprint to only areas necessary for the construction process. • Utilise single access roads only. • The footprint of the proposed development should be limited to the areas that already suffer transformation. • Rehabilitation of the areas that are impacted by the development outside of the ultimate infrastructure footprint will aid in abating the ecological impacts.	**6 - Moderate**	• Vegetation stripping of the infrastructure footprint will be necessary to allow for the establishment of infrastructure. • This will have limited significance to the due to the site having already been historically subject to impacting features.
Loss of RDL floral species during site clearing.	**0.6 - Low**	• The occurrence of RDL floral species is highly unlikely due to the transformation of the associated habitat throughout the site.	**0.6 - Low**	• Site clearing will remove all vegetation to accommodate the infrastructure development. RDL or otherwise sensitive floral species may be included when vegetation is stripped, suffering loss of individuals. • This is highly unlikely due to the transformed nature of the footprint area and therefore thought insignificant to the project.
Loss and/or displacement of sensitive faunal species.	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas	**0.6 - Low**	• Site disturbances and vegetation (habitat) loss may lead to the loss of faunal species that are sensitive to disturbances. • Again, the transformed nature of the footprint area assumes that only highly adaptable and generalist species would inhabit the site and therefore thought insignificant to the project.
Destruction of nesting and/or roosting habitat for faunal species.	**4 - Moderate**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed	**0.6 - Low**	• Site clearing will remove all vegetation to accommodate the infrastructure development. • The transformed nature of the footprint area assumes that only highly adaptable

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		state of the proposed construction footprint and immediate surrounding areas.		and generalist species would inhabit the site and therefore thought insignificant to the project.
Destruction of ground-dwelling and/or sedentary fauna.	**0.6 - Low**	• Limit the footprint to only areas necessary for the construction process. • Utilise single access roads only. • Avoid indiscriminate destruction of habitat.	**0.6 - Low**	• Site clearing will remove all vegetation and habitat to accommodate the infrastructure development. Ground-dwelling fauna (e.g. Mygalomorph spiders) or ground-nesting birds may be included when vegetation is stripped, suffering loss of individuals. • Thought to have a low probability, however, due to the already-transformed nature of the proposed development site.
Destruction of sensitive habitat	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas.	**0.6 - Low**	• Association that the site has with CBAs and ESAs indicates that sensitive habitat units occur at the site. The proposed development site has already suffered ecological and physical transformation and therefore this is thought to be an insignificant impact.
Disturbance of features that alter the vegetation structures	**0.6 - Low**	• Indiscriminate habitat destruction to be avoided and the proposed development should remain as localised as possible (including support areas and services). • Unlikely to occur due to the transformed state of the proposed construction footprint and immediate surrounding areas.	**0.7 - Low**	• Disturbances of soils will lead to altered state of vegetation structures. This will often lead to bush encroachment or establishment of exotic invasive species. • The infrastructure footprint will be permanently stripped of vegetation and maintained as such. A perimeter area will also be maintained to avert fire risks.
Habitat fragmentation resulting from infrastructure	**0.5 - Low**	• The habitat is already highly fragmented due to surrounding infrastructure development. The significance of this impact due to the proposed development is	**0.4 - Low**	• The proposed development site is embedded within an industrial area and therefore already suffers relatively ecological isolation. An open area occurs to the southeast, but access is hindered by

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
development.		therefore insignificant.		a railway line. This is therefore not thought to be a significant ecological impact emanating from the proposed development.
Soil erosion.	**0.3 - Low**	• Topsoil stockpiles should be protected from erosion.	**0.3 - Low**	• Soil erosion will take affect any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil. • Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses. • The site is relatively flat, so there will be limited risk of erosion. Stockpiled soils will, however, be at risk of dispersal.
Soil contamination, vegetation loss and vegetation disturbance due to fuel and chemicals	**4 - Moderate**	• Mitigation measures as stipulated in the EMPr must be implemented in order to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an Environmental Control Officer (ECO). • Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. • Emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip-trays must be placed under vehicles and equipment when not in use. • Implement suitable erosion control	**0.3 - Low**	• Pollution of water resources and land. • Loss of natural habitats for the biodiversity occurring in the area.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		measures. • All liquid chemical must be stored in a bundled area with a capacity of at least 110% of maximum allowable volume.		
Potential Impact Vegetation and habitat disturbance due to the accidental introduction of alien species	**4 - Moderate**	• The Contractor implements suitable methods during the construction phase to limit the introduction and spread of alien invasive plant species. • Promote awareness of all personnel. • The establishment of pioneer species should be considered with the natural cycle of rehabilitation of disturbed areas, which assists with erosion control, dust and establishment of more permanent species. This can be controlled during construction phase and thereafter more stringent measures should be implemented during the rehabilitation and post rehabilitation. • Larger exotic species that are not included in the Category 1b list of invasive species could also be allowed to remain for aesthetic purposes.	**0.3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Vegetation and habitat disturbance due to pollution and littering during construction phase	**4 - Moderate**	• The Contractor should employ personnel on site responsible for preventing and controlling of litter. • Promote good housekeeping with daily clean-ups on site. • During construction, refresher training can be conducted to construction workers with regards to littering, ad hoc veld fires, and dumping. • No fires are allowed on site.	**0.3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Loss of habitat of the	**4 - Moderate**	• Vehicles and construction workers should	**0.3 - Low**	• Loss of natural habitats for the biodiversity

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Leipoldtville Sand Fynbos and CBA region		under no circumstances be allowed outside the site boundaries to prevent impact on the surrounding vegetation. • Where possible, natural vegetation must not be cleared and encouraged to grow. • All stockpiles, construction vehicles, equipment and machinery should be situated away from the natural vegetation. • Disturbance of vegetation must be limited only to areas of construction. • Prevent contamination of natural grasslands by any pollution. • Areas cleared of vegetation must be re-vegetated prior to contractor leaving the site		occurring in the area.
Damage to plant life outside of the proposed development site	**4 - Moderate**	• Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by ECO. • Areas which could be deemed as no go should be clearly marked.	**0.3 - Low**	• Loss of natural habitats for the biodiversity occurring in the area.
Disturbance to animals	**4 - Moderate**	• Animals residing within the designated area shall not be unnecessarily disturbed. • During construction, refresher training can be conducted to construction workers with regards to littering and poaching. • The Contractor and his/her employees shall not bring any domestic animals onto site. • Toolbox talks should be provided to contractors regarding disturbance to animals. Particular emphasis should be placed on talks regarding snakes.	**0.3 - Low**	• Displacement of animals.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
Animal passage out of construction site	**4 - Moderate**	• Allow for safe animal passage through and specifically out of the construction site.	**0.3 - Low**	• Loss of animals within the proposed area.
The proposed construction activities may affect biodiversity through the encroachment of exotic vegetation following soil disturbance, in addition the maintenance of the area would disturb naturalised species within the area	**4 - Moderate**	• Newly cleared soils will have to be re-vegetated and stabilised as soon as construction has been completed and there should be an on-going monitoring program to control and/or eradicate newly emerging invasive species.	**0.3 - Low**	• The encroachment of exotic vegetation following soil disturbance.
Increased employment opportunities and economic growth	**4 - Moderate**	• Leverage this through procurement policies that favour local suppliers and businesses.	**2- Low**	• Infrastructure development drives economic growth and has a huge multiplier effect. Infrastructure development not only generates employment directly through construction and operations but also creates an industrial base around the development for goods and services to supply the construction workers and activities. These industries would get more entrepreneurs and employ more labour. These workers would purchase more goods from the markets, creating a virtuous cycle.
Creation of temporary skilled and unskilled job opportunities	**4 - Moderate**	• It is recommended that if practical, a local employment policy is adopted to maximise the opportunities made available to the	**2- Low**	• Creating temporary skilled and unskilled job opportunities.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
directly on the project		local labour force (Sourced from nearest towns or within the Cederberg Local Municipality). • The recruitment selection process should seek to promote gender equality and should aim to optimise the employment of women wherever possible. • Efforts need to be employed to enhance indirect local employment/entrepreneurship opportunities by supporting local entrepreneurs as far as possible, where appropriate.		
Temporary increase in traffic disruptions and movement patterns during the construction phase	**6- Moderate**	• Standard working hours to be implemented during the construction phase, and/or as any deviation that is approved. • Construction vehicles must be roadworthy, and drivers must be qualified, obey traffic rules, follow speed limits and made aware of the potential road safety issues. • All construction vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs and control measures along the main access roads to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be visible at all times. • Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules. • All roads used by the project Developer	**1- Low**	• If mitigation measures are not implemented, the traffic disruptions will continue to impact the surrounding businesses and the nearby communities.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		and its contractors must be maintained in good working order during the construction phase. • It is recommended that a Community Liaison Officer be appointed to implement as the proposed grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process		
Nuisance impacts in terms of temporary increase in noise and dust, or the wear and tear on access roads to the site	**5- Moderate**	• Dust suppression measures must be implemented for heavy vehicles on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • It is recommended that a Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.	**2- Moderate**	• If mitigation measures are not implemented the propose development will generate dust and noise and will continue to impact the surrounding businesses and the nearby communities.
Termination of temporary employment	**6 Moderate**	• N/A	**6-Moderate**	• Loss of temporary employment.
Safety and security	**4-Moderate**	• Waste streams must be identified and documented. • Waste management plan must be	**2- Low**	• This increase the risk of a fire outbreak which will have an impact on the substation and the personal working within the

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		implemented. • Accredited waste facilities to be contracted for accepting / recycling the waste. • Working hours should be kept between daylight hours during the construction phase, and/or as any deviation that is approved by the relevant authorities. • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site; the fencing of the site should be maintained throughout the construction periods. • Access in and out of the construction camp should be strictly controlled • No open fires are permitted outside of designated areas. • Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff. • A comprehensive employee induction programme would cover land access protocols, fire management and road safety. • The contractor should have personnel trained in first aid on site to deal with smaller incidents that require medical attention • It is recommended that a Community Liaison Officer should be appointed to implement a grievance mechanism. A method of communication should be implemented whereby procedures to lodge		premises.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		complaints are set out in order for the local community to express any complaints or grievances with the construction process • It is recommended that a Stakeholder Engagement Plan be compiled and implemented for the construction phase of the project.		
Disturbance, damage, destruction or sealing-in of fossil remains preserved at or beneath the ground surface within the development area, most notably by bedrock excavations during the construction phase.	**1-Low**	• Monitoring of all substantial bedrock excavations for fossil remains by ECO, with reporting of substantial new palaeontological finds to SAHRA for possible specialist mitigation.	**1-Low**	• Will result in the permanent loss of any heritage features.
During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.	**1-Low**	• No mitigation measures are required as no sites were identified. It is recommended that a chance find procedure should be implemented for the project.	**1-Low**	• Will result in the permanent loss of archaeological and paleontological material or objects
Soil and water contamination due to the handling and storage of dangerous goods during	**6-Moderate**	• Any spillages of dangerous substances must be contained as soon as possible, and remedial and clean-up actions initiated	**1-Low**	• May result in a fire or explosion and the contamination of soil and ground water.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
the construction and operation phases.		immediately. • Regular inspections of the permanent bunded areas for storage of dangerous goods must be undertaken throughout the life cycle of the project. • Appropriate spill kits must be available on site. • Maintenance vehicles must have access to spill kits. • An emergency spill response plan must be developed for implementation during the construction and the operational phase. Personnel should be suitably trained to attend to any spills that may occur. • A fire management plan must be developed for implementation during the construction and the operational phase. Personnel must be suitably trained to manage any fires which may occur on site. • Flammable substances must be stored in enclosed containers away from heat, sparks, open flames, or oxidizing materials. • Develop a monitoring and leak detection procedure for monitoring of the chemical spillages.		
OPERATION PHASE				
Vegetation transformation for areas that are routinely maintained.	**1-Low**	• The peripheral area of the substation will be routinely maintained to avert the fire risks and therefore any emergent exotic vegetation can be simultaneously managed	**0-Low**	• Routine disturbances of vegetation will result in transformation of the structures, with an expected increase in abundance of pioneering species. • The relatively small spatial scale tends to render this impact insignificant.
➢ **Storage and handling of Hazardous Substances**				

Potential impacts:	**Significance rating of impacts (positive or negative):**	**Proposed mitigation:**	**Significance rating of impacts after mitigation:**	**Risk of the impact** and **mitigation not being implemented**
Storing and handling of dangerous chemicals	**4 - Moderate**	• A spill response kit must be available at all times. The incident must be reported on and if necessary, a biodiversity specialist must investigate the extent of the impact and provide rehabilitation recommendations. Responsible and technology-specific prevention and response infrastructure must be in place. • Any pollution incident(s) originating from this development shall be reported to the Regional Head of the DWS within 24 hours. • Storage of chemicals to be limited to appropriate and secure facilities on site and access limited to authorised personnel only. • Storage in secure containers to ensure/limit the potential for the occurrence of leakages. • Storage area to be bunded with an appropriate volume capacity to protect from environmental contamination should accidental leakages occur. • Transferal of chemicals to batteries should be done according to best practice guidelines to limit spillage. • A fire management plan must be developed for implementation during the construction and the operational phase. Personnel must be suitably trained to manage any fires which may occur on site. • Should spillage occur, the ECO must be informed immediately, and a clean-up	**3 - Moderate**	• Spills into the surrounding environment (including potential spills from the Battery Energy Storage System) could contaminate habitats as well as water resources associated with a spillage • Spillages of dangerous chemicals from inadequate and unprotected storage facilities and/or spillages during routine operations will contaminate soils and lead to chemicals (heavy metals) becoming bio-available to enter into the food chain. • Chemical leachates could contaminate groundwater and/or be transported to surface water ecosystems via surface water runoff.

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
		operation immediately commenced. Contaminated soils must be cleared and removed for disposal at a registered waste site capable of disposal of the chemicals.		

Table 6-5: Summary of Decommissioning Phase Impacts

NB: The impacts below have been determined for the decommissioning of the proposed construction site. All activities relating to the future decommissioning of the proposed development and the associated infrastructure does not form part of this application and as such would be subject to a separate Environmental Authorisation Process.

Id.	Impact	Description	Nature of Impact (Negative / Positive)	Management Objective / Principle	Level of Mitigation
Decommissioning Phase					
Equipment associated with the proposed Project would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly and replacement of the infrastructure with more appropriate technology/infrastructure available at that time. » Site Preparation Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment, preparation of the site (e.g. lay down areas, construction platform) and the mobilisation of construction equipment. » Disassemble and Remove Infrastructure Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements or any other requirements deemed applicable by the Original Equipment Manufacturer. .					

7 APPROACH TO CORRECTIVE ACTION

7.1 Implementation of Corrective Action

Checking and corrective action forms part of the environmental management function and is aimed at ensuring that the necessary environmental management activities are being implemented and that the desired outcomes are achieved. When non-conformities do occur that have a negative impact on the environment, these should be rectified by the implementation of corrective actions issued by the ECO and PM within a reasonable or agreed period of time. All corrective actions need to be documented and the outcome photographed and included in the next report. Broadly, the mechanisms for addressing non-compliance that are provided for in the environmental specifications and associated contract documentation can be divided into the following categories:

- Controlling performance via the certification of payments;
- Requiring the Contractor to “make good”, at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours;
- Removing environmentally non-compliant staff/ plant from site, or suspending part or all of the activities on site;
- To confirm, upon receipt of the Tender, that the Contractor has made sufficient allowance in his Tender Price for meeting the various environmental requirements; and
- During the tender adjudication process for each Contract, each Contractor should be scored in terms of the aforementioned considerations and allocated an environmental competency score. This score should form a key consideration in the final decision-making regarding the award of the various contracts.

8 METHOD STATEMENTS

A Method Statement (MS) must be compiled for every activity undertaken by the Contractor which poses a risk to the environment (natural, biophysical and social), and includes the following:

- The MS should be submitted at least 7 working days prior to the commencement of work to the ECO;
- A MS describes the scope of the intended work in a step by step description to ensure that the ECO / EO understand the Contractors intentions. This will enable them to assist in devising any mitigation measures which would minimise environmental impact during these tasks;
- The ECO may require changes to a MS if it does not comply with the specification or if, in the reasonable opinion of the ECO, the proposal may result in, or carries a greater than reasonable risk of damage to the environment in excess of that permitted by the EMPr or any legislation;
- The Contractor shall carry out the activities in accordance with the approved MS;

- Approved MS shall be readily available on the site and shall be communicated to all relevant personnel;
- Approval of the MS shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract;
- No claim for delay or additional cost incurred by the Contractor shall be entertained due to inadequacy of a MS;
- For each instance where it is requested that the Contractor submit a MS to the satisfaction of the ECO, the format should clearly indicate as a minimum the following:
    - Responsible person (Name and Identity Number) and an alternative (Name and Identity Number);
    - The applicable requirements provided in all legislation and policies which have a bearing on the proposed activities;
    - Training Requirements;
    - Timing of activities as per the Project / Construction Schedule;
    - Materials, plant and equipment to be used;
    - Proposed construction procedure, including the order in which the activities making up the procedure will be carried out, designed to implement the relevant environmental specifications;
    - The system to be implemented to ensure compliance with the above;
    - Person Protection Equipment (PPE) required;
    - A detailed description of the process of work, methods and materials;
    - Emergency Procedures;
    - Response in the case of a non-compliance; and
    - Other information deemed necessary by the ECO.
- All MS must be signed by the Engineer; and
- Work may not commence until the MS has been approved by the ECO. All MS will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr main document.

The following MS shall be prepared by the Contractor for approval:

- **Site Layout**: The graphical representation with detailed notes of the location, layout and method of establishment of the construction camp must be provided and must include the following:
    - All Contractor's buildings, and/or offices;
    - Lay down areas;
    - Vehicle and plant storage areas, including wash areas;
    - Workshops, if required and approved by ECO;
    - Fuel storage and dispensing areas, if required and approved by ECO;
    - Cement/concrete batching areas, if required and approved by ECO (including the methods employed for the mixing of concrete and particularly the containment of runoff water from such areas and the method of transportation of concrete);
    - Other infrastructure required for the running of the project.
- **Access Routes**: Details, including a drawing, showing where and how the access points and routes will be located and managed must be provided in a MS. Details of fences and gates affected or used during the construction activities, including a drawing showing the location of fences and access gates must be provided.
- **Pollution control**: Expected solid waste types, quantities, methods and frequency of collection and disposal as well as location of disposal sites must be identified and

stated in a MS. The MS shall further include methods of minimising, controlling, collecting and disposing of contaminated water, and details of any hazardous substances/materials to be used, together with the transport, storage, handling and disposal procedures for the substances.

- **Safety considerations**: The Contractor shall provide details identifying what safety precautions will be implemented to ensure the safety of all staff, and the general public at large, on site during the life of the project. This will include protective clothing requirements for all types of construction activities on site, including protection against dust, noise, falling objects, and work associated with electricity and working at heights.
- **Emergency procedures**: The Contractor shall provide details regarding all relevant emergency procedures that will be implemented for fire control and accidental leaks and spillages of hazardous substances (including fuel and oil). The Contractor shall further include details of risk reduction measures to be implemented including firefighting equipment, fire prevention procedures and spill kits.
- **Waste management control**: The minimizing of waste must be promoted and alternative methods for waste management must be investigated. The Contractor shall provide details regarding how solid and liquid waste generated on the construction site and site camp will be collected, stored, transported and disposed of. Details of any service provider(s) appointed to manage this task must also be provided.
- **Storm water and erosion control**: The Contractor shall provide details of how storm water emanating within or adjacent to the construction site may impact on construction activities. Details on how the Contractor will deal with storm water runoff and potential erosion within the construction footprint and servitude must be provided. Details of any service provider(s) appointed to manage this task must also be provided.

9 ENVIRONMENTAL AWARENESS PLAN

Environmental awareness training is required for all personnel involved in the proposed project. This includes all employees working on the site including temporary labourers, contractors and subcontractors. The Environmental Awareness Plan is intended to describe the method that will be adopted by the proponent to inform any person acting on their behalf, including an agent, sub-contractor, employee or any person rendering a service, of any environmental risk which may result from the implementation of the project activities and the manner in which risks must be managed in order to avoid adverse environmental consequences.

Environmental awareness training should cover:

- The importance of the EMPr;
- Specific details of the EMPr;
- Employees role in compliance with the EMPr;
- Environmental effects associated with the activities;
- Training targeted at specific personnel, e.g. example operators of heavy machinery;
- The environmental impacts, actual or potential, of their work activities;

- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures;
- Emergency preparedness and response requirements;
- The potential consequences of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities;
- Environmental legal requirements and obligations;
- The importance of not littering;
- The importance of using supplied toilet facilities;
- The need to use water and electricity sparingly; and
- Details of and encouragement to minimise the production of waste and re-use, recover and recycle waste where possible.

Training should be conducted by a suitably qualified person and if necessary, in more than one language to ensure it is understood by all workers. Copies of the environmental training must be available on site in languages appropriate to the work force. Records of the training sessions including attendance registers, nature of training and date of training should be kept to ensure all parties have received the necessary training and for auditing purposes.

In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. Environmental awareness and training is an important aspect of the implementation of the EMPr. Once the awareness plan and training material are available, the entire workforce and project management team should undergo an environmental awareness training course. Environmental awareness training is critical for the workforce to understand how they can play a role in achieving the objectives specified in the EMPr. All visitors to the site (including project team members which are not based onsite), must undergo Environmental Induction before being permitted to the construction and associated area. The Environmental Induction should be structured so as to provide a condensed version of the comprehensive Environmental Awareness Training that will be provided to the workforce / onsite staff.

Environmental awareness could be fostered in the following manner:

- Induction for all workers on site, before commencing work;
- Refresher courses as and when required;
- Daily toolbox talks at the start of each day with all workers coming on site, where workers might be alerted to particular environmental concerns associated with their tasks for that day or the area/habitat in which they are working; and
- Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

The Environmental Awareness Plan should be drawn up by the PM, in consultation with the ECO and EO and should be kept for implementation and audit purposes. The

Environmental Awareness Plan should be a dynamic document (or set of documents) which should be updated as changes to the project, environment, staff and *etc.* occur.

10 TRAINING

The applicable training will be as follows:

- The EO shall be appropriately trained in environmental management and shall possess the skills necessary to impart environmental management skills to all personnel involved in the construction of the proposed mixed business and residential development;
- The PM and EO shall ensure, on behalf of the Developer, that the employees (including construction workers, engineers, and long-term employees) are adequately trained and understand the management measures provided in the EMPr; and
- All employees shall have an induction presentation on environmental awareness. The cost, venue and logistics shall be for Eskom's account.

Where possible, training must be conducted in the predominant mother language spoken by the employees. The induction and training shall, as a minimum, include the following:

- The importance of conformance with all the specifications of the EMPr and other environmental policies and procedures;
- The significant environmental impacts, actual or potential, of their work activities;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving conformance with the EMPr and other environmental policies and procedures;
- The potential consequences of departure from specified operating procedures; and
- The mitigation measures required to be implemented when carrying out their work activities.

10.1 Environmental Authorisation

The ECO shall convey the contents of this EMPr and the conditions of the EA and discuss the contents in detail with the Developer's PM and Contractors. This formal induction training shall be done with all main and sub-contractors. Record of the training dates, people who attended and discussion points shall be kept by the ECO.

11 ENVIRONMENTAL IMPACT MANAGEMENT OUTCOMES AND ACTIONS

The management measures documented in each of the sub-sections below have been compiled using the following information:

- Impact Assessment and mitigation measures documented in the BAR for the proposed establishment of a mixed business and residential development and its operations; and
- Mitigation and management recommendations provided by the specialist studies and EAP.

The mitigation and management measures relating to each anticipated impact are described in Table 11-1.

In addition to the above-mentioned information sources, the EMPr should be updated to include the conditions documented in the EA to be received upon approval of the BAR. The Developer should appoint an EAP to amend the EMPr should amendments be required by DFFE.

11.1 Pre-Construction and Construction Phase

Pre-construction -Planning and Design Phase

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

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

Construction Phase

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

» Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
» Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, traffic and road use, and effects on local businesses and residents.

- Minimises the impact on the indigenous natural vegetation, and habitats of ecological value (i.e. drainage lines).
- Minimises impacts on fauna using the site.
- Minimises the impact on heritage site should they be discovered.
- Establishes an environmental baseline during construction activities on the site, where possible.

In order to meet this goal, the following impacts, responsible person have been identified, together with necessary actions and monitoring requirements. Refer to Table 11-1.

Table 11-1: Impacts, Management/ Mitigation Measures during Pre-Construction and Construction Phase

Impact management outcomes:

- Ensure that environmental awareness training is implemented;
- Undertake responsible water usage;
- To ensure no pollution of surface and groundwater resources;
- To ensure no instances of erosion on or adjacent to the site is reported or identified;
- Ensure that the stormwater management plan is implemented;
- Minimal impacts on vegetation and habitats;
- Avoid displacement of faunal community;
- Minimal visual impacts;
- Minimal impacts on wetlands, streams and rivers; and
- Prevent dust fallout exceedances from occurring within the dust monitoring network.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
1.	Appointment of construction contractor	• Ensure that unskilled labour required for the construction and installation of equipment are predominately South Africans from the surrounding communities.	Developer	Not applicable	Not applicable
2.	Environmental Awareness Training	• All personnel must undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of species, their identification, conservation status and importance, biology, habitat requirements and management requirements within the EA; • All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".	Developer, Health and Safety Officer, Contractor, ECO	Once-off, or as neccessary	Audit
3.	Economic benefit to local economy	• Ensure that unskilled labour required for the construction and installation of equipment are predominately South Africans from the surrounding communities.	Developer / Contractor	Not Applicable	Not Applicable.
4.	Increased employment opportunities and	• Leverage this through procurement policies that favour local suppliers and businesses.	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	economic growth				
5.	Creation of temporary skilled and unskilled job opportunities directly on the project	• It is recommended that if practical, a local employment policy is adopted to maximise the opportunities made available to the local labour force (*Sourced from nearest towns or within the ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality*). • The recruitment selection process should seek to promote gender equality and should aim to optimise the employment of women wherever possible. • Employment of youth and Black and Coloured people must be prioritized. • Efforts need to be employed to enhance indirect local employment/entrepreneurship opportunities by supporting local entrepreneurs as far as possible, where appropriate. • Implement training and on-the-job skills development programmes for temporary employees where feasible. • Employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBB EE) criteria to the extent possible. • Recruitment and employment practises must be in accordance with all labour legislation in South Africa. • Vacancies should be advertised in the local media when they become available.	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.
6.	Increased demand for low-cost housing and municipal services	• Prioritise employment of local people. • Provide suitable housing and living arrangements if temporary employees are brought in to undertake construction activities. • Accommodation provided must not compromise safety of employees and surrounding communities. All applicable land-use agreements must be in place before construction commences. • Adequate arrangements for daily transport to and from the construction site must be in place before commencement of construction phase activities. • All non-local low and semi-skilled workers should be assisted with transport to return home when they are not required on site (i.e. weekends, etc.). • All non-local construction workers should be assisted with transport back	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		to their place of residence within one week of their temporary employment contracts coming to an end.			
7.	Strain on community health & safety services	• Prioritise employment of local people from the various communities in ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality. • The Applicant as well as any contractors that are appointed to undertake the construction phase activities should develop and agree a code of conduct which sets standards for acceptable behaviour and outlines behaviour and activities which could constitute grounds for dismissal. Any employee or contractor appointed by the Applicant to undertake construction phase activities that is found to be in breach of the code of conduct should be dismissed after following due process in accordance with prevailing labour legislation. Criminal activities should be reported to SAPS immediately for investigation and further action. • The Applicant and contractor should agree and implement an HIV/AIDS / TB awareness programme. • The Applicant should develop and implement an appropriate method of communication with the local community. A community liaison officer should be appointed during the construction phase to engage with local community members regarding any issues, complaints or grievances that they may have.	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.
8.	Influx of jobseekers	• Prioritise employment of local people from the various communities in ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality. • In consultation with the ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality, investigate the option of establishing a Monitoring Forum to monitor and identify potential influx related problems associated with the proposed project. The Monitoring Forum should include other renewable energy operators in the area. • Employment for 'walk-in' temporary / casual labourers at the proposed construction site should not be permitted.	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.
9.	Risk to livestock, crops, houses and farm infrastructure	• The construction site should be fenced off prior to commencement of the construction phase. Movement of construction workers should be restricted to the construction site during work hours. • A code of conduct that sets standards for acceptable behaviour and outlines behaviour and activities which could constitute grounds for	Developer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		dismissal must be in place prior to construction. Consequences for wilful or negligent damage to private property must be outlined, communicated with all employees and enforced accordingly when alleged infringements are reported. • Any loss or damage associated with construction phase activities, or the actions of employees or contractors appointed by the Applicant must be compensated according to a value/scale agreed with the affected landowner. • Movement of people and vehicles associated with construction phase activities should be confined to designated areas or public roads. • A strict speed limit must be enforced. • All farm gates must be closed after accessing/exiting a property. • Daily transport for low and semi-skilled workers to and from site should be provided by the Applicant/EPC. • EMPr must details measure to ensure proper storage and management of waste on site. In particular, plastic waste which could be ingested by livestock must be managed appropriately. • The possibility and practicality of establishing firebreaks around the perimeter of the construction site prior to commencement of construction activities should be investigated. • Smoking on site must be confined to designated areas. • Construction related activities that could pose a potential fire risk must be managed in accordance with safety protocols and procedures outlined in the EMPr in compliance with prevailing fire, health and safety legislation. • No construction phase employees should be permitted on site after work hours, with the exception of security staff.			
10.	Dust nuisance	• Water sprays, especially on dry and windy days, on haul roads and where vegetation is being / has been cleared. Dust nuisance Complaints should be recorded in the complaints register at the construction site.	Contractor / EO / Developer / ECO	Duration of Construction Phase.	Complaints register must be kept at the construction site. No. of dust complaints received will be

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
					used to measure the effectiveness of the dust impact mitigation.
11.	Possible sedimentation from uncovered areas	• Vegetation clearance should be undertaken in phases, i.e. limited to working unit at a time.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
12.	Destruction and further loss and fragmentation of the vegetation community	• All development areas must be clearly demarcated, and restricted to the proposed development areas/corridors; • Areas of indigenous vegetation outside of the direct project footprint, should under no circumstances be fragmented or disturbed further; • All activities must make use of existing roads and tracks as far as practically and feasibly possible; • Permit from relevant authorities must be obtained prior commencement of any construction activities for the disturbance or removal of any nationally or provincially protected species • Apply for a permit to relocate protected plant species into the on-site relocation areas already used for transplantation of rescued plants or if not available, then to similar habitat recommended by a specialist (Refer to the guidelines for the rescue and relocation of Protected plant species on site in Appendix D: Plant Rescue and Protection Plan); • Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. Use of re-usable/recyclable materials are recommended; • The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas thereby causing further encroachment of invasive species.	Not Applicable.	Not Applicable.	Not Applicable.
13.	Displacement of faunal community due to habitat loss, direct	• The ECO must be on site when construction begins to identify fauna species that will be directly disturbed and to relocate protected fauna/flora that are found during the construction activities. The area must be walked	Contractor / EO / ECO	Duration of Construction Phase.	Monthly ECO Audits

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	mortalities and disturbance	though prior to construction to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated; • Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals; • No trapping, killing, or poisoning of any wildlife is to be allowed; • The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna.			
14.	Clearing of vegetation to accommodate infrastructure and services	• Vegetation clearing prior and during construction must be limited to the footprint of the proposed development; • Utilise single access roads only; • The footprint of the proposed development should be limited to the areas that already suffer transformation; • All construction activities must be restricted to the development footprint area. This includes laydown and storage areas, ablutions, offices etc.; • Rehabilitation of the areas that are impacted by the development outside of the ultimate infrastructure footprint will aid in abating the ecological impacts (Refer to the procedures to be undertaken and the monitoring of the revegetation and rehabilitation of the construction footprint post-construction activities in Appendix E: Revegetation and Rehabilitation Plan).	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits
15.	Damage to plant life outside of the proposed development site	• Construction activities should be restricted to the development footprint area and then the compliance in terms of footprint can be monitored by Environmental Control Officer (ECO). • Areas which could be deemed as no go should be clearly marked.	Contractor / EO / ECO	Duration of Construction Phase.	Monthly ECO Audits
16.	Construction of roads	• The footprint area of the road should be kept a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas; • Exposed road surfaces awaiting grading must be stabilised to prevent the erosion of these surfaces. Signs of erosion must be addressed	Contractor / Developer	Duration of Construction Phase.	Monthly ECO Audits

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		immediately to prevent further erosion of the road; • Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse; • Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows; • A suitable stormwater plan must be compiled for the road. This plan must attempt to displace and divert stormwater from the road and discharge the water into adjacent areas without eroding the receiving areas. It is preferable that run-off velocities be reduced with energy dissipaters and flows discharged into the local watercourses; • All areas outside of the demarcated areas should be declared a 'no-go' area during the construction phase and all efforts must be made to prevent access to this area from construction workers and machinery; • Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated; • Areas that are cleared during construction need to be re-vegetated with indigenous vegetation to prevent erosion and reduce the likelihood of encroachment by alien invasive plant species upon completion of the road (refer to the Alien Plant and Open Space Management Plan in Appendix F which provides guidelines and procedures for the prevention of the spread and clearance of alien invasive plant species); • Any topsoil that is removed during construction must be appropriately removed and stored. This includes on-going maintenance of such topsoil piles so that they can be utilised during decommissioning phases and re-vegetation.			
17.	Conservation of Drainage Systems	This section is critical to those drainage systems proposed to be crossed by means of roads: • Crossings are to be constructed during the low flow period; • Well-engineered, and wide enough culvert systems should be installed at all drainage systems, including those minor systems not identified during the site assessment; • It is critical to spread flows across the system, avoiding incisions in the	Contractor / Developer	Duration of Construction Phase.	Monthly ECO Audits

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		landscape caused by concentrated flows. Temporary stormwater channels should be filled with aggregate and/or logs (branches included) to dissipate flows; • It is recommended that the material surrounding and holding the culverts in place include a coarse rock layer that has been specifically incorporated to increase the porosity and permeability to accommodate flooding and very low flows; • The culverts used in the design should be as large as possible, partially sunken and energy dissipating material must be placed at the discharge area of each culvert to prevent erosion of these areas. • The use of larger culverts will prevent the build-up of debris by allowing the free movement of debris through the large culverts; • Culverts should avoid inundation (damming) of upstream areas by facilitating streamflow and catering properly for both low flows and high flows; • Surface run-off from the roads flowing down the embankments often scours the watercourse on the sides of the culvert causing sedimentation of the channel. This should be catered for with adequate concreted stormwater drainage depressions and channels with energy dissipaters that channel these flows into the river in a controlled manner; • The culvert installations should further consider the scouring action of high flows and gabion structures or similar should be placed on both sides of the culvert on the embankments both upstream and downstream. This will serve as retention of the soils from scouring around and underneath the culvert structures aiding in the protection of the structure; • Large aggregate outsourced or from the project area (if available) can be used for energy dissipation in the channel downstream of the culverts to reduce the likelihood of scouring the riverbed and sedimentation of the catchment. It is preferable that larger aggregate be used to avoid flows removing material from the site; • Signs of erosion must be addressed immediately to prevent further erosion; • Monthly erosion monitoring must take place from May to August to identify erosion alongside the proposed road;			

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		• Silt traps and fences must be placed in the preferential flow paths along the road to prevent sedimentation of the watercourse.			
18.	Vehicle traffic congestion	• Standard working hours to be implemented during the construction phase, and/or as any deviation that is approved. • Construction vehicles must be roadworthy, and drivers must be qualified, obey traffic rules, follow speed limits and made aware of the potential road safety issues. • All construction vehicles should be inspected regularly to ensure their road worthiness. • Provision of adequate and strategically placed traffic warning signs and control measures along the main access roads to warn road users of the construction activities taking place for the duration of the construction phase. Warning signs must be visible at all times. • Implement penalties for reckless driving for the drivers of heavy vehicles as a way to enforce compliance to traffic rules. • All roads used by the project Developer and its contractors must be maintained in good working order during the construction phase. • It is recommended that a Community Liaison Officer be appointed to implement as the proposed grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
19.	Destruction of vegetation and habitats / Land / soil pollution from chemical / hydrocarbon spills, litter and waste metals.	• Establish a chemical storage area that is suitably designed to contain all spills. • Ensure that hydrocarbons are stored in a bunded area with a capacity of 110% of storage volume. • Ensure that the bunded area is suitably designed to allow for cleaning and prevent spillage to the environment. • Ensure that all vehicles, storage, and usage areas have suitable spill kits. • Develop a chemical and hydrocarbon spill procedure. • Ensure that chemical and hydrocarbon usage is controlled. • No servicing of vehicles onsite. • Regular inspection and servicing of vehicles.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		• Develop a spill management procedure for vehicles that may leak accidently. • Develop a waste management plan. The minimizing of waste must be promoted and alternative methods for waste management must be investigated. • Ensure that all spills (concrete, hydrocarbons, oils, chemicals) are cleaned up. • Storage facilities: the applicant must ensure that fluids are stored and managed properly in a concrete or cement lined surface with berm walls to avoid any seepage into the groundwater resources and ensure that the design of the storage area is such that any leakages or spillages can be contained. • In case of leakages or spillages of hydrocarbons the Department of Water and Sanitation must be informed within 24 hours and immediate cleanup procedure must be conducted as stipulated in section 19 of the National Water Act; (Act 36 of 1998). • Any cleanup of the contaminants must be disposed of in a permitted hazardous landfill site and remediation report for the clean-up measures must be sent to the department for comments before implementation. • Ensure litter is cleared regularly to designated waste areas.			
20.	Pollution may enter ground / surface water	• Establish a chemical storage area that is suitably designed to contain all spills. • Ensure that hydrocarbons are stored in a bunded area with a capacity of 110% of storage volume. • Ensure that the bunded area is suitably designed to allow for cleaning and prevent spillage to the environment. • Ensure that all vehicles, storage, and usage areas have suitable spill kits. • Develop a chemical and hydrocarbon spill procedure. • Ensure that chemical and hydrocarbon usage is controlled. • All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site. • Install spill trays under the BESS.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
21.	Nuisance impacts in	• Dust suppression measures must be implemented for heavy vehicles on a	Contractor / EO	Duration of	Complaints

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	terms of temporary increase in noise and dust, or the wear and tear on access roads to the site	regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers. • Ensure all vehicles are road worthy, drivers are qualified and are made aware of the potential noise and dust issues. • It is recommended that a Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.	/ ECO	Construction Phase.	register must be kept at the construction site. No. of dust complaints received will be used to measure the effectiveness of the dust impact mitigation.
22.	Erosion and loss of soil resources	Develop a storm water management plan prior to commencement with construction. Storm water must be effectively managed and channelled effectively, and details of the storm water management plan must be forwarded to the local municipality for approval. The storm water management plan must incorporate the following principles in the design of the site: • Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion; • Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, silt fences). As construction progresses, the stormwater control measures must be monitored and adjusted to ensure complete erosion and pollution control at all times; • Minimise the area of exposure of bare soils to minimise the erosive forces of wind, water and all forms of traffic; • Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources; • Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction; • Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process;	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		• Design and construct roads to avoid concentration of flow along and off the road; • Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point. Provide detention storage on the road and/or upstream of the stormwater culvert; • Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion. • Where construction causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area; and • Preferably all drainage channels on site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed. • Use silt traps where necessary. • Use bumps, humps, and cut off drains to control water velocity of exposed soils. • Stockpile soils from footings in demarcated areas. • All removed soil and material stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. • Any exposed earth should be rehabilitated promptly by planting suitable vegetation (vigorous indigenous grasses) to protect the exposed soil. • Use soil material from footings in rehabilitation of impacted areas wherever possible. • Develop a spill management procedure for vehicles that may leak accidently. • Develop a waste management plan.			
23.	Habitat fragmentation resulting from infrastructure development.	• The habitat is already highly fragmented due to surrounding infrastructure development. The significance of this impact due to the proposed development is therefore insignificant. • Where possible proposed infrastructure must be aligned to the existing	Contractor / EO / ECO	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		development i.e., roads			
24.	Damage to equipment or containers during storage and installation	• Inspection of packaging for damage. • Risk assessment to be conducted. • Effective scheduling to limit onsite storage of equipment - site to be ready to readily accept BESS. • Proper supervision is required. • Adhere to Original Equipment Manufacturer (OEM) handling, transportation and storage instructions. • Agreement / contract with HazMat company for first response, site clean-up and rehabilitation. • All Material Safety Data Sheet (MSDS) available for the BESS.			
25.	Sedimentation, siltation, and increased turbidity in surface water	• Soil stock piling to be done at the designated area.	Contractor / EO / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
26.	Impact on heritage resources	• If during construction, any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures must be implemented. • Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below: o If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager. o It is the responsibility of the senior on-site Manager to make an initial	Contractors and Sub-contractors / EO / ECO	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		assessment of the extent of the find and confirm the extent of the work stoppage in that area. o The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA. o The potential burial site (K10) should be indicated on development plans and avoided. The possible grave must be shielded (30m buffer) from potential construction-related impacts.			
27.	Impact on palaeontological resources	• There is a very small chance that fossils may have been trapped in features such as palaeo-pans or palaeo-springs, and buried by the aeolian sands, but no such feature is visible in the satellite imagery. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr (Bamford 2022). • The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence. • When excavations begin the rocks must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted. • Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. • Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. • If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. • Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit	Contractor / EO / Developer / ECO	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. • If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. • If no fossils are found and the excavations have finished then no further monitoring is required.			
28.	Uncontrolled activities may lead to fires	• Undertake monitoring to determine if fires have any impact on the surrounding environment, suitable rehabilitation is to be undertaken where necessary. A fire management plan to be established prior to construction commencing. • Vegetation is to be cut back in areas where welding is undertaken to prevent fires from occurring. • Fire breaks along the servitude are to be established. • Suitable fire-fighting equipment and training is to be provided.	Contractor / EO / Developer / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
29.	Safety and security	• Waste streams must be identified and documented. • Waste management plan must be implemented. • Accredited waste facilities to be contracted for accepting / recycling the waste. • Working hours should be kept between daylight hours during the construction phase, and/or as any deviation that is approved by the relevant authorities. • The perimeter of the construction site should be appropriately secured to prevent any unauthorised access to the site; the fencing of the site should be maintained throughout the construction periods. • Access in and out of the construction camp should be strictly controlled • No open fires are permitted outside of designated areas. • Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff. • A comprehensive employee induction programme would cover land access protocols, fire management and road safety. • The contractor should have personnel trained in first aid on site to deal with	Contractor / EO / Developer / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		smaller incidents that require medical attention. • It is recommended that a Community Liaison Officer should be appointed to implement a grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process. • It is recommended that a Stakeholder Engagement Plan be compiled and implemented for the construction phase of the project.			
30.	Destruction of avifaunal habitat and avifauna	• Where possible, existing access routes and walking paths must be made use of. • The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this. • The duration of the construction should be kept to a minimum to avoid disturbing avifauna. • Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible. • Schedule or limit (where feasible) activities during least sensitive periods, to avoid migration, nesting and breeding seasons (May – August). • All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. • All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken. • The design of the proposed PV must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy, considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins et al., 2017). • Anti-collision devices such as bird flappers must be installed where power	Developer / Contractor	Construction phase Pre-construction Construction Construction Construction Construction Pre-construction Pre-construction	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		lines cross avifaunal corridors (e.g. grasslands, rivers, wetlands, and dams) • Infrastructure should be consolidated where possible in order to minimise the amount of ground and air space used. • All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution. • Use environmentally friendly cleaning and dust suppressant products. • As far as possible power cables within the project area should be thoroughly insulated and preferably buried. • Any exposed parts must be covered (insulated) to reduce electrocution risk. • White strips should be placed along the edges of the panels, to reduce similarity to water and deter birds and insects (Horvath et al, 2010). Consider the use of bird deterrent devices to limit collision risk.		Construction Construction Construction Construction Construction Construction Construction	
31.	Management of waste	• Waste management must be a priority and all waste must be collected and stored effectively. All solid waste collected shall be disposed of at a licensed disposal facility; • Domestic waste generated from site must be removed and disposed by the applicant, landowner, or site manager. Therefore, the method that they will be using to control and monitor waste must be provided to the Department. A signed copy of controlling and monitoring waste must be submitted to this Department to demonstrate that provision will be made to render such service. • Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days. Recycling is encouraged; • All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported. • Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation);	Developer / Health and Safety Officer / Contractor	Duration of Construction Phase.	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		• Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area; • Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.			
32.	Storage and Handling of Dangerous Goods: Soil and water contamination due to the handling and storage of dangerous goods during the construction and operation phases.	• Any spillages of dangerous substances must be contained as soon as possible, and remedial and clean-up actions initiated immediately. • Regular inspections of the permanent bunded areas for storage of dangerous goods must be undertaken throughout the life cycle of the project. • Appropriate spill kits must be available on site. • Maintenance vehicles must have access to spill kits. • An emergency spill response plan must be developed for implementation during the construction and the operational phase. Personnel should be suitably trained to attend to any spills that may occur. • A fire management plan must be developed for implementation during the construction and the operational phase. Personnel must be suitably trained to manage any fires which may occur on site. • Flammable substances must be stored in enclosed containers away from heat, sparks, open flames, or oxidizing materials. • Develop a monitoring and leak detection procedure for monitoring of the chemical spillages. • In case of leakages or spillages of hydrocarbons the Department of Water and Sanitation must be informed within 24 hours and immediate cleanup procedure must be conducted as stipulated in section 19 of the National Water Act; (Act 36 of 1998). • Any cleanup of the contaminants must be disposed of in a permitted hazardous landfill site and remediation report for the clean-up measures must be sent to the department for comments before implementation.	Contractor / EO / Developer / ECO	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
33.	Visibility of PV panels in the landscape may interrupt and fragment	• PV panels and their support structures must be designed with as low a profile as possible. This will minimise the visibility of the panels. All surfaces (exception of PV surfaces) should be painted using the selected	Contractor / Developer	Monthly monitoring within the duration of Construction	Monthly ECO Audits.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	the natural monochromatic landscape	colour palette to eliminate reflection and to match the natural surroundings.		Phase.	
34.		• A colour palette should be selected for the development that matches the surrounding landscape. This palette should be documented in the EMPr and all structures and roofs (faces of PV panels obviously excluded) should be colour treated / painted to conform to this colour palette. This includes small surfaces such as the reverse side of signs, fence poles and fencing mesh, etc. No reflective metal surfaces should be left exposed.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
35.	Construction of the proposed development may negatively affect the expansive views of the Kalahari Rangelands from the N14, D3257 and other sensitive view points by introducing unnatural elements, movement and contrast	• The area of land cleared of vegetation must be kept to a minimum. Wherever possible, existing natural vegetation must be left *in-situ*, to maintain some level of natural screening. • Areas that are temporarily cleared must be rehabilitated as soon as the need for the use of that area ends.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
36.	Impact of change of sense of place of Kalahari Rangelands	• This impact would be moderate to low given that there are few sensitive receptors. However, the following mitigation measures must be implemented: • Reversing of construction vehicles should be kept to a minimum to minimise the use of reverse warning sounds and wherever possible vehicles should be turned around without using reverse gear.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.
37.	Construction activities may impact on tourism in the region.	• The extent of land cleared of vegetation at any one time must be kept to a minimum. A dust suppression plan must be implemented during construction phase on all bare areas. Transportation of any abnormal loads and high volumes of heavy trucks must be scheduled for low traffic times on the N14 to limit the impact of this on tourists and people travelling for work.	Contractor / Developer	Monthly monitoring within the duration of Construction Phase.	Monthly ECO Audits.

11.2 Operational Phase

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

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the proposed operation activities to be undertaken without significant disruption to other land uses in the area, regarding traffic and road use, and effects on local community.
- Minimises impacts on fauna/avifauna using the site.

An operations manager must be appointed during operation whose duty it will be to ensure the implementation of the operation EMPr for operation activities and all infrastructure under the control of the facility owner. For all Eskom Holdings SOC Limited infrastructure, Eskom manages its operations through the implementation of the Environmental Management System ISO 14001:2004 and relevant in-house procedures. For any public road infrastructure, the Provincial Roads Authority and/or SANRAL manage their infrastructure through the implementation of relevant departmental environmental management procedures

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Table 11-2: Impacts, Management/ Mitigation Measures during Operational Phase

Impact management outcomes:

- Undertake responsible water usage;
- To ensure no pollution of surface and groundwater resources;
- To ensure no instances of erosion on or adjacent to the site is reported or identified;
- Ensure that the stormwater management plan is implemented;
- Minimal impacts on wetlands, streams and rivers;
- Minimal impacts on vegetation and habitats;
- Minimal visual impacts;
- Prevent dust fallout exceedances from occurring within the dust monitoring network; and
- Prevent air emission exceedances of the National Ambient Air Quality Standards.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
1.	Creation of employment, skills development, procurement and business opportunities	• Prioritise employment of local people from ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality, particularly for semi and unskilled job categories as far as possible. • Employment of Coloured and Black African people; women; and youth should be prioritised. • Engage with ZF Mgcawu District and the Dawid Kruiper Local Municipality to enquire about any district or local skills databases. • Implement training and on-the-job skills development programmes for temporary employees where feasible. • Employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBB EE) criteria to the extent possible. • Recruitment and employment practises must be in accordance with all labour legislation in South Africa. • Vacancies should be advertised in the local media when they become available.	Developer / Operations Manager	Duration of Operational Phase.	Compliance inspection by the authority.
2.	Strain on community health & safety services	• Prioritise employment of local people from the various communities in ZF Mgcawu District Municipality, and the Dawid Kruiper Local Municipality. • The Applicant as well as any contractors that are appointed to undertake the construction phase activities should develop and agree a code of conduct	Developer / Operations Manager	Duration of Operational Phase.	Compliance inspection by the authority.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		which sets standards for acceptable behaviour and outlines behaviour and activities which could constitute grounds for dismissal. Any employee or contractor appointed by the Applicant to undertake construction phase activities that is found to be in breach of the code of conduct should be dismissed after following due process in accordance with prevailing labour legislation. Criminal activities should be reported to SAPS immediately for investigation and further action. • The Applicant and contractor should agree and implement an HIV/AIDS/TB awareness programme. • The Applicant should develop and implement an appropriate method of communication with the local community. • A community liaison officer should be appointed during the construction phase to engage with local community members regarding any issues, complaints or grievances that they may have. • The water provided for domestic use must comply with the SANS 241: 2015 guidelines for drinking water (edition 6). Regular monitoring must be done to ensure compliance. If the quality of the water is of such a nature that it is a threat to human health, then this Department and the Provincial Department of Health must be informed of the procedures to rectify the problem			
3.	Change of sense of place post-construction activities	• This impact would be moderate to low given that there are few sensitive receptors. • As with construction activities, reversing of site vehicles should be kept to a minimum to minimise the use of reverse warning sounds and wherever possible vehicles should be turned around without using reverse gear.	Developer / Operations Manager	Duration of Operational Phase.	Compliance inspection by the authority.
4.	Decommissioning activities may impact the experience of tourists to the region and result in impacts to tourist sentiment and tourism revenue.	• The extent of land cleared of vegetation at any one time must be kept to a minimum and the site must be completely re-vegetated with appropriate locally indigenous vegetation as soon as possible. • A dust suppression plan must be implemented during the decommissioning phase on all bare areas. • Transportation of any abnormal loads away form site and high volumes of heavy trucks must be scheduled for low traffic times on the N14 to limit the impact of this on tourists and people travelling for work.	Developer / Operations Manager	Duration of Operational Phase.	Compliance inspection by the authority.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
5.	Pollution from litter, waste metals, vehicle spills / hydrocarbon spills during maintenance activities	• Ensure that a site clean-up is undertaken at the end of every maintenance cycle to ensure that no pollution has occurred. Where this has happened, appropriate remedial action is to be taken.	Developer / Operations Manager	Duration of Operational Phase.	Compliance inspection by the authority.
6.	Pollution may enter ground / surface water	• Ensure that all vehicles, storage, and usage areas have suitable spill kits. • Develop a chemical and hydrocarbon spill procedure. • Ensure that chemical and hydrocarbon usage is controlled.	Operations Manager / Developer	Duration of Operational Phase.	Compliance inspection by the authority.
7.	Improvement on livelihood of the local communities (positive)	• No Mitigation proposed	Developer	Duration of Operational Phase.	Not Applicable.
8.	Storing and handling of dangerous chemicals	• Storage of chemicals to be limited to appropriate and secure facilities on site and access limited to authorised personnel only; • Storage in secure containers to ensure/limit the potential for the occurrence of leakages; • Storage area to be bunded with an appropriate volume capacity to protect from environmental contamination should accidental leakages occur; • Transferal of chemicals to batteries should be done according to best practice guidelines to limit spillage. • A fire management plan must be developed for implementation during the construction and the operational phase. Personnel must be suitably trained to manage any fires which may occur on site. • Should spillage occur, the ECO must be informed immediately, and a clean-up operation immediately commenced. Contaminated soils must be cleared and removed for disposal at a registered waste site capable of disposal of the chemicals.	Operations Manager / Developer	Duration of Operational Phase.	Compliance inspection by the authority.
9.	Contribution to the Local Economic Development and Infrastructural Development	• None required	Developer	Duration of Operational Phase.	Not applicable

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	(Positive)				
10.	Destruction of vegetation and habitats	• Progressive rehabilitation of areas that have been cleared of invasive plants will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seedbank Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion; • The Alien Plant and Open Space Management System (Appendix F) must be implemented to ensure that prevention of spread and clearance of alien invasive plant species on site. • Areas that have been disturbed but will not undergo development must be revegetated with indigenous vegetation; • Eroded areas must be rehabilitated using the appropriate techniques and re-vegetated using indigenous flora (refer to the guidelines for revegetation and rehabilitation of the construction areas in Appendix E); • A spill response kit must be available at all times. The incident of accidental spillage of contaminants from the BESS must be reported on, and if necessary, a Biodiversity Specialist must investigate the extent of the impact and provide rehabilitation recommendations; • Responsible and technology-specific prevention and response infrastructure must be in place; • An appropriate/adequate fire management plan must be implemented to ensure that the surrounding natural vegetation is unaffected.	Developer	Duration of Operational Phase.	Compliance inspection by the authority.
11.	Impact on small fauna migrating across the Solar PV and BESS facility	• A qualified environmental control officer must be on site when activities begin. • A site walk through is recommended by a suitably qualified ecologist prior to any activities taking place and any SSC or protected species should be noted. • In situations where these species are observed and must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development and implementation of a search, rescue and recovery program is suggested for the protection of these species. • Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.	Developer/ Maintenance crew / Contractor / Environmental Manager or Officer	Duration of Construction, Operational Phase / Post-construction	Compliance inspection by the authority.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		• If fencing is required: wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area. • Once the development layout has been confirmed, the footprint area must be fenced off appropriately in segments pre-construction to allow animals to move or be moved out of these areas before breaking ground activities occur. • Construction activities must take place systemically and the perimeter fence should not be completed if required (i.e., leaving sections unfenced to allow fauna to escape) until systematic clearing is completed. Drilling etc. should start one side of the site and progress towards the section of the site where fences are incomplete (away from the center of the PAOI)." • Once the fence is construction, monitoring of the fence line should be done daily to repair the fence where it has become damaged, and to remove or rescue fauna that has become trapped or stuck in the fence. • The lower wires of security fences should not be electrified to avoid electrocution of small mammals and tortoises. • Daily fence patrols must be undertaken to rescue small mammals, reptiles, snakes and tortoises that may have become stuck in the fences..			
12.	Destruction of avifaunal habitats	• Areas of already fragmented indigenous vegetation, even secondary communities outside of the direct project footprint, must under no circumstances, be fragmented or disturbed further. Clearing of vegetation must be minimized and avoided where possible. Clearing beneath panels must be avoided. • The site ecological importance for SCCs is rated as high, and therefore should be avoided where possible. The extent should be minimised, with drainage lines avoided where possible. Clearing of vegetation beneath panels should be avoided and roads kept to a minimum. • Where possible, existing access routes and walking paths must be made use of. • Rehabilitation of the disturbed areas existing in the project area must be made a priority. • Topsoil must also be utilised, and any disturbed area must be re-vegetated	Developer/ Maintenance crew / Contractor	Duration of Operational Phase / Post-construction	Compliance inspection by the authority.

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
		with plant and grass species which are endemic to this vegetation type. • Erosion control and alien invasive management plan must be compiled. • Environmentally friendly dust suppressants need to be utilised. • A fire management plan needs to be compiled and implemented to restrict the impact fire might have on the surrounding areas.			
13.	Impact on avifauna	• All maintenance personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species (e.g., guineafowl and francolin), and owls, which are often persecuted out of superstition. Signs must be put up to enforce this. • Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) motion detection lights should be used wherever possible. • All maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. • All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region. • Use environmentally friendly cleaning and dust suppressant products. • Fencing mitigations must be implemented as follows: o Top 2 strands must be smooth wire o Routinely retention loose wires o Minimum 30cm between wires o Place markers on fences	Developer	Operational phase	Compliance inspection by the authority.
14.	Potential heat impacts on surrounding communities resulting from "het island effect"	• The development is proposed for an area where several large-scale PV and concentrated solar developments have already been constructed / are planned. There is a gap in the knowledge regarding heat island effects of the latter and its potential impacts on local climates/regional climates. Hence, heat island effect monitoring must be included in the EMPR as there is a need to understand the heat island effects of solar developments.	Developer/ Environmental Manager or Officer	Duration of, Operational Phase / Post-construction	Compliance inspection by the authority.
15.	Impact of the proposed	• Non-reflective materials must be used in construction of roofs, fences and	Developer	Duration of Operational	Compliance inspection by the

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	development on the views of the Kalahari Rangelands from the D3276 due to reflection, glare and contrast of buildings in the monochromatic landscape.	other infrastructure. Any walls or reflective surfaces must be painted in dull earthen colours in keeping with the colour palette selected. • A lighting plan should be drawn up to identify the minimum number and locations of required lights. • Lighting must be kept to a functional minimum and all lighting should be fully shielded, focused downward and should be mounted as low as possible to achieve its function. • Mobile lighting must be used to conduct night-time maintenance activities and permanent lighting must not be used for this purpose. • All lights should be fully shielded to ensure no escape of uplight and sky glow. • All lights should be amber or warm colours as opposed to blueish white lights. Locally indigenous shrubs must be encouraged / planted along the outside perimeter and indigenous vegetation (grasses) should be retained beneath and in between the solar panels.		Phase.	authority.
16.	Impact of the proposed development on the views of the Kalahari Rangelands from the N14 due to reflection, glare and contrast of buildings in the monochromatic landscape				
17.	Impact of the proposed development on the experience of tourists visiting the Orange River Vineyards and resorts.				
18.	Impact of the proposed development on				

Id.	Impact	Impact Management Actions	Responsible Person	Frequency and/or Time Period	Method of Monitoring
	views and quality of life of people in residential areas and businesses along the N14 corridor.				
19.	Impact of the proposed development views and the quality of life of people in residential areas, tourist resorts and businesses on the opposite side of the Orange River.				

11.3 Decommissioning Phase

Similar to construction, the removal of the infrastructure associated with the project would involve the preparation of the area, given the amount of machinery and workers that will remain and work on the decommissioning. The following decommissioning activities are relevant:

- Operational access roads are expected to be in good condition and be appropriate for the transit of decommissioning equipment (heavy cranes, special trucks, etc.).
- A small temporary decommissioning camp may be established with associated staff facilities.
- Laydown areas will be prepared as required. In this regard vegetation may require stripping and topsoil may be stockpiled for use in rehabilitation.
- All waste materials and chemicals will be removed for reuse in other facilities or proper management through authorised waste management service providers.
- The elimination of all lubricants and chemical products stored in the plant will be carried out. These products may be sold or turned over to an authorised waste management service provider, as they are not the plant's main components.
- Reusable elements are components that can be used again, i.e., are not waste. It is advantageous to find a use for these so-called sub-products, due to the reduced costs involved with the consequent economic and environmental benefits. The possible sub-products from the BESS will be multiple in terms of type, quantity and volume. Thus, certain substances are not considered "usable". Other materials from the plant may be reusable in other such facilities, depending on their condition.
- Concrete structures and buildings (including foundations) will be demolished and the rubble will be disposed of at appropriate facilities, unless otherwise agreed for an alternative use in line with the decommissioning and closure plan.

11.3.1 Rehabilitation

Following decommissioning and removal of all project material from the site, the disturbed areas will be rehabilitated to pre-project land capability. Where possible, rehabilitation will be conducted concurrently with decommissioning. The following rehabilitation activities are relevant:

- The existing profiles of the land affected will be improved and stabilised thereby leaving profiles not incompatible with the topography of the area, which is essentially flat.
- Ripping of compacted soils will be done prior to adding topsoil, which will be done by mechanical means. It is expected that there will be a sufficient amount of topsoil and/or subsoil moved and stockpiled during the construction phase to facilitate rehabilitation.
- If required, potential areas or land for extracting topsoil or subsoil will be identified. The land capability characteristics of such areas should be similar to the affected soils (same texture, colour, permeability, etc.).

- Vegetation will be re-established. The plant species used will match those naturally occurring in the area. This will be conducted in consultation with a biodiversity specialist.

11.3.2 Aftercare and Maintenance

Following rehabilitation, a period of maintenance and aftercare will be required to ensure that rehabilitation is successful. In this regard, the following activities are relevant:

- Fertilisation of soil depending on soil fertility test results.
- Control and removal alien/invasive species.
- Implementation of erosion controls (if required).
- Auditing of vegetation recover and adaption of strategies where necessary.

Table 11-3: Impacts, Management/ Mitigation Measures during Decommissioning Phase

Impact management outcomes:

- Undertake responsible water usage;
- To ensure no pollution of surface and groundwater resources;
- To ensure no instances of erosion on or adjacent to the site is reported or identified;
- Minimal impacts on vegetation and habitats;
- Avoid displacement of faunal community;
- Minimal visual impacts;
- Minimal impacts on wetlands, streams and rivers; and
- Prevent dust fallout exceedances from occurring within the dust monitoring network.

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Decommissioning Phase					

Equipment associated with the proposed Project would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly and replacement of the infrastructure with more appropriate technology/infrastructure available at that time.

» Site Preparation

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

» Disassemble and Remove Infrastructure

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements or any other requirements deemed applicable by the Original Equipment Manufacturer.

As with construction activities, reversing of site vehicles should be kept to a minimum to minimise the use of reverse warning sounds and wherever possible vehicles should be turned around without using reverse gear.

The extent of land cleared of vegetation at any one time should be kept to a minimum. A dust suppression plan should be implemented during the decommissioning phase on all bare areas. Transportation of any abnormal loads away form site and high volumes of heavy trucks should be scheduled for low traffic times on the N14 to limit the impact of this on tourists and people travelling for work. The site should be re-vegetated with appropriate locally indigenous vegetation as soon as possible.

» Creation of local employment associated with decommissioning activities
  - Prioritise employment of local people from ZF Mgcawu District and the Dawid Kruiper Local Municipality, particularly for semi and unskilled job categories as far as possible.

Id.	Impact	Mitigation / Management Measures	Responsible Person	Frequency and/or Time Period	Method of Monitoring
Decommissioning Phase					
		○ Employment of Coloured and Black African people; women; and youth should be prioritised. ○ Engage with ZF Mgcawu District and the Dawid Kruiper Local Municipality to enquire about any district or local skills databases. ○ Implement training and on-the-job skills development programmes for temporary employees where feasible. ○ Employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBB-EE) criteria to the extent possible. ○ Recruitment and employment practises must be in accordance with all labour legislation in South Africa. ○ Vacancies should be advertised in the local media when they become available. » Loss of employment ○ Prior to a scheduled closure, engage with all relevant stakeholders such as the ZF Mgcawu District, the Dawid Kruiper Local Municipality and Labour Unions regarding the proposed closure and decommissioning timeframes and possible socio-economic interventions to ameliorate the impact on individuals and the broader community. ○ Provide counselling and guidance to employees who will need to be retrenched. ○ Provide assistance with claiming UIF and other state assistance if required. ○ Assistance with registering as a jobseeker (with the relevant local and district municipalities, employment agencies or other solar PV operators).			

12 MONITORING

This chapter deals with Compliance Monitoring as well as specific monitoring requirements, as per the Specialist Studies, during construction and operational phases. The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. An audit of the environmental monitoring and management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards.

Regular monitoring of all the environmental management measures and components shall be carried out by the Developer's PM and independent ECO to ensure that the provisions of this plan are adhered to. Ongoing and regular reporting of the progress of implementation of this Programme should be done. Various points of compliance will be identified with regard to the various impacts that the construction will have on the environment.

Prior to the start of construction activities, an audit schedule should be drawn up, on basis of the environmental authorisation requirements and with input from ECO. The audit schedule should include target dates for implementation of recommendations and timeframes for submission to the Developer's EM, Developer's appointed PM and DEA. The audits should be timed to coincide with scheduled project meetings, where possible.

12.1 Fauna monitoring programmes

- The following monitoring programmes must be implemented:
    - Impacts of the light on nocturnal insects [what species, estimated deaths, what species are attracted due to the concentration of high numbers of insects (e.g. attracting bats?)].
    - Reptile presence and mortalities monitoring (which species, observation frequency, presence of their predators like raptors).
    - Bird injuries and mortalities (some species e.g. misjudge the reflection of the panels for water bodies and injure themselves e.g.) of both nocturnal and diurnal species. This applies for panels and fence lines, as well as power lines.
- Monitoring data to be recorded in registers and reported on quarterly, collating monthly data.
- Raw data and photos to be made available upon request from the Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAERL).

12.2 Compliance monitoring and Auditing

12.2.1 Environmental auditing

The key to a successful EMPr is appropriate monitoring and review to ensure effective functioning of the EMPr and to identify and implement corrective measures in a timely manner. An audit of the environmental monitoring and management actions undertaken is essential to

ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards.

Regular monitoring of all the environmental management measures and components shall be carried out by the Developer (Eskom) and the ECO to ensure that the provisions of this plan are adhered to. Ongoing and regular reporting of the progress of implementation of this Programme should be done. Various points of compliance will be identified with regard to the various impacts that the construction will have on the environment.

The following conditions must be included in the EA with regards to the Environmental Auditing:

- **An Environmental Compliance Audit of the development must be undertaken annually to audit the level of compliance of the licence holder to the conditions of the EA and EMPr. Audits shall commence once construction has been initiated and the first audit must be undertaken within 365 days of the start date of construction as communicated to the Competent Authority.**

- **An independent environmental auditor must be appointed with the relevant experience and qualifications in the field of Environmental Management**

- **The Environmental Compliance Audit must be submitted to the Competent Authorities Compliance Monitoring Directorate within 30 days of concluding the site audit**

Site Documentation or Reporting

Site documentation standard shall be used to keep records on site. In addition, all non-compliances to the EA will be reported to the assigned PM within 24 hours. All documents as listed below shall be kept on site and be available for monitoring and auditing purposes. Site inspections by an Environmental Audit team may require access to this documentation for auditing purposes. The documentation shall be signed by all parties to ensure that such documents are legitimate. Regular monitoring of all site works by the ECO is imperative to ensure that all problems encountered are solved punctually and amicably. When the ECO is not available, the PM shall keep abreast of all works to ensure no problems arise.

The following documents must be kept on site:

- Access negotiations and physical access plans;
- Site instructions;
- Pre-construction audit report undertaken by ECO;
- Complaints register;
- Records of all remediation / rehabilitation activities;

- Copy of this EMPr;
- Copy of the Environmental Authorisation;
- Environmental Awareness Plan;
- Monthly compliance report;
- Environmental training records; and
- Emergency response procedures.

The monthly compliance report should include:

- Complaints received from I&APs and details of the actions taken;
- Environmental incidents, spills of hazardous substances, *etc.*
- Environmental damage which requires rehabilitation; and
- Damages of private property such as buildings or crops.

12.2.2 Compliance Monitoring

Undertaking Compliance Monitoring Inspections

The Developer or PM shall appoint a qualified and experienced ECO to ensure the licence holder and contractor's implementation of and adherence to the EMPr.

The ECO shall conduct regular compliance monitoring inspections to ensure that the system for implementation of the EMPr is operating effectively. The compliance monitoring inspections shall check that a procedure is in place to ensure that:

- The EMPr and the Method Statements being used are the up-to-date versions;
- Variations to the EMPr, Method Statements and non-compliances and corrective actions are documented; and
- Emergency procedures are in place and effectively communicated to personnel.

The audit programme shall consist of the following at a minimum:

- **First audit no later than 1 month after the commencement of construction activities; and**
- **Thereafter audits at monthly intervals, at a minimum or as per EA requirement.**

Compliance with the EMPr

The Developer and/or its agents are deemed not to have complied with the EMPr and remedial action if:

- There is evidence of contravention of the EMPr clauses within the boundaries of the site or extensions;
- Environmental damage ensues due to negligence; and
- The Developer fails to comply with corrective or other instructions issued by the PM, within a time period specified by the PM.

12.3 Environmental Contact Person

To be confirmed prior commencement of the proposed development should DFFE grant an EA to proceed with the project.

12.4 Emergency Numbers

- Police: 10111
- Ambulance 10177
- Netcare 911 082 911

13 SITE REHABILITATION

13.1 Removal of structures and infrastructure

During and following the completion of the construction activities, the area must be rehabilitated by appropriate landscaping, levelling, topsoil dressing, land preparation, alien plant eradication and vegetation establishment. All construction plant, equipment, storage containers and temporary fencing must be removed from site.

13.2 Waste and pollution control

- Waste minimisation, the re-use, recycling and recovery of waste must be promoted;
- Rubble, including surplus rock, foundations and batching plant aggregates will be removed from the construction site and firstly recycled and re-used, where possible, before disposed of at a registered landfill site;
- All waste storage containers will be removed from site on a regular basis;
- All portable sanitation facilities will be removed by a certified contractor. It must be ensured that no leaks or spillage from sanitation facilities occurs during the removal thereof; and
- All hazardous waste which is temporary stored on site, including the storage containers must be removed from site and disposed of at a registered hazardous landfill site.

13.3 Topsoil replacement and soil amelioration

- The principle of Progressive Reinstatement must be followed wherever possible. This includes the reinstatement of disturbed areas on an ongoing basis, immediately after the specified construction activities for that area are concluded;
- Execute top soiling activity prior to the rainy season or any expected wet weather conditions;
- Execute topsoil placement concurrently with construction where possible, or as soon as construction in an area has ceased;
- Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes and roads. Replace topsoil to the original depth. These areas will be quantified by the ECO;
- Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality;
- The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage, and approved by the ECO; and
- Do not use topsoil suspected to be contaminated with the seed of alien vegetation.

14 CONCLUSION

It is the opinion of the EAP that the implementation of the management and mitigation measures provided in the EMPr is sufficient to manage the environmental impacts associated with the proposed project. This EMPr will furthermore contribute to realizing the following over-arching objectives set out to be reached using the document as an environmental management tool:

- Ensure that sufficient monetary provision, aligned with the significance of the environmental impact and scale of the project, is made to remediate and rehabilitate the environment impacted on by the construction activities;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events and environmental incidents; and
- Provide feedback to drive continual improvement in environmental performance.

The effectiveness of this EMPr will to a large degree rest on adherence to and fulfilling the roles and responsibilities of each role player and stakeholder. The roles and responsibilities for management actions contained in the EMPr (refer to Section 5 of this document) and arrangements for coordination among the role players are clearly defined in this document.

ZITHOLELE CONSULTING (PTY) LTD

APPENDIX I-1: GENERIC EMPr FOR SUBSTATION

GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including but not limited to the applicant and the competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. Scope

The scope of this generic EMPr applies to the development or expansion of substation infrastructure for the transmission and distribution of electricity requiring EA in terms of NEMA. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realization of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information and is **not legally binding**	Definitions, acronyms, roles & responsibilities and documentation and reporting.
B	1	Pre-approved generic EMPr template	Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity, which are presented in the form of a template that has been pre-approved. The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template **is not required** to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA. To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA

Part	Section	Heading	Content
			will comply with the pre-approved generic EMPr template contained in Part B: Section 1, and understands that the impact management outcomes and impact management actions are **legally binding**. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and impact management actions have been either pre-approved or approved in terms of Part C. This section **must be** submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C is applicable to the site, it **is required** to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The

Part	Section	Heading	Content
			information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding. This section applies only **to additional** impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in Part B: section 1.
Appendix 1			Contains the method statements to be prepared prior to commencement of the activity. The method statements are **not required** to be submitted to the competent authority.

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
  - a 'responsible person',
  - a method for implementation,
  - a timeframe for implementation
- For monitoring
  - a responsible person
  - frequency
  - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by the holder of the EA. This template once signed and dated is legally binding. The holder of the EA will remain responsible for its implementation.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in Regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in Regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features and within 50 m from the development footprint.

Sub-section 3 is the declaration that the applicant (s)/proponent (s) or holder of the EA in the case of a change of ownership must complete which confirms that the applicant/EA holder will comply with the pre-approved 'generic EMPr' template in Section 1 and understands that the impact management outcomes and impact management actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"**hazardous substance**" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover as a minimum applicable details with regard to:

(i) Construction procedures;
(ii) Plant, materials and equipment to be used;
(iii) Transporting the equipment to and from site;
(iv) How the plant/ material/ equipment will be moved while on site;
(v) How and where the plant/ material/ equipment will be stored;
(vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
(vii) Timing and location of activities;
(viii) Compliance/ non-compliance; and
(ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

"solid waste" means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

"spoil" means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

"topsoil" means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

"works" means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered Interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: *Guide to roles and responsibilities for implementation of an EMPr*

Responsible Person(s)	**Role and Responsibilities**
Developer's Project Manager (DPM)	<u>Role</u> The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. <u>Responsibilities</u> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.

Responsible Person(s)	Role and Responsibilities
Developer Site Supervisor (DSS)	Role The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. Responsibilities - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	Role The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr. The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a

Responsible Person(s)	Role and Responsibilities
	variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken;

Responsible Person(s)	Role and Responsibilities
	- Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer (dEO)	<u>Role</u> The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. <u>Responsibilities</u> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports;

Responsible Person(s)	Role and Responsibilities
	- Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<u>Role</u> The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities. <u>Responsibilities</u> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

Responsible Person(s)	Role and Responsibilities
contractor Environmental Officer (cEO)	<u>Role</u> Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: <u>Responsibilities</u> - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all substation infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice.

Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant CA for them to deal with the transgression, as it deems fit. The contractor is deemed not to have complied with the EMPr if, inter alia, There is a deviation from the environmental conditions, impact management outcomes and impact management actions activities, as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and

14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in (**section 4.11**) below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in (**section 4.10**) above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and

4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes included in the EMPr file and submitted to the CA at intervals as indicated in the EA.

The ECOs must prepare a monthly EAR. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contactor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities; – The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; – Refresher environmental awareness training is available as and when required; – All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; – The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering. – Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities;	cEO	• Induction Training • Toolbox talks • Visual aids (posters, pamphlets, etc) • Environmental awareness training workshops • Refresher workshops • Training material covers environmental awareness • Record keeping of attendance at training workshops/induction training	Pre-construction Construction	ECO	Once-off As and when neccessary	• Workshop material • Toolbox talk registers • Attendance registers • Visual aid material • Photographic records • Completed and up to date filing system with proof of training • Environmental awareness training material requirement checklist

c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. – A record of all environmental awareness training courses undertaken as part of the EMPr must be available; – Educate workers on the dangers of open and/or unattended fires; – A staff attendance register of all staff to have received environmental awareness training must be available. – Course material must be available and presented in appropriate languages that all staff can understand.						that includes training in the relevant language

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; – Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; – Sites must be located where possible on previously disturbed areas; – The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***;	Contractor, ECO, DPM	• Development of an appropriate method statement • Approval of site camp by ECO	Pre-construction	ECO	Once-off	• Electronic correspondences indicating approvals contained within the environmental file. • Method Statement that meets this requirement • Site Layout Map indicating approved construction camp • Fencing meets requirement of Section

						5.5. of the EMPr
– The use of existing accommodation for contractor staff, where possible, is encouraged. –	A local Contractor will be employed and there will be no need for staff accommodation on site.					

5.3 Access restricted areas

Impact management outcome: Access to restricted areas prevented.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development; – Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and – Unauthorised access and development related activity inside access restricted areas is prohibited.	Contractor dEO cEO	• Walk down of substation site • Erect temporary barriers (if required) • Signage at restricted areas	Pre-construction Construction	ECO	Once off prior to commencement of construction	• Results / Report of walk down • Sensitivity map • Visual inspection • Photographic records

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; – All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition – All contractors must be made aware of all these access routes. – Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense; – Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; – In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with ***section 4.9: photographic record***; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor; – Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands – Access roads must only be developed on a pre-planned and approved roads.	Contractor, DPM, dEO	• Meetings • Signed access agreement	Pre-Construction Construction	ECO	• Once-off • Weekly • As and when required • Continuous	• Signed access agreements • Minutes of meetings • Written approvals for deviations • Visual inspection of access roads • Photographic records

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible; – Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***; – All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; – At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;	DPM DSS dEO cEO	• Existing and new gates will be recorded and documented as per the requirements of section 4.9 • Undertake maintenance activities on fences and barriers	Pre-construction Construction At the end of the Construction Phase	ECO	Weekly	• Access agreements • Visual checks • Photographic record

– Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; – Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; – Original tension must be maintained in the fence wires; – All gates installed in electrified fencing must be re-electrified; – All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities; – Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable; – Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner. – All fencing must be developed of high quality material bearing the SABS mark; – The use of razor wire as fencing must be avoided; – Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; – On completion of the development phase all temporary fences are to be removed; – The contractor must ensure that all fence uprights						

are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage**.**

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; – The Contractor must ensure the following: a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. – Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems;	There will be no abstraction from groundwater or surface water Contractor dEO / cEO	Implement the required water conservation measures throughout onsite construction processes	Construction	ECO	Monthly, and as and when required	Successful implementation of water conservation

and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged.						

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; – All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; – Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; – Water that has been contaminated with	Contractor dEO / cEO	Identification of cement/ concrete batching areas Provision of spill kits Designated bins / containers for contaminate materials Analysis of water samples (where required)	Pre-construction Construction	ECO	Monthly	Visual inspection Results of sample analysis Safe disposal certificates

suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.						

5.8 Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All measures regarding waste management must be undertaken using an integrated waste management approach; – Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; – A suitably positioned and clearly demarcated waste collection site must be identified and provided; – The waste collection site must be maintained in a clean and orderly manner; – Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;	Contractor, dEO, cEO	Provision of appropriate waste bins Identification of water storage areas Awareness training Signage	Construction Operation	ECO	Monthly	Visual inspection Safe disposal certificates Training material Training Attendance records

– Staff must be trained in waste segregation; – Bins must be emptied regularly; – General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; – Hazardous waste must be disposed of at a registered waste disposal site; – Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; – In the event of a spill, prompt action must be taken to clear the polluted or affected areas; – Where possible, no development equipment must traverse any seasonal or permanent wetland – No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone	**N/A – no watercourses occur in vicinity of the substation location**					

should occur; – Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; – There must not be any impact on the long term morphological dynamics of watercourses or estuaries; – Existing crossing points must be favored over the creation of new crossings (including temporary access) – When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.	

5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General: – Indigenous vegetation which does not interfere with the development must be left undisturbed; – Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; – Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing; – Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed; – The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; – Trees felled due to construction must be documented and form part of the Environmental	Contractor, dEO, cEO	Walk down of substation area Application for permits with Free State Department of Economic, Small Business Development, Tourism & Environmental Affairs (if required) Appointment of registered pest control operator Record trees felled & herbicide use (if any)	Pre-Construction Construction Operation	ECO	Monthly	Results / Report of walk down Permit applications Appointment letter Registers – trees felled /herbicide use

Audit Report; – Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris; – Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; – A daily register must be kept of all relevant details of herbicide usage; – No herbicides must be used in estuaries; – All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to ***Section 5.3: Access restricted areas***. Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.						

5.11 Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the	Contractor	Adherence to avifaunal specialist	Construction	ECO	Monthly	Awareness material

landowner or a person representing the landowner being present; – The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; – Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; – Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; – No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; – No deliberate or intentional killing of fauna is allowed; – In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and – No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.	dEO cEO	recommendations Awareness training Pamphlets Toolbox talks Permit applications (if required)	Operation			Interviews with staff Toolbox talk topics Permit applications (if required)

5.12 Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in ***Section 5.3: Access restricted areas***; – Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; – All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.	Contractor dEO cEO	Checking excavations Awareness training Posters Flyers Toolbox talks Contact SAHRA if any human remains and/or other archaeological, palaeontological and historical material are uncovered	Construction	ECO	Monthly	Awareness material Interviews with staff Toolbox talk topics SAHRA recommendations / Responses (if required)

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; – All unattended open excavations must be adequately fenced or demarcated; – Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; – Ensure structures vulnerable to high winds are secured; – Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	Contractor dEO cEO	• Risk assessment • Create incident & complaint register • Regular inspection of excavations, scaffolding • Check weather forecast (heavy winds / rain)	Construction	ECO	Monthly	• Risk registers • Incident and compliant registers • Inspection reports • Weather reports / access to forecasts

5.14 Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available; – The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; – Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out;	Contractor dEO cEO	• Appoint a suitable service provider • Regular inspection of chemical toilets	Construction	ECO	Monthly	• Service provider appointment /contract • Collection &Disposal certificates • Visual inspection

e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained.						

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area; – Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; – The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; – Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;	Contractor dEO cEO	• Appoint suitable service providers (counselling, pest control HIV testing etc) • Awareness training • Visual aids – flyers, posters • Set up condom	Construction	ECO	Monthly	• Appointment /Contracts with service providers • Awareness training material • Contents of flyers/ posters • Visual checks

– Free condoms must be made available to all staff on site at central points; – Medical support must be made available; – Provide access to Voluntary HIV Testing and Counselling Services.		disposal areas				& worker interview responses

5.16 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project; – The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; – All staff must be made aware of emergency procedures as part of environmental awareness training; – The relevant local authority must be made aware of a fire as soon as it starts; – In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see ***Hazardous Substances section 5.17***).	Contractor dEO cEO	• Identify possible emergencies • Include ESKOM emergency procedures • Include in toolbox talks • Set up communication lines with local authority	Construction Operation	ECO	Monthly	• Emergency Procedure • Toolbox talk topics • •Communication lines with local authority • Incident reports

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; – All hazardous substances must be stored in suitable containers as defined in the Method Statement; – Containers must be clearly marked to indicate contents, quantities and safety requirements; – All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; – Bunded areas to be suitably lined with a SABS approved liner; – An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; – All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); – All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;	Contractor dEO cEO	• Provide suitable storage for Hazardous Chemicals • Install gates /locks to control access • Keep records of type and amount stored on site • Train relevant employees on handling of hazardous substances • Provide appropriate PPE • Provide	Construction Operation	ECO	Monthly	• Visual inspection • Hazardous chemical register • Training records • Safe disposal certificates (where applicable)

– Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; – The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; – The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); – The floor of the bund must be sloped, draining to an oil separator; – Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained; – All empty externally dirty drums must be stored on a drip tray or within a bunded area; – No unauthorised access into the hazardous substances storage areas must be permitted; – No smoking must be allowed within the vicinity of the hazardous storage areas; – Adequate fire-fighting equipment must be made available at all hazardous storage areas;		appropriate number of spill kits & firefighting equipment and train employees on usage				

– Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used; – An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; – The responsible operator must have the required training to make use of the spill kit in emergency situations; – An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; – In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to ***Section 5.7*** for procedures concerning ***storm and waste water management*** and ***5.8*** for ***solid and hazardous waste management.***						

5.18 Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area; – During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts; – Leaking equipment must be repaired immediately or be removed from site to facilitate repair; – Workshop areas must be monitored for oil and fuel spills; – Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available; – The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed;	Contractor dEO cEO	• Provide drip trays • Follow a maintenance schedule to ensure repairs to equipment and vehicles • Provide appropriate number of spill kits & firefighting equipment and train employees on usage	Construction Operation	ECO	Monthly	• Visual inspection • Hazardous chemical register • Training records • Safe disposal certificates (where applicable)

– Water drainage from the workshop must be contained and managed in accordance Section ***5.7: Storm and waste water management***.						

5.19 Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Concrete mixing must be carried out on an impermeable surface; – Batching plants areas must be fitted with a containment facility for the collection of cement laden water. – Dirty water from the batching plant must be contained to prevent soil and groundwater contamination – Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains; – A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; – Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; – Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;	Contractor dEO cEO	• Identify suitable batching areas • Provide facilities/containers to contain dirty water from batching plant • Erect fencing around batching areas • Regular inspecting of batching plants & areas	Construction	ECO	Monthly	• Visual inspection • Photographic record

– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to ***Section 5.20: Dust emissions***) – Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; – Temporary fencing must be erected around batching plants in accordance with Section ***5.5: Fencing and gate installation***.						

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make	Contractor dEO cEO	• Provide water bowers • Check weather forecast (heavy winds) • Speed signs • Identify suitable topsoil stockpile areas	Construction	ECO	Weekly	Visual inspection

recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; – Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; – Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; – Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; – For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

5.21 Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Any blasting activity must be conducted by a suitably licensed blasting contractor; and – Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.	**n/a – there will be no blasting**					

5.22 Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only; – All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; – Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; – Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.	Contractor dEO cEO	Method statement on noise minimisation	Construction	ECO	Weekly	Preconstruction checklist Code of Conduct Complaint register Operating hours

5.23 Fire prevention

Impact management outcome: Prevention of uncontrollable fires.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant; – Firefighting equipment must be available on all vehicles located on site; – The local Fire Protection Agency (FPA) must be informed of construction activities; – Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; – Two way swop of contact details between ECO and FPA.	Contractor dEO cEO	Designated smoking area must be demarcated on site.	Construction Operation	ECO	Monthly	• Visual check of smoking areas • Communication with FPA • Notice boards

5.24 Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies; – All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; – Topsoil stockpiles must not exceed 2 m in height; – During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.); – Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor dEO cEO	• Identify suitable locations for topsoil storage • Regular inspection of topsoil storage areas	Construction	ECO	Weekly	• Inspection records • Visual inspection of topsoil stockpiles

5.25 Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone; – Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards; – Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Rehabilitation of the disturbed areas must be managed in accordance with ***Section 5.35: Landscaping and rehabilitation***;	Contractor dEO cEO	• Identify suitable locations for topsoil storage • Regular inspection of rehabilitated areas	Construction	ECO	Weekly	• Inspection records • Visual inspection of rehabilitated areas

– All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.						

5.26 Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must be undertaken in accordance with ***Section 5.18: Workshop, equipment maintenance***	Contractor dEO cEO	Regular inspection of rehabilitated areas	Construction	ECO	Weekly	• Inspection records • Visual inspection of rehabilitated areas

and storage; and – Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***.						

5.27 Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Batching of cement to be undertaken in accordance with **Section *5.19: Batching plants***; and – Residual solid waste must be disposed of in accordance with **Section *5.8: Solid waste and hazardous management***.	**Refer to Section 5.19: Batching plants** **&** **Section 5.8: Solid waste and hazardous management**					

5.28 Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Management of dust must be conducted in accordance with Section ***5. 20: Dust emissions***;	**Refer to Section 5. 20: Dust emissions;**					

– Management of equipment used for installation must be conducted in accordance with Section ***5.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills must be conducted in accordance with Section ***5.17: Hazardous substances***; and – Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.	**Refer to Section 5.18: Workshop, equipment maintenance and storage;** **Refer to Section 5.17: Hazardous substances; and** **Refer to Section 5.8: Solid waste and hazardous management**

5.29 Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts – Emergency repairs due to breakages of equipment must be managed in accordance with ***Section 5. 18: Workshop, equipment maintenance and storage*** and ***Section 5.16: Emergency procedures***.	Contractor dEO cEO	Visual inspection	During assembling of infrastructure	ECO	Monthly	Photographic inspection of assembly areas

5.30 Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with **Section *6.8: Solid waste and hazardous Management***; – Management of equipment used for installation shall be conducted in accordance with **Section *5.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills shall be conducted in accordance with ***Section 5.17: Hazardous substances***.	**Refer to Section 6.8: Solid waste and hazardous Management;** **Refer to Section 5.18: Workshop, equipment maintenance and storage; and** **Refer to Section 5.17: Hazardous substances**					

5.31 Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible	Method of	Timeframe for	Responsible	Frequency	Evidence of

	person	implementation	implementation	person		compliance
– Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.	**Refer to Section 5.8: Solid waste and hazardous management**					

5.32 Socio-economic

Impact management outcome: enhanced socio-economic development.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Develop and implement communication strategies to facilitate public participation; – Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; – Sustain continuous communication and liaison with neighboring owners and residents – Create work and training opportunities for local stakeholders; and – Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.	Contractor dEO cEO	• Obtain I&AP List with contact details from applicant • Communicate details of designated contact person to I&APs • Set up quarterly • Communicate on sessions / meetings • Appoint	Construction Operation	ECO	Monthly	• Communication with I&APS • Meeting minutes • Event attendance registers • No complaints received from stakeholders and the communication plan is implemented • Communication

		community members in jobs that suit available skill sets				with the neighboring community meets the requirement of the Grievance Mechanism. • Conflict resolution is undertaken as per the documented procedures.

5.33 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in ***sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage***;	Contractor dEO cEO	• Visual inspection during temporary closure for potential snag	Prior to temporary closure	ECO	Prior to temporary closure	• Completed checklist • Visual inspection • Communication

– Hazardous storage areas must be well ventilated; – Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; – Emergency and contact details displayed must be displayed; – Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; – Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; – Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; – Structures vulnerable to high winds must be secured; – Wind and dust mitigation must be implemented; – Cement and materials stores must have been secured; – Toilets must have been emptied and secured; – Refuse bins must have been emptied and secured; – Drip trays must have been emptied and secured.		items. • Make a checklist of requirements • Communicate requirements to employees • Notify service providers / local authorities • Arrange collection of refuse & contaminated liquid • Do a final inspection				records • Safe disposal certificates

5.34 Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment; – Oil containing equipment must be stored to prevent leaking or be stored on drip trays; – All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers; – Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment; – The Contractor must also be equipped to contain and clean up any pollution causing spills; and – Disposal of unusable material must be at a licensed waste disposal site.	Contractor dEO cEO	Visual inspection during construction, assembly and dismantling of old equipment	Decommissioning	ECO	Continuous	• Equipment & material list • Inspection report • Contracts for removal disposal • Collection / disposal certificate

5.35 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site; – All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 – All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; – Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; – Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; – Rehabilitation of access roads outside of farmland;	Contractor dEO cEO	Visual inspection of disturbed areas and subsequent landscaping and rehabilitation.	Rehabilitation	ECO	Continuous	• Physical inspection • Photographic evidence

– Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition; – Stockpiled topsoil must be used for rehabilitation (refer to ***Section 5.24: Stockpiling and stockpiled areas***); – Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; – Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; – Subsoil must be ripped before topsoil is placed; – The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; – Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. – Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of						

seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area						

6 ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant:

Name of applicant: Eskom Holdings SOC Ltd (Ms Andrea van Gensen)

Tel No: (053) 830 5775

Fax No: n/a

Postal Address: P.O. Box 606, Kimberley

Physical Address: Eskom Distribution, DSC Building, Ground floor (C Block), 69 Memorial Road, Monument Heights, Kimberley, 8301

7.1.2 Details and expertise of the EAP:

Name of EAP: Ms Natasha Lalie

Tel No: (011) 207 2060

Fax No: 086 674 6121

E-mail address: natashal@zitholele.co.za

Expertise of the EAP (Curriculum Vitae included): Refer to Appendix 2 of this EMPr for the CV of the EAP

7.1.3 Project name:

Proposed Kiwano Solar Photovoltaic and Battery Energy Storage System Facility including associated substation and 132kV loop-in loop-out powerline near Upington, Northern Cape Province.

7.1.4 Description of the project:

Eskom Holdings SOC Ltd intends to develop, construct and operate a 58 MW Solar Photovoltaic (PV) Plant, 40MW Grid-Scale Battery Energy Storage System (BESS) facility, a 132kV Kiwano Substation, and construction of a 132kV powerline outside the town of Upington in the Northern Cape Province. The proposed development falls within the jurisdiction of Dawid Kruiper Local Municipality and within Z F Mgcawu District Municipality.

The proposed Kiwano BESS and PV facility will comprise of the following:

- PV installation with envisaged capacity of 58 MW,
- BESS installation with envisaged capacity of 40 MW / 200 MWh
- Kiwano 132 kV substation with 5 feeder bays

- Single Twin-Tern 132 kV overhead line on a double circuit support structure, connecting Kiwano substation to Upington substation.

The PV facility proposed for Kiwano will include the following associated infrastructure:

- Total site area for PV installation up to 1,150,000 m^2 (115 hectares) to allow for the construction of a PV facility with capacity of 58 MW.
- Solar PV modules, up to a total of 450,000 m^2, that convert solar radiation directly into electricity. The solar PV modules will be elevated above the ground and will be mounted on either fixed tilt systems or tracking systems (comprised of galvanised steel and aluminium). The Solar PV modules will be placed in rows in such a way that there is allowance for a perimeter road and security fencing along the site boundary, and access roads in between the PV module rows.
- Inverter stations, each occupying a footprint up to approximately 30 m^2, with up to 60 Inverter stations installed on the site. Each Inverter station will contain an inverter, step-up transformer, and switchgear. The Inverter stations will be distributed on the site, located alongside its associated Solar PV module arrays. The Inverter station will perform conversion of DC (direct current) to AC (alternating current), and step-up the LV voltage of the inverter to 22 kV, to allow the electricity to be fed into the Kiwano substation. Inverter stations will connect several arrays of Solar PV modules and will be placed along the internal roads for easy accessibility and maintenance.
- Below ground electrical cables with trenching - connecting PV arrays, Inverter stations, O&M buildings, and 132kV Kiwano substation.
- Adequately designed foundations and mounting structures that will support the Solar PV modules and Inverter stations.
- Where possible, existing roads that provide access to the Kiwano site will be used, upgraded, and extended as necessary. For Site A, an access road, approximately 6 m wide and estimated up to 5 km long, will be required to provide access to the PV site. For Site B, a new access road from the existing D3276 road to the site will be required, approximately 6 m wide and estimated up to 1 km long. The existing D3276 road will require upgrading, approximately 6 m wide and estimated up to 4 km long (from N14 to site access road).
- A perimeter road around the site, approximately 5 m wide and 4.5 km in length.
- Internal roads for access to the Inverter stations, approximately 5 m wide and 18 km total length.
- Internal roads/paths between the Solar PV module rows, approximately 2-3 m wide, to allow access to the Solar PV modules for operations and maintenance activities.
- Infrastructure required for the operation and maintenance of the Kiwano PV Plant installation:
    - Meteorological Station
    - O&M Building – comprising control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities (including sewage infrastructure)
    - Spares Warehouse and Workshop
    - Hazardous Chemical Store

- Security Building
- Parking areas and roads

- Small diameter water supply pipeline connecting existing municipality pipeline, approximately 5 km long.
- Stormwater channels
- Perimeter fencing of the Kiwano site, with access gates. Detailed requirements will be determined following the security risk assessment.
- Temporary laydown area, occupying a footprint up to 100,000 m^2 (10 hectares). The laydown area will be used during construction and rehabilitated thereafter. The laydown area will also accommodate water storage tanks or lined ponds (estimated 815 kl/month for the first 3 months and 408 kl/month for the remaining 21 months, until construction is completed).
- Temporary concrete batching plant, occupying a footprint up to 10,000 m^2 (1 hectare). The concrete batching plant area will be used during construction and rehabilitated thereafter.
- Temporary site construction office area, occupying a footprint up to 10,000 m^2 (1 hectare). This area will accommodate the offices for construction contractors during construction and rehabilitated thereafter.

7.1.5 Project location:

NO	FARM NAME(if applicable)	FARM NUMBER(if applicable)	PORTION NAME	PORTION NUMBER	LATITUDE	LONGITUDE
0	Keimoes	1080	n/a	Remainder	28°30'15.40"S	21° 8'03.14"E

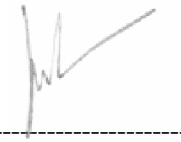
7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features within 50 m from the development footprint.

7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 day prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Signature Proponent/applicant/ holder of EA Date:



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7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and impact management actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

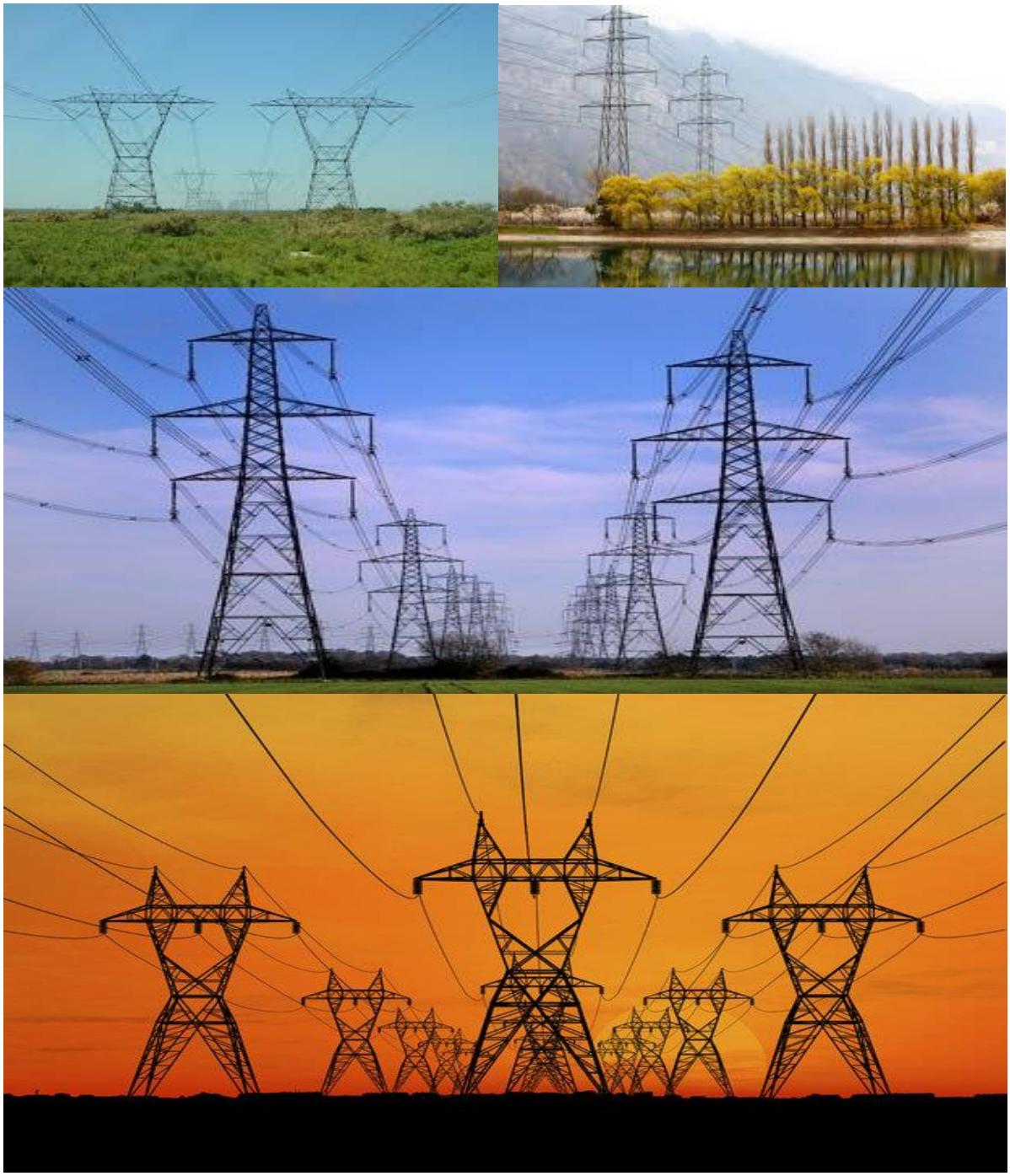
APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

APPENDIX I-2: GENERIC EMPr FOR POWER LINES

APPENDIX 1

GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE DEVELOPMENT AND EXPANSION FOR OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE



environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended, (EIA Regulations) or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of overhead electricity transmission and distribution infrastructure, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. Scope

The scope of this generic EMPr applies to the development or expansion of overhead electricity transmission and distribution infrastructure requiring EA in terms of NEMA, i.e. with a capacity of 33 kilovolts or more. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realisation of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information and is **not legally binding**	Definitions, acronyms, roles & responsibilities and documentation and reporting.
B	1	Pre-approved generic EMPr template	Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure, which are presented in the form of a template that has been pre-approved. The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template **is not required** to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA. To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA will comply with the pre-approved generic EMPr

Part	Section	Heading	Content
			template contained in Part B: Section 1, and understands that the impact management outcomes and impact management actions are **legally binding**. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and actions have been either pre-approved or approved in terms of Part C. This section **must be** submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C is applicable to the site, it **is required** to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP, and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding.

Part	Section	Heading	Content
			This section applies only **to additional** impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in Part B: section 1.
Appendix 1			Contains the method statements to be prepared prior to commencement of the activity. The method statements are **not required** to be submitted to the competent authority.

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
  - a 'responsible person',
  - a method for implementation,
  - a timeframe for implementation
- For monitoring
  - a responsible person
  - frequency
  - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the corridor in which the proposed overhead electricity transmission and distribution infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps must identify features both within the planned working area and any known sensitive features in the surrounding landscape within 50m from the development footprint. The overhead transmission and distribution profile must be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions must be used.

Sub-section 3 is the declaration that the applicant/proponent or holder of the EA in the case of a change of ownership must complete, which confirms that the applicant/EA holder will comply with the pre-approved generic EMPr template in Section 1 and understands that the impact management outcomes and actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"hazardous substance" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover applicable details with regard to:

(i) Construction procedures;
(ii) Plant, materials and equipment to be used;
(iii) Transporting the equipment to and from site;
(iv) How the plant/ material/ equipment will be moved while on site;
(v) How and where the plant/ material/ equipment will be stored;
(vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
(vii) Timing and location of activities;
(viii) Compliance/ non-compliance; and
(ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

"solid waste" means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

"spoil" means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

"topsoil" means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil; and

"works" means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: *Guide to roles and responsibilities for implementation of an EMPr*

Responsible Person (s)	**Role and Responsibilities**
Developer's Project Manager (DPM)	<u>Role</u> The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. <u>Responsibilities</u> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	<u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS

Responsible Person (s)	Role and Responsibilities
	is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. Responsibilities - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	Role The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non- compliance with the Performance Specifications as set out in the EA and EMPr. The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required. Responsibilities

Responsible Person (s)	Role and Responsibilities
	The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer	Role

Responsible Person (s)	Role and Responsibilities
(dEO)	The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. <u>Responsibilities</u> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<u>Role</u> The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where

Responsible Person (s)	Role and Responsibilities
	specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion for overhead electricity transmission and distribution infrastructure activities. Responsibilities - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: Responsibilities - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA,

Responsible Person (s)	Role and Responsibilities
	EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place for all overhead electricity transmission and distribution infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. At a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints

received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant CA for them to deal with the transgression, as it deems fit. The contractor is deemed not to have complied with the EMPr if, inter alia, There is a deviation from the environmental conditions, impact management outcomes and impact management actions , as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and
14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in (**section 4.11**) below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in (**section 4.10**) above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and
4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes must be included in the EMPr file and be submitted to the CA at intervals as indicated in the EA.

An Environmental Audit Report must be prepared monthly. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of overhead electricity transmission and distribution infrastructure. There is a list of aspects identified for the development or expansion of overhead electricity transmission and distribution infrastructure, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of overhead electricity transmission and distribution infrastructure.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contactor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities;	ECO / cEO / dEO	Environmental awareness training workshops	Pre-construction Construction	ECO dEO	Once-off	Attendance register and training minutes / notes for the record
– The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course;	Contractor	Training sessions	Pre-construction Construction	ECO dEO	As and when required	Attendance register and training minutes / notes for the record
– Refresher environmental awareness training is available as and when required;	ECO / cEO / dEO	Refresher workshops	Construction phase	ECO dEO	As and when required	Attendance register and training minutes / notes for the record
– All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr;	ECO / cEO / dEO	Training workshops	Construction phase	ECO dEO	Continuous	Attendance register and training minutes / notes for the record
– The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum:	Contractor	Develop and place appropriate posters at key	Pre-construction Construction	ECO dEO cEO	Continuous	Photographic record

a)Safety notifications; and b) No littering.		locations				
– Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j)Fire prevention; and k) Disease prevention.	ECO / cEO / dEO	Develop environmental awareness training material which covers the minimum requirements	Pre-construction Construction	ECO dEO	Prior to commencement of training	Environmental awareness training material requirement checklist
– A record of all environmental awareness training courses undertaken as part of the EMPr must be available;	ECO / cEO / dEO	Record keeping (hard copy and e-filing)	Construction	ECO dEO	Continuous	Completed and up to date filing system with proof of training
– Educate workers on the dangers of open and/or unattended fires;	cEO / dEO	Environmental awareness	Pre-construction Construction	ECO dEO	Prior to commencement	Environmental awareness

		training material which covers the dangers of open and/or unattended fire			of training	training material requirement checklist
– A staff attendance register of all staff to have received environmental awareness training must be available.	ECO / cEO / dEO	Record keeping (hard copy and e-filing)	Construction	ECO dEO	Continuous	Completed and up to date filing system with proof of training
– Course material must be available and presented in appropriate languages that all staff can understand.	ECO / cEO / dEO	Filing of training material (in appropriate language)	Construction	ECO dEO	Continuous	Environmental awareness training material requirement checklist that includes training in the relevant language

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;	Contractor cEO	Development of an appropriate method statement	Pre-construction	ECO dEO	Once-off	Method Statement that meets this requirement
– Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through;	ECO	Approval by ECO	Pre-Construction	ECO	Once-off	Site Layout Map indicating approved construction camp
– Sites must be located where possible on previously disturbed areas;	DPM	Approval by ECO	Pre-Construction	ECO	Once-off	Site Layout Map indicating approved construction footprint
– The camp must be fenced in accordance with	DPM	Design and	Pre-construction	ECO	Continuous	Fencing meets

Section 5.5: Fencing and gate installation; and		implementation of fencing as per Section 5.5. of the EMPr.	Construction	dEO		requirement of Section 5.5. of the EMPr
– The use of existing accommodation for contractor staff, where possible, is encouraged.	A local Contractor will be employed and there will be no need for staff accommodation on site					

5.3 Access restricted areas

Impact management outcome: Access to restricted areas prevented.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through, and any additional areas identified during development;	dEO / cEO Contractor	Pre-construction walk through	Pre-construction	ECO	Once-off	Site Layout Map indicating restricted access areas
– Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and	dEO / cEO Contractor	Signage and fencing around the restricted areas	Placement of temporary barriers around access restricted areas	ECO	Once-off	Access restricted areas are closed-off through temporary barriers and barriers maintained to a sufficient standard
– Unauthorised access and development related activity inside access restricted areas is prohibited.	Contractor / dEO / cEO	Erect appropriate temporary barriers around	Construction	ECO	Continuous	Audit checklist compliance

		access restricted areas and provide clear signage of restricted status				

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area;	n/a – The landowner is Eskom.					
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities;	n/a – The landowner is Eskom.					
– The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities;	n/a – The landowner is Eskom.					
– All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition	Contractor	Undertake maintenance activities on the internal roads	Construction phase	cEO / ECO	Weekly	Photographic evidence of road condition pre-construction,

		within Eskom property used for construction				record of implementation and effectiveness of maintenance activities
– All contractors must be made aware of all these access routes.	dEO / cEO	Site Layout Map indicating all access routes	Pre-Construction Construction	ECO	Once-off	Site Layout Map available on site
– Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense;	Contractor	All access routes developed that are not in-line with the access route agreements must be closed	Construction and Rehabilitation	ECO	As and when the deviation occurs	Photographic record of the closure of access roads and re-vegetation
– Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads;	Contractor Eskom maintenance personnel	Existing access routes to be used must be specified and the development of new roads must be avoided as far as possible	Construction and operation	cEO Operation and maintenance team	Continuous	Implementation of the approved layout
– In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with ***section 4.9: photographic record***; prior to use	n/a – internal roads under the ownership of Eskom will be used.					

and the condition thereof agreed by the landowner, the DPM, and the contractor;						
– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands	DPM and Contractor	Design access roads to follow fence lines and avoid vegetated areas	Pre-construction	ECO	Once-off during the design phase Once-off during the construction phase	Implementation of approved Site Layout Plan
– Access roads must only be developed on pre-planned and approved roads.	Contractor	Approved Site Layout Plan	Construction	ECO	Once-off during the design phase Weekly during the construction phase	Implementation of approved Site Layout Plan

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.		
Impact Management Actions	**Implementation**	**Monitoring**

	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible;	Contractor	Identify and inform all relevant staff of the existing gates to be used	Pre-construction Construction	dEO	Monthly	Existing gates are utilised on a frequent basis and only limited new access gates are developed
– Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***;	DPM DSS dEO cEO	Existing and new gates will be recorded and documented as per the requirements of section 4.9	Construction	ECO	Once, when the construction of all new gates have been completed	Photographic record of the existing and new gates as per the requirements of section4.9
– All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner;	Contractor	Ensure all relevant gates are fitted with locks and are always locked	Construction Operation	ECO Operation and maintenance team	Bi-weekly (every second week)	All gates are locked and no complaints from Eskom are received in this regard
– At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;	dEO	Install new gates where required with approval from Eskom	Construction	ECO	Once, prior to construction and during the construction phase, as and when	New gates are installed where the power line crosses fences

					required	
– Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground;	Contractor	Install gates in a manner so that there is a gap of no more than 100mm between the bottom of the gate and the ground	Construction	ECO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement
– Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate;	Contractor	Implement a reinforced concrete sill beneath gates installed for jackal proofing	Construction	cEO	Once, during the erection of the gates during the construction phase	New gates installed as per the requirement
– Original tension must be maintained in the fence wires;	Contractor	Maintain original tension of fences through required activities	Construction	ECO	Monthly	No tension reduction on fence wires
– All gates installed in electrified fencing must be re-electrified;	Contractor	Electrify gates installed in electrified fencing	Construction	ECO	Once, during the erection of the gates during the construction	Gates installed in electrified fencing is electrified

					phase	
– All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities;	Contractor	Undertake maintenance activities on fences and barriers	Construction	ECO	Monthly	Photographic record of maintained fencing and gates
– Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora;	Contractor	Fence construction camps, batching plants, hazardous storage areas and access restricted areas. Avoid sensitive flora	Construction	ECO	Once during the erection of fencing	Photographic record of fences erected
– Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the landowner.	dEO/ cEO Contractor	Obtain written approval from the relevant landowner where temporary fencing is required to restrict livestock movement	Construction	ECO	To be monitored as temporary fencing is required	Written approval to be provided by the dEO
– All fencing must be developed of high-quality material bearing the SABS mark;	Contractor	Make use of high-quality	Construction	cEO	To be monitored,	Use of high-quality materials for

		materials approved by SABS			as fencing is erected during the construction phase	fencing approved by SABS
– The use of razor wire as fencing must be avoided;	Contractor	Razor wire must not be sourced or used for the erection of fencing	Construction	ECO	To be monitored, as fencing is erected during the construction phase	Fences erected do not make use of razor wire
– Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times;	DSS and Contractor	Ensure fenced areas are locked as required through the implementation of a formalized process.	Construction	cEO	Weekly and as and when required	Fences are locked and no complaints from Eskom are received.
– On completion of the development phase all temporary fences are to be removed;	Contractor	Removal of all temporary fences	At the end of the Construction Phase	ECO dEO	Once, following the completion of the construction phase	No temporary fences associated with the project is present following completion of the construction phase

– The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.	Contractor	Appropriate removal of all fence uprights	At the end of the Construction Phase	ECO dEO	Once, following the completion of the construction phase	No evidence of fence uprights

5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis;	n/a – there will be no abstraction of water					
– The Contractor must ensure the following: a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution	n/a - there will be no abstraction of water					

or sedimentation of the downstream watercourse are implemented.						
– Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. – d. The use of grey water is encouraged.	Contractor / dEO / cEO in consultation with the ECO	Implement the required water conservation measures throughout onsite construction processes	Construction	ECO	Monthly, and as and when required	Successful implementation of water conservation

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager;	Contractor dEO cEO	Implement measures for the control and management of runoff	Construction	ECO	Weekly	No mismanagement of runoff or contaminated water due to the temporary concrete batching plant
– All spillage of oil onto concrete surfaces must be controlled by the use of an	Contractor and	Obtain approved	Construction	ECO	Monthly,	Availability of approved

approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility;	cEO	absorbent material and make use of licensed waste disposal facilities for disposal of oil				absorbent material at the construction site and proof of disposal of oil at licensed disposal facilities
– Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO;	DPM in consultation with the ECO	Consultation as required. The necessary water quality testing must be undertaken prior to discharge.	Construction	ECO	As and when the need arises to discharge natural stormwater runoff and clean water	Proof of consultationbetwe en the DPM and ECO and the outcomes thereof to be provided. Proof of water quality testing and the results thereof.
– Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.	DPM in consultation with the ECO	Consultation between the DPM and the ECO to determine if water can be discharged directly into water bodies (where present). The necessary water quality testing must be undertaken prior	Construction	ECO	As and when the need arises to discharge water	Proof of consultation between the DPM and ECO and the outcomes thereof to be provided. Proof of water quality testing and the results thereof.

		to discharge				

5.8 Solid and hazardous waste management

Impact management outcome: Waste is appropriately stored, handled and safely disposed of at a recognised waste facility**.**

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All measures regarding waste management must be undertaken using an integrated waste management approach;	Contractor dEO cEO	Procurement of sufficient waste receptacles to separate respective waste streams. Agreement with a registered landfill to accept the various waste streams of safe disposal.	Construction	ECO	Monthly	Implementation of the waste management plan and proof of waste management through proof of responsible disposal
– Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided;	Contractor	Provision of appropriate waste collection bins strategically	Construction	ECO	Weekly	Appropriate waste collection bins are available

		placed throughout the site				throughout the site Photographic record
– A suitably positioned and clearly demarcated waste collection site must be identified and provided;	DPM and Contractor	Identify an appropriate location for the waste collection site which must be clearly demarcated	Construction	ECO	Once-off, prior to the commencement of construction	A waste collection site is appropriately placed and demarcated
– The waste collection site must be maintained in a clean and orderly manner;	Contractor	Regular collection of waste and maintenance of the area must be undertaken asper the waste requirements for the project during construction	Construction	ECO	Weekly	The waste collection site is maintained and clean
– Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal;	Contractor	Provide separate and marked bins for the different waste types associated with the construction	Construction	cEO	Weekly	Separate waste bins on site for the different waste types

		phase				
– Staff must be trained in waste segregation;	cEO / dEO in consultation with the ECO	Include waste segregation as part of the environmental awareness training material.	Pre-construction Construction	ECO	Monthly, and as and when required	Environmental awareness training material requirement checklist
– Bins must be emptied regularly;	Contractor	Bins must be emptied before reaching total capacity and on a regular basis as required for the project	Construction	ECO	Monthly	No mismanagement of bins.
– General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company;	Contractor	Disposal of general waste at licensed waste disposal facilities must be undertaken as per the waste management plan	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided
– Hazardous waste must be disposed of at a registered waste disposal site;	Contractor	Disposal of hazardous waste at licensed waste	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided

		disposal facilities must be undertaken as per the waste management plan				
– Certificates of safe disposal for general, hazardous and recycled waste must be maintained.	Contractor	Obtain certificates for safe disposal of waste	Construction	ECO	Monthly	Disposal certificates of disposal at licensed facilities to be provided and filed as part of the filing system

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities;	Contractor dEO cEO	Contractor to undertake activities which can cause spills of pollutants outside of watercourses	Construction	ECO	Weekly	No incidents reported of spillage of pollutants into watercourses Photographic record
– In the event of a spill, prompt action must be taken to clear the polluted or affected	Contractor and	Develop a management	Construction	ECO	Weekly	Feedback must be provided by the

areas;	cEO	plan or process for implementation should a spill take place				contractor in terms of how the spill was handled and photographic evidence of the feedback must be provided and kept on record
– Where possible, no development equipment must traverse any seasonal or permanent wetland	Contractor dEO cEO	No-go areas are cordoned off with red danger tape around the seasonal and permanent wetlands	Construction	ECO	Weekly	No evidence of equipment in the no-go areas.
– No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur;	**n/a – the site is not located near estuaries.**					
– Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available;	Contractor dEO cEO	An approved method statement for access to towers within watercourses must be available at all times.	Construction	ECO	Weekly	Access to tower positions within the watercourses are as per the approved method statements.
– There must not be any impact on the long-term morphological dynamics of	DPM, cEO	Spill Contingency	Construction	ECO, dEO	All phases of a project	No incidents of accidental spillage

watercourses or estuaries;		Plan for accidental spillage of contaminants in a watercourse and ensure it is continuously monitoring	Operation		life-cycle i.e. construction, operation and decommissioning	of contaminants into the watercourses
– Existing crossing points must be favored over the creation of new crossings (including temporary access)	Contractor	Several new crossings will be established due to the numbers of drainage lines on the site. The approved method statement for construction within the crossings are to be implemented.	Construction	ECO	Monthly, as and when required	No signs of degradation of the watercourses
– When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works,	Contractor	Activities undertaken near watercourses must be in-line with these considerations	Construction	ECO	Monthly, as and when required	No signs of degradation of the watercourses

appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and – d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.		and monitored				

5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General:						
– Indigenous vegetation which does not interfere with the development must be	cEO / dEO and	Demarcate areas of	Construction	ECO	Weekly, and as and	No unnecessary clearance of

left undisturbed;	Contractor	indigenous vegetation to be avoided before clearance is undertaken	Operation	Eskom Maintenance team	when required	indigenous vegetation is undertaken Photographic record
– Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species;	Contractor	Demarcate areas containing protected or endangered species to be avoided by construction activities	Construction phase	ECO	Weekly, and as and when required	No signs of clearance of Protected and endangered plant species other that those permitted to be removed by the relevant authority
– Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing;	Vegetation Ecologist	Protected Plant Search, Rescue and Relocation Plan	Pre-construction	ECO	Weekly until all Protected plants are relocated	Relocation of Protected Plant species is implemented as per the Plant Search, Rescue and Rehabilitation Plan.
– Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries prior to the cutting or clearing of the affected species, and they must be filed;	DPM	Permitting process is completed.	Pre-Construction	ECO	Once-off, prior to the commencemnt of construction	Permit from Northern Cape Department of Agriculture, Environmental Affairs, Rural

						Development and Land Reform is filed.
– The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals;	ECO	Environmental Audit Report provides details of the compliance with the conditions of the permit.	Construction	N/A	Continuous	Environmental Audit Checklist indicates compliance with conditions of the permit.
– Trees felled due to construction must be documented and form part of the Environmental Audit Report;	**n/a –Tree feeling is not applicable.**					
– Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris;	Contractor	Felled trees, vegetation cuttings and debris must be disposed of at a licensed waste disposal facility	Construction	ECO	Monthly	No felled trees, vegetation cuttings and debris are dumped in inappropriate locations and disposal certificates are available as proof of responsible disposal
– Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately	DPM and Contractor	Appointment of a registered pest control operator	Construction Operation	ECO	As and when herbicide is required	Documented proof of appointment of registered pest control operators

trained;						
– A daily register must be kept of all relevant details of herbicide usage;	Contractor	Develop a daily register for the documentation of the details of herbicide usage	Construction	ECO	Monthly	Daily register provided by the herbicide controller
– No herbicides must be used in estuaries;	**n/a- the site does not occur in the vicinity of estuaries**					
– All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to ***Section 5.3: Access restricted areas***.	Contractor cEO	Spatially demarcate Protected plant species and implement fencing as per Section 5.3	Construction	ECO	Once-off	Demarcation and fencing is as per Section 5.3
Servitude:						
– Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager;	Contractor in consultation with the DPM	Identify areas of vegetation not to be trimmed.	Construction and Operation	ECO Eskom maintenance team	Monthly	An indication of the areas where vegetation has not been trimmed or where vegetation has been removed from access roads must be provided.
– Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the land owner and the EA holder	Contractor	Clearing to be undertaken as per the requirements provided by	Construction	ECO	Monthly, and as and when required	Proof must be provided that areas agreed for clearance have been cleared.

		Eskom				
– Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility;	Contractor	Alien plant removal must be undertaken as per the Alien Invasive and Open Space Management System	Construction Operation	ECO	Monthly, and as and when required	Records of alien plant clearance must be available.
– Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280;	Contractor	Develop a procedure for the trimming of vegetation in terms of the listed requirements	Construction Operation	ECO Eskom Maintenance Team	Monthly, and as and when required	Records that trimming of vegetation complied with the listed requirements
– Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation;	Contractor	Dispose of the debris in accordance with the Waste Management Plan	Construction Operation	ECO Eskom Maintenance Team	Monthly, and as and when required	Proof must be provided that the debris has been disposed off at a licensed waste disposal facility
In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing which limit	Contractor	Develop a procedure for the cutting of vegetation for stringing purposes	Pre-Construction Construction	ECO	Once, prior to the commencement of construction	Proof of implementation of the procedure for cutting of vegetation for stringing purposes

impact to the environment must always be considered.						

5.11 Protection of fauna

Impact management outcome: Minimise disturbance to fauna.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present;	dEO / cEO Contractor	Develop a procedure for dealing with livestock within the affected properties	Pre-Construction Construction	ECO	Once, prior to the commencement of construction and as and when required during construction	Written consent provided by Eskom
– The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme;	dEO / cEO in consultation with the Contractor	Ensure that the planning and development programme considers breeding sites for wild bird species	Pre-Construction Construction	ECO	Once, prior to the commencement of construction and as and when required during construction	Planning and development programme considers breeding sites for wild bird species

– Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present;	dEO / cEO in consultation with the Contractor	Avoid breeding sites and ensure that special care is taken in the presence of nestlings and fledglings	Construction Operation	ECO Eskom Maintenance Team	Weekly, and as an when required during construction. Monthly =, and as and when required during operation	Photographic record o intact breeding sites
– Nesting sites on existing parallel lines must documented;	dEO / cEO in consultation with the Contractor	Walk-downs of the existing line located parallel to the project must be undertaken and nests and the details thereof documented	Construction Operation	ECO Eskom Maintenance Team	Quarterly, and as and when required	Details of walkdowns undertaken must be noted and kept on file and photographic records nesting sites must be kept

– Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds;	dEO / cEO in consultation with the Contractor	Avifaunal specialist recommendations must be implemented	Construction Operation	ECO Eskom Maintenance Team	Continuous	Photographic record of compliance and successful implementation of mitigation measures
– Bird guards and diverters must be installed on the new line as per the recommendations of the specialist;	dEO / cEO in consultation with the Contractor	Recommendations made by the specialist for the installation of bird guards and diverters must be adhered to and implemented as appropriate. Bird guards and diverters must be maintained	Construction Operation	ECO Eskom Maintenance Team	Continuous	Photographic record of implementation and maintenance of bird guards and diverters
– No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas;	dEO / cEO in consultation with the Contractor	Environmental awareness training and induction must cover this aspect	Construction	ECO	Monthly, and as and when required	No signs of poaching

– No deliberate or intentional killing of fauna is allowed;	dEO / cEO in consultation with the Contractor	Environmental awareness training and induction must cover this aspect	Construction	ECO	Monthly, and as and when required	No signs of deliberate killing of fauna
– In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and	dEO / cEO in consultation with the Contractor	Implement and maintain snake deterrents on pylons in areas where snakes are abundant	Construction Operation	ECO Eskom Maintenance Team	Once, during the construction of the pylons and as and when required. Monthly during operation	Photographic record of the implementation and maintenance of snake deterrents
– No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.	dEO / cEO in consultation with the Contractor	Obtain permits from Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform for removal/relocation of Protected	Pre-construction	ECO	Once-off prior to construction	Permits are available for inspection on site

		Plant species				

5.12 Protection of heritage resources

Impact management outcome: Minimise impact to heritage resources.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in ***Section 5.3: Access restricted areas***;	DPM and a suitably qualified specialist dEO / cEO in consultation with the Contractor	Undertake a Heritage Walkthrough Survey Spatially Identify and demarcate areas of heritage significance as per the Heritage Impact Assessment and the Heritage Walk-through Report and as per the requirements of section 5.3	Pre-construction	ECO	Once, prior to the commencement of construction	Proof of avoidance of sensitive heritage features through details of avoidance and photographic records

– Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance;	Suitably qualified specialist in consultation with the ECO	Appoint an Archaeologist to carry out the monitoring of excavations for fossils, artefacts and important heritage material	Construction	ECO	Continuous during excavations	Proof of appointment of a heritage specialist and photographic record of monitoring
– All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.	dEO / cEO in consultation with the Contractor and ECO	Develop and implement procedures for situations where human remains archaeological, palaeontological or historical material are uncovered	Construction	ECO	Weekly, during the construction phase and as and when required	Proof of work ceased and the required procedures followed in cases where material is discovered.

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify fire hazards, demarcate and restrict public access to these areas as well as notify	cEO	Implementation of the fire	Pre-Construction	ECO	Once, prior to the	Compliance with Emergency

the local authority of any potential threats e.g. large brush stockpiles, fuels etc.;	dEO Contractor	management plan as per Eskom's Emergency Preparedness Plan	Construction		commencement of construction and weekly during the construction phase	Preparedness Plan
– All unattended open excavations must be adequately fenced or demarcated;	Contractor	Ensure that all Excavations undertaken is fenced and demarcated within a reasonable timeframe and in instances where excavations will be open for long-periods of time	Construction	ECO	Weekly	Excavations are fenced where required and photographic proof can be provided
– Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding;	Contractor	All staff must be easily identifiable, and the climbing of towers and scaffolding must be undertaken by authorised personnel as	Construction	ECO	Continuous	No incidents of unauthorised climbing is reported

		managed by the Contractor				
– Ensure structures vulnerable to high winds are secured;	Contractor	Ensure that sufficient stabilization measures are implemented to secure structure vulnerable to high winds	Construction	ECO	Weekly, or as required	No incidents of unstable structures due to high winds is reported
– Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	cEO	Compile and regularly update as incidents and complaints are submitted from the public and indicate the actions taken to resolve the complaint	Construction	ECO	Monthly, and as and when required	Incidents and complaints register is up to date

5.14 Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.		
Impact Management Actions	**Implementation**	**Monitoring**

	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available;	Contractor dEO cEO	Mobile toilets are placed at strategic locations on site and away from sensitive environmental habitats	Pre-construction Construction	ECO	Weekly	Mobile toilets located in non-sensitive environmental areas
– The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances;	Contractor dEO cEO	Environmental induction and awareness training to cover this aspect	Construction	ECO	Continuous	No evidence of non-compliance
– Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long	Contractor in consultation with the cEO	The installation of mobile toilets meets this requirement	Construction	ECO	Continuous	No evidence of non-compliance

weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards;						
– A copy of the waste disposal certificates must be maintained.	Contractor	Certificates obtained from licensed waste disposal facility with the emptying of the toilets must be kept on file	Construction	ECO	Monthly, and as and when required	Certificates for waste disposal from the licensed waste disposal facility

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area;	Contractor	Only Environmentally friendly Pest control must be used, when required	Construction	ECO	As and when pest control is required for the project	Proof of pest control measures undertaken by pest controller

– Ensure that the workforce is sensitized to the effects of sexually transmitted diseases, especially HIV AIDS;	cEO / Contractor in consultation with the ECO	Sex education to be covered at Induction / environmental awareness training presentations	Construction	ECO	Once, prior to the commencement of construction and monthly during construction	Toolbox talk registers
– The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area;	Contractor	Develop and place information posters on HIV/AIDS	Construction	ECO	Continuous	Photographic evidence of poster placement
– Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;	Contractor	Sex education to be covered in presentations at Induction/Environmental Awareness Training	Construction	ECO	Once-off	Environmental awareness training checklist
– Free condoms must be made available to all staff on site at central points;	Contractor	Condoms at mobile toilets which are accessible	Construction	ECO	continuous	Proof of placement of free condoms by the contractor to be provided
– Medical support must be made available;	dEO / cEO	Ensure that designated personnel with	Construction	ECO	Monthly	Check the availability of first aid trained

		first aid training are available onsite and that first aid kits to provide medical support is readily available				personnel and medical kits (including If these are complete in terms of supplies)
– Provide access to Voluntary HIV Testing and Counselling Services.	Contractor	Compile a HIV testing schedule and provide counselling services where required	Construction	ECO	Quarterly, as and when required	Voluntary testing schedules and proof of counselling (where undertaken)

5.16 Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project;	Contractor	Develop an Emergency Preparedness, Response and	Pre-Construction	ECO	Once, prior to the commenc ement of	Emergency Preparedness, Response and Fire Management Plan

		Fire Management Plan specific to the project			construction	compiled
– The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation;	Contractor	Develop an Emergency Preparedness, Response and Fire Management Plan specific to the project which covers accidents, potential spillages and fires	Pre-Construction	ECO	Once, prior to the commencement of construction	Adherence to Eskom's Emergency Preparedness Plan
– All staff must be made aware of emergency procedures as part of environmental awareness training;	dEO / cEO	Emergency procedures covered in Induction training	Pre-Construction	ECO	Prior to commencement of induction training	Environmental awareness training material covers emergency procedures Toolbox talk register
– The relevant local authority must be made aware of a fire as soon as it starts;	Contractor in consultation with the ECO	Develop and include procedures in the Emergency Preparedness,	Construction	ECO	As and when required	The local authority was informed as per the relevant procedure set out in the Emergency

		Response and Fire Management Plan for the event of a fire and the procedure to be followed for informing the local authority				Preparedness, Response and Fire Management Plan
– In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see ***Hazardous Substances section 5.17***).	Contractor	Implement the required mitigation measures in the event of a spill or leak as per the requirements of Section 5.17.	Construction Operation	ECO	As and when a spill or leak occurs	The mitigation measures included under Section 5.17 have been adhered to

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible;	cEO dEO Contractor	Develop a strategy of how hazardous substances can be and should be minimised	Pre-construction Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Contractor to provide evidence of substances used for proof of compliance
– All hazardous substances must be stored in suitable containers as defined in the Method Statement;	Contractor dEO Contractor	Method Statement for the storage of hazardous substances in suitable containers	Pre-construction Construction	ECO	Once, prior to the commencement of construction and monthly during the construction phase	Photographic proof that hazardous substances are stored in suitable containers as per the requirements of the relevant Method Statements
– Containers must be clearly marked to indicate contents, quantities and safety requirements;	Contractor	Where hazardous material is stored, these must be clearly marked indicating all the required aspects	Construction	ECO	Monthly	Photographic proof that containers are marked as per the requirements

– All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers;	Contractor	Ensure that storage areas are sufficiently bunded which are of sufficient capacity to contain a spill / leak from the stored containers	Construction	ECO	Monthly	Photographic proof that storage areas are bunded and proof that the bund areas are of sufficient capacity contain a spill /leak from the stored containers
– Bunded areas to be suitably lined with a SABS approved liner;	Contractor	Ensure that bunded storage areas are suitably lined	Construction	ECO	Once-off	Photographic proof that bunded storage areas are suitably lined
– An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis;	Contractor	Compile and update an Alphabetical Hazardous Chemical Substance (HCS)control sheet specific to the project	Construction	ECO	Monthly, and as and when required	Complete and up to date control sheet provided by the Contractor
– All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);	Contractor	Keep a record of all hazardous chemicals and the respective MSDS	Construction	ECO	Monthly, and as and when required	Record of hazardous chemicals and the respective MSDS

– All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet;	Contractor	Provide training for personnel working with HCS	Pre-construction	ECO	Once, prior to the commencement of construction and as and when required	Record of training provided to personnel working with HCS
– Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;	Contractor	Develop environmental awareness training material which covers the relevant impacts and safety measures. Provide appropriate training and personal protective equipment for the relevant personnel handling hazardous substances and materials	Construction	ECO	Prior to the commencement of the environmental awareness training and monthly during the construction phase for personal protective equipment	Environmental awareness training material requirement checklist and all relevant personnel have undergone appropriate training and have access to personal protective equipment
– The Contractor must ensure that diesel and	Contractor	Appropriate	Construction	ECO	Monthly,	Storage tanks for

other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers;		storage facilities must be installed for the storing of diesel, other liquid fuel, oil and hydraulic fluid			and as and when required	the project are appropriate and no incidents are reported in this regard
– The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall);	Contractor	Appropriate storage facilities must be constructed or obtained for tanks as per the requirements listed	Construction	ECO	Monthly, and as and when required	Photographic evidence
– The floor of the bund must be sloped, draining to an oil separator;	Contractor	Appropriate storage facilities must be constructed as per the requirements listed	Construction	ECO	Once, during construction	Bunded storage areas are constructed according to the requirements
– Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;	Contractor	Appropriately constructed refueling facility must be developed as per the	Construction	ECO	Weekly, or as required	Soils at the refueling facility are protected as required and drip trays are provided and used

		requirements. Drip trays must be provided for use				
– All empty externally dirty drums must be stored on a drip tray or within a bunded area;	Contractor	Ensure that drums are stored appropriately within bunded areas	Construction	ECO	Weekly	Drip trays or bunded areas are used for the storage of dirty drums
– No unauthorised access into the hazardous substances storage areas must be permitted;	Contractor	Ensure through the implementation of procedures that no unauthorised access is undertaken into the storage areas	Construction	ECO	Continuous	Proof of the implementation of the relevant procedure must be provided by the contractor
– No smoking must be allowed within the vicinity of the hazardous storage areas;	Contractor	Appropriate signage to be provided	Construction	ECO	Continuous	Photographic evidence of signage
– Adequate fire-fighting equipment must be made available at all hazardous storage areas;	Contractor	Hazardous storage areas must be fitted with adequate fire-fighting	Construction	ECO	Continuous	Adequate firefighting equipment is available and has been serviced

		equipment				
– Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;	Contractor	Provide a mobile refuelling unit as well as suitable ground protection, where required	Construction	ECO	Continuous	A mobile refuelling unit and suitable ground protection is available for use
– An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times;	Contractor	Provide an appropriate spill kit for the project for the use of hazardous substances	Construction	ECO	Continuous	Appropriate spill kits are available for use
– The responsible operator must have the required training to make use of the spill kit in emergency situations;	Contractor	Provide training on the use of spill kits to the relevant employees	Construction	ECO	Once-off, prior to construction	Proof of training to be provided by the contractor
– An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken	Contractor	Provide an appropriate number of spill kits in relevant areas	Construction	ECO	Monthly	Proof of appropriate number of spill kits appropriate areas to be provided by the contractor
– In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of	cEO and Contractor	Storage and disposal of contaminated	Construction	ECO	Monthly, and as and when	Proof of storage and disposal must

according to the National Environmental Management: Waste Act 59 of 2008. Refer to ***Section 5.7*** for procedures concerning ***storm and waste water management*** and ***5.8*** for ***solid and hazardous waste management.***		soil must be in accordance with the National Environmental Management: Waste Act and sections 5.7 and5.8 of this EMPr			required	be provided. Certificates of disposal at licensed waste disposal facilities must be provided

5.18 Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area;	Contractor dEO cEO	Method statement on maintenance of vehicles and equipment.	Construction	ECO	Monthly	Photographic evidence of a dedicated area for the maintenance of vehicles and machinery.
– During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent	Contractor	Ensure that a drip tray is available for emergency	Construction	ECO	Monthly	Contractor to provide evidence of drip tray use for

spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts;		repairs required				emergency repairs
– Leaking equipment must be repaired immediately or be removed from site to facilitate repair;	Contractor	Ensure that leaking equipment is repaired immediately, or removed from site for repairs	Construction	ECO	Monthly	Contractor to provide details of equipment repaired or removed from site
– Workshop areas must be monitored for oil and fuel spills;	Contractor	Undertake regular inspections of the workshop areas for oil and fuel spills and keep an updated register of inspection onsite	Construction	ECO	Monthly	Register of inspection
– Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available;	Contractor	Provide an appropriate spill kit on site	Construction	ECO	Monthly, or as required	Appropriate spill kits are available for use
– The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed;	Contractor	Ensure that the workshop area is sufficiently bunded in accordance with the	Construction	ECO	Once, during the Constructio n Phase and as and when	Workshop area is bunded in accordance with the required specification

		required specification			required	
– Water drainage from the workshop must be contained and managed in accordance ***Section 5.7: storm and wastewater management***.	Contractor	Ensure that water drainage from workshop area is managed as per the requirements of section 5.7	Construction	ECO	Monthly	Workshop drainage is managed in accordance with the requirements

5.19 Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Concrete mixing must be carried out on an impermeable surface;	Contractor dEO cEO	Method statement on concrete mixing	Construction	ECO	Weekly	Photographic evidence that no concrete mixing is undertaken on open ground
– Batching plants areas must be fitted with a containment facility for the collection of	**Not Applicable – No batching plant required for the installation of the overhead power line.**					

cement laden water.						
– Dirty water from the batching plant must be contained to prevent soil and groundwater contamination	**Not Applicable – No batching plant required for the installation of the overhead power line.**					
– Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains;	Contractor	Provide storage area for bagged cement in-line with the listed requirements	Construction	ECO	Weekly	Photographic proof of bagged cement stored in an appropriate area
– A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted;	Contractor	Provision of wash out facility and monitoring of water usage	Construction	ECO	Weekly	No cement laden water is released into the environment. Only minimal water is used for washing
– Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility;	Contractor	Make use of hardened concrete where possible or dispose of concrete in a suitable manner	Construction	ECO	Weekly	Certificates of disposal of concrete at licensed waste disposal facility
– Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site;	Contractor	Bind empty cement bag and temporarily store it in an appropriate	Construction	ECO	Weekly	Proof of binding of cement bags and storage in an appropriate are on site to be provided

		area on site				by the Contractor empty
– Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to ***Section 5.20: Dust emissions***)	Contractor	Ensure that sand and aggregates are kept damp or otherwise protected from dust generation	Construction	ECO	Monthly	Proof of damping (or alternative dust suppression) of sand and aggregates
– Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility;	Contractor	Ensure that all excess sand, stone and cement is removed or reused	Construction	ECO	Once-off, post-construction	Certificates for the disposal of sand, stone and cement at licensed waste disposal facilities or proof of reuse must be provided
– Temporary fencing must be erected around batching plants in accordance with ***Section 5.5: Fencing and gate installation***.	**Not Applicable – No batching plant required for the installation of the overhead powerline.**					

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO;	Contractor dEO cEO	Dust suppression via water tanker. Implementation of dust screens as required. Covering of trucks transporting soil material.	Construction	ECO	Weekly	Photographic evidence
– Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible;	Contractor dEO cEO	Proper planning for vegetation removal must be undertaken as well as for the associated rehabilitation	Construction Rehabilitation Phase	ECO	Weekly	Rehabilitation Plan to be implemented by Contractor
– Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present;	Contractor	Ensure that specific limitations are placed on the transport and handling of erodible materials during high wind conditions or when a visible dust plume is	Construction	ECO	As and when required	No complaints regarding this

		present				
– During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level;	ECO	ECO to make recommendations	Construction	ECO to advise further		
– Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind;	Contractor	Place soi stockpiles in areas less affected by wind	Construction	ECO	Weekly	Soil stockpiles are not exposed to wind and have not been eroded
– Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;	Contractor	Contractor to implement erosion control measures are commended and agreed with the ECO	Construction	ECO	Weekly, until erosion is resolved	Recommendations made by the ECO have been implemented by the Contractor
– Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas;	cEO / dEO /Contractor	Inform all drivers of speed limits and place appropriate signage along the relevant roads	Construction	ECO	Continuous	No complaints from stakeholders
– Straw stabilisation must be applied at a rate	Contractor	Ensure that	Construction	ECO	Monthly	Photographic

of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks;		straw stabilization is undertaken as per the listed requirements				records
– For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.	Contractor	Appropriate dust suppressant measures are implemented	Construction	ECO	Weekly	Photographic records

5.21 Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Any blasting activity must be conducted by a suitably licensed blasting contractor; and	**n/a – no blasting will be required.**					
– Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.	**n/a – no blasting will be required.**					

5.22 Noise

Impact Management outcome: Unnecessary noise is prevented by ensuring that noise from construction activities is mitigated.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only;	Contractor	Ensure that noise limits do not exceed acceptable limits and avoid the use of amplification communication	Construction	ECO	Continuous, or as and when neccessary	No complaints from stakeholders
– All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained;	Contractor	Implementation of silencing technology	Construction	ECO	Continuous, or as and when neccessary	No complaints from stakeholders
– Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers;	cEO dEO cEO	Update complaints register. Provide daily transport to and from site for employees	Construction	ECO	Monthly, and as and when neccessary	No complaints from stakeholders
– Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it	cEO and Contractor	Compile a Code of Conduct for staff. Appropriate	Construction	ECO	Once, prior to the commence ment of construction	No complaints from stakeholders

must be ensured that development activities must still meet the impact management outcome related to noise management.		operating hours must be identified for the project.				

5.23 Fire prevention

Impact management outcome: Prevention of uncontrollable fires.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant;	cEO / dEO Contractor	Identify and demarcate through signage designated smoking areas	Pre-construction Construction	ECO	Monthly	Photographic record of designated smoking area
– Firefighting equipment must be available on all vehicles located on site;	cEO / dEO Contractor	Provision of firefighting equipment on vehicles	Construction	ECO	Continuous	All vehicles are fitted with firefighting equipment and the details thereof provided by

						the cEO
– The local Fire Protection Agency (FPA) must be informed of construction activities;	cEO / dEO Contractor	Undertake formal consultation to inform the local FPA of the associated construction activities	Construction	ECO	Once, during the commencement of the Construction Phase	Proof of consultation with the FPA
– Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;	Contractor	Contact numbers are provided at awareness training and displayed at the construction camp	Construction	ECO	Prior to the commencement of construction	Environmental Awareness training material requirement checklist and photographic record of contact numbers on display
– Two-way swop of contact details between ECO and FPA.	ECO	Consultation between the ECO and FPA in order to exchange contact details	Pre-Construction	ECO	Once-off	Signed proof of swop of contact details

5.24 Stockpiling and stockpile areas

Impact management outcome: Erosion and sedimentation as a result of stockpiling are reduced.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies;	Contractor dEO cEO	Identify and demarcate in appropriate location for the storage of excavated materials	Construction	ECO	Continuous	Photographic evidence that excavated material is not stored within sensitive environmental areas
– All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods;	Contractor	Implement appropriate and sufficient maintenance on stockpiled material regularly	Construction	ECO	Continuous	Stockpiled material is maintained sufficiently and is clear of weeds and alien vegetation
– Topsoil stockpiles must not exceed 2 m in height;	Contractor	Implement measures to ensure stockpiles	Construction	ECO	Continuous	Topsoil stockpiles do not exceed 2m

		are under 2m in height				in height
– During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.);	Contractor	Implement measures to ensure stockpiles are covered	Construction	ECO	As and when required	Contractor to provide proof of availability of appropriate material to cover stockpiles when required
– Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.	Contractor	Sandbags must be provided in order to prevent erosion of stockpiled materials	Construction	ECO	Continuous	Contractor to provide proof of availability of sandbags to prevent erosion of stockpiled materials

5.25 Finalising tower positions

Impact management outcome: No environmental degradation occurs as a result of the survey and pegging operations.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No vegetation clearing must occur during survey and pegging operations;	Contractor	Ensure that vegetation	Pre-construction	ECO	Weekly	Evidence to provided that

		clearance commences once approval for commencement is granted				vegetation clearance commenced when approval was granted
– No new access roads must be developed to facilitate access for survey and pegging purposes;	Contractor	No new access roads constructed to allow access for survey and pegging purposes	Pre-construction	ECO	Weekly	Contractor to provide photographic proof that no new roads have been developed
– Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas;	DPM, Suitably Qualified Specialist and Contractor	Final walk-down of the proposed servitude to demarcate tower positions in agreement with the relevant personnel	Pre-construction	ECO	Once the final tower positions have been finalised and agreed upon	Provision of final tower positions to the ECO
– The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO.	Surveyor in consultation with the ECO	Undertake consultation between the surveyor and the ECO	Pre-construction	ECO	Weekly	Consultation with the ECO regarding the distribution of pegs.

5.26 Excavation and Installation of foundations

Impact management outcome: No environmental degradation occurs as a result of excavation or installation of foundations.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a recognised disposal site, if not used for backfilling purposes;	Contractor	Use of a licensed waste disposal facility for the disposal of excess spoil	Construction	ECO	Monthly	Certificates obtained for the disposal of excess spoil at a licensed waste disposal facility
– Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes;	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Construction	ECO	Monthly	Photographic record of use of spoiled material for landscaping.
– Management of equipment for excavation purposes must be undertaken in accordance with ***Section 5.18: Workshop equipment maintenance and storage***; and	Contractor	Undertake the management of equipment for excavation as per the requirements of section 5.18	Construction	ECO	Monthly	Management of equipment is undertaken in line with the requirements of section 5.18
– Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***.	Contractor	Implementation of management of hazardous	Construction	ECO	Monthly	Management of spills are in accordance

		substances are in accordance with the requirements of Section 5.17				with Section 5.17.
– Batching of cement to be undertaken in accordance with **Section *5.19 : Batching plants***;	**n/a - there will be cement batching**					
– Residual cement must be disposed of in accordance with **Section *5.8: Solid and hazardous waste management***.	Contractor	Implementation of disposal of residual cement is in accordance with the requirements of Section 5.8	Construction	ECO	Monthly	The disposal of residual cement is undertaken in line with section5.8.

5.27 Assembly and erecting towers

Impact management outcome: No environmental degradation occurs as a result of assembly and erecting of towers.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Prior to erection, assembled towers and tower sections must be stored on elevated	Contractor	Provide the necessary	Construction	ECO	Weekly	Implementation of elevated

surface (suggest wooden blocks) to minimise damage to the underlying vegetation;	dEO cEO	measures to ensure that towers are stored on elevated surfaces to avoid damage to vegetation				surface and photographic record thereof
– In sensitive areas, tower assembly must take place off-site or away from sensitive positions;	**n/a – tower positions will be located in transformed areas**					
– The crane used for tower assembly must be operated in a manner which minimises impact to the environment;	Contractor in consultation with the cEO and the ECO	Ensure that no impact to the environment is imposed during the operation of the crane	Construction	ECO	Weekly	No environmental damages incurred as a result of the crane.
– The number of crane trips to each site must be minimised;	Contractor in consultation with the cEO and the ECO	Ensure that the utilisation of the crane is maximised when on site.	Construction	ECO	Weekly	No. of crane trips are recorded and minimised.
– Wheeled cranes must be utilised in preference to tracked cranes;	Contractor	Ensure wheeled cranes are utilised.	Construction	ECO	Weekly	Wheeled cranes are utilised
– Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of	Contractor	Placement of towers on site are undertaken	Construction	ECO	Weekly	Use of manual / helicopter to erect towers.

environmental impact;		with due consideration to the environment				
– Access to tower positions to be undertaken in accordance with access requirements in specified in Section 8.4: Access Roads;	Contractor	Undertake access to tower positions in terms of the requirements of Section 8.4	Construction	ECO	Weekly	Tower positions are in accordance with the requirement of Section 8.4.
– Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in Section 8.10: Vegetation clearing;	Contractor	Undertake vegetation clearance as per the requirements of section 5.10	Construction	ECO	Weekly	Vegetation clearance is in accordance with Section 8.10
– No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor;	Contractor in consultation with the DPM and DSS	Written permission for levelling at tower sites, if required, must be obtained from the DPM and DSS prior to the undertaking of any levelling activities	Construction	ECO	Monthly, and as and when required	Written permission from the DPM and DSS provided to the Contractor
– Topsoil must be removed separately from subsoil material and stored for later use	Contractor	Implement appropriate	Construction	ECO	Weekly, and as and when	Proof of appropriate

during rehabilitation of such tower sites;		measures to ensure that topsoil is removed from subsoil material	Rehabilitation Phase		required	measures implemented must be provided by the Contractor
– Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil;	Contractor	Implement measures to ensure that stored stockpiles do not exceed 1m	Construction	ECO	Weekly	There are no non-conformances with regards to this aspect
– Excavated slopes must be no greater that 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes;	Contractor	Implement the listed requirements for the excavation of slopes	Construction	ECO	Weekly	There are no non-conformances with regards to this aspect
– Fly rock from blasting activity must be minimised and any pieces greater than 150 mm falling beyond the Working Area, must be collected and removed;	**n/a – no blasting activities will be required**					
– Only existing disturbed areas are utilised as spoil areas;	Contractor in consultation with the ECO	Identify, demarcate and use existing disturbed areas for spoil areas	Pre-construction Construction	ECO	Weekly	Spoil areas are approved by the ECO
– Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fines is kept to a minimum;	**n/a**					

– Surface water runoff is appropriately channeled through or around spoil areas;	DPM and Contractor	Design and implement appropriate surface runoff measures for spoil areas	Pre-construction Construction	ECO	Once, during the construction of the surface runoff measures	Implementation of surface runoff measures through and/or around spoil areas
– During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that;	Contractor	Develop and implement backfilling procedures which ensures that topsoil is not placed at the bottom of foundations.	Pre-construction Construction	ECO	Weekly	Backfilling operations are undertaken as per the procedures developed
– The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation;	Contractor	Rehabilitation of the surface spoil must be undertaken in accordance with the requirements of section 5.29	Rehabilitation	ECO	Weekly	Rehabilitation of the surface spoil is undertaken as per the requirements of section 5.29
– The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion as soon as construction activities on the site is	Contractor	Ensure that topsoil is spread evenly and compacted	Rehabilitation	ECO	Weekly	Proof that topsoil has been spread evenly and compacted

complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.		appropriately. This must be undertaken outside of the start of the dry season				correctly must be provided by the Contractor/ cEO. Proof that the activities were undertaken outside of the start of the dry season must be provided by the Contractor

5.28 Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances, the siting of the winch and tensioner must avoid Access restricted areas and other sensitive	**This will be complied with as the proposed servitude is located in a non-sensitive ecological area.**					

areas;						
– The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks;	Contractor	Drip trays to be provided	Construction	ECO	Weekly	Sufficient drip trays are available for the winch tensioner stations and no spills occur
– Refueling of the winch and tensioner stations must be undertaken in accordance with Section 5.17: Hazardous substances;	Contractor	Measures are in place to ensure that the refuelling is in accordance with the requirements of Section 5.17.	Construction	ECO	Monthly	Refuelling is as per the requirements of Section 5.17.
– In the case of the development of overhead transmission and distribution infrastructure, a one metre "trace-line" may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along "trace-lines". Vegetation clearing must be undertaken by hand, using chainsaws and hand held implements, with vegetation being cut off at ground level. No tracked or wheeled mechanised equipment must be used;	Contractor	Develop and implement procedures for implementation for vegetation clearing during stringing in line with the specification.	Construction	ECO	Once, prior to the commencement of construction and weekly during stringing	Implementation of the procedures putting place and proof thereof from the Contractor
– Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a	Contractor	Identify and implement the stringing	Construction	ECO	Weekly	Implementation of identified method of

helicopter;		method with the least environmental impact				stringing with the least environmental impact
– Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing;	Contractor	Identify prior to construction areas where protection measures will be required during stringing. Where access is to be restricted timeous written notice must be provided to the affected parties	Construction	ECO	Monthly, and as and when required	Proof of implementation of protection measures and proof of written notice to affected parties must be provided by the Contractor
– No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given reasonable notice, in writing;	Contractor	Existing services must be mapped/demarcated on site, and avoided during construction	Construction	ECO	Monthly, and as and when required	No disruption of services occurs. Where disruption occurs proof overwritten notice to affected parties must be provided by the Contractor

– Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 work days minimum), in writing, must be provided to the landowner;	**n/a – the proposed powerline does not traverse cultivated agricultural land**
– Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.	**n/a – the proposed powerline does not traverse cultivated agricultural land**

5.29 Socio-economic

Impact management outcome: Socio-economic development is enhanced.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Develop and implement communication strategies to facilitate public participation;	dEO / cEO	Identify and implement appropriate strategies for communication with the communities through consideration of the community needs	Pre-Construction Construction	ECO	Once, prior to the commencement of construction	No complaints received from stakeholders and the communication plan is implemented

– Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process;	Contractor	Development and implement a Grievance Mechanism which considers the community needs and provides procedures for conflict resolution	Pre-Construction Construction	ECO	Once, prior to the commencement of construction	Conflict resolution is undertaken as per the documented procedures. No complaints received from the stakeholders.
– Sustain continuous communication and liaison with neighboring owners and residents	Contractor	Development and implement and Grievance Mechanism provides procedures for communication / liaison with neighboring landowners and residents	Pre-Construction Construction	ECO	Continuous	Communication with the neighboring community meets the requirement of the Grievance Mechanism. No complaints received from the stakeholders.
– Create work and training opportunities for local stakeholders; and	Contractor	Develop and implement a "locals first" policy for the provision of employment opportunities	Pre-Construction Construction	ECO	Once, prior to the commencement of construction	The "locals first"policy is considered in terms of the employment and training opportunities
– Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This	**n/a – local labor will be sourced and three will be no overnight stays at the site, except for security staff.**					

would reduce the risk to local farmers.	

5.30 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in ***sections 5.17: management of hazardous substances*** and ***5.18 workshop, equipment maintenance and storage***;	Contractor dEO cEO	Bunds are to be emptied as per the requirements of Sections 5.17 and 5.18.	Construction	ECO	Prior to site closure for more than 05 days	Bunds are emptied as per the requirement listed under sections 5.17 and 5.18
– Hazardous storage areas must be well ventilated;	Contractor dEO cEO	Install appropriate ventilation in hazardous storage areas	Construction	ECO	Prior to site closure for more than 05 days	Photographic evidence of installed ventilation in hazardous storage areas
– Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service;	Contractor dEO cEO	Ensure fire extinguishers are serviced, as required and are easily accessible with appropriate signage indicating location. Ensure service records	Construction	ECO	Prior to site closure for more than 05 days	Signage placed indicating location of fire extinguishers and service records

		and kept up to date and filed				
– Emergency and contact details displayed must be displayed;	Contractor/ cEO dEO	Place emergency and contact details which are readily available and easily accessible	Construction	ECO	Prior to site closure for more than 05 days	Photographic proof of contact details on display
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel;	Contractor dEO cEO	A workshop must be held with the security staff regarding emergency situations and the contacts to be made.	Pre-construction Construction	ECO	Prior to site closure for more than 05 days	Proof of the workshop held must be kept on file by the contractor.
– Night hazards such as reflectors, lighting, traffic signage etc. must have been checked;	Contractor dEO cEO	Regular checks of night hazards must be undertaken	Construction	ECO	Prior to site closure for more than 05 days	Proof of checks of night hazards must be provided by the contractor
– Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.;	Contractor dEO cEO	Identify any potential fire hazards and notify the relevant local authority	Construction	ECO	Prior to site closure for more than 05 days	Proof of notification of the fire hazards to the local authority must be provided by the Contractor
– Structures vulnerable to high winds must be secured;	Contractor dEO cEO	Ensure structures vulnerable to wind are secure prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	Structures vulnerable to wind are secured prior to site closure

– Wind and dust mitigation must be implemented;	Contractor dEO cEO	Implement wind and dust mitigation prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	Wind and dust mitigation is implemented prior to site closure
– Cement and materials stores must have been secured;	Contractor dEO cEO	Ensure that cement and material stores are secured prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	Cement and material stores are secured and evidence is provided by the Contractor
– Toilets must have been emptied and secured;	Contractor dEO cEO	Ensure that toilets are emptied and secured prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	Toilets are emptied and secured prior to site closure
– Refuse bins must have been emptied and secured;	Contractor dEO cEO	Ensure that refuse bins are emptied and secured prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	refuse bins are emptied and secured prior to site closure
– Drip trays must have been emptied and secured.	Contractor dEO cEO	Ensure that drip trays are emptied and secured prior to site closure	Construction	ECO	Prior to site closure for more than 05 days	Drip trays are emptied and secured prior to site closure

5.31 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed to a registered waste site and certificates of disposal provided;	Contractor dEO cEO	The Rehabilitation Plan must be implemented. Spoil and waste are disposed of at a registered landfill site.	Rehabilitation	ECO	Weekly	Rehabilitation measures are in accordance with the Rehabilitation Plan. Certificates of waste disposal at licensed facilities are available.
– All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983	Contractor in consultation with ECO	Assess all slopes and determine whether contouring is required	Rehabilitation	ECO	Weekly	All slopes are assessed and contoured as required
– All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983;	Contractor in consultation with ECO	Assess all slopes and determine whether terracing is required	Rehabilitation	ECO	Weekly	All slopes are assessed and terraced as required
– Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition;	Contractor	Ensure all berms have a slope of1:4 and is replanted with indigenous species and grasses	Rehabilitation	ECO	Weekly	All berms have a slope of 1:4 and is replanted with indigenous species and

						grasses
– Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners;	**n/a – the project site is not within cultivated agricultural land**					
– Rehabilitation of tower sites and access roads outside of farmland;	**n/a – the project site is not within cultivated agricultural land**					
– Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition;	Contractor	Indigenous vegetation is to be planted in accordance with the Rehabilitation Plan must be implemented.	Rehabilitation	ECO	Weekly	Indigenous species are used for rehabilitation
– Stockpiled topsoil must be used for rehabilitation (refer to Section ***5.24: Stockpiling and stockpiled areas***);	Contractor	Ensure stockpiled topsoil is used as per the requirement listed under section 5.24	Rehabilitation	ECO	Weekly	Stockpiled topsoil is used as per the requirement listed under section 5.24
– Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion;	Contractor	Ensure that topsoil is spread evenly	Rehabilitation	ECO	Weekly	Topsoil is spread evenly
– Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed;	Contractor	Remove all visible weeds from placement area and topsoil before spreading the topsoil	Rehabilitation	ECO	Weekly	No weeds are visible in the topsoil
– Subsoil must be ripped before topsoil is placed;	Contractor	Undertake the ripping of subsoil prior to the spreading of topsoil	Rehabilitation	ECO	Weekly	Subsoil is ripped before topsoil is placed

– The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment;	Contractor	Commencement of rehabilitation must be in accordance with the Rehabilitation Plan	Rehabilitation	ECO	Weekly	Rehabilitation is undertaken during the optimal time
– Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled ;	Contractor	All impacted slopes must be stabilized	Rehabilitation	ECO	Weekly	Slopes are stabilized
– Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly	Contractor	Contract design specifications must be adhered to.	Rehabilitation	ECO	Weekly	Slopes are stabilized as per design specifications
– Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil.	Contractor	Spoil used for landscaping must be applied as per the listed requirements	Rehabilitation	ECO	Weekly	Photographic record and confirmation from Contractor
– Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil;	Contractor in consultation with a suitably qualified specialist	Make use of a suitable vegetation seed mixture should enhancement be required	Rehabilitation	ECO	As and when required	Use of a suitable vegetation seed mixture if required

– e) The final product must not cause an ecological imbalance in the area						

6 ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of regulation 26(h) of the EIA Regulations.

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant:

Name of applicant: Eskom Holdings SOC Ltd (Ms. Andrea van Gensen)

Tel No: (053) 830 5775

Fax No: n/a

Postal Address: P.O. Box 606, Kimberley

Physical Address: Eskom Distribution, DSC Building, Ground floor (C Block), 69 Memorial Road, Monument Heights, Kimberley, 8301

7.1.2 Details and expertise of the EAP:

Name of EAP: Ms Natasha Lalie

Tel No: (011) 207 2060

Fax No: 086 674 6121

E-mail address: natashal@zitholele.co.za

Expertise of the EAP (Curriculum Vitae included): Refer to Appendix 2 of this EMPr for the CV of the EAP

7.1.3 Project name:

Proposed Kiwano Solar Photovoltaic and Battery Energy Storage System Facility including associated substation and 132kV loop-in loop-out powerline near Upington, Northern Cape Province.

7.1.4 Description of the project:

Eskom Holdings SOC Ltd intends to develop, construct and operate a 58 MW Solar Photovoltaic (PV) Plant, 40MW Grid-Scale Battery Energy Storage System (BESS) facility, a 132kV Kiwano Substation, and construction of a 132kV powerline outside the town of Upington in the Northern Cape Province. The proposed development falls within the jurisdiction of Dawid Kruiper Local Municipality and within Z F Mgcawu District Municipality.

The proposed Kiwano BESS and PV facility will comprise of the following:

- PV installation with envisaged capacity of 58 MW,
- BESS installation with envisaged capacity of 40 MW / 200 MWh
- Kiwano 132 kV substation with 5 feeder bays
- Single Twin-Tern 132 kV overhead line on a double circuit support structure, connecting Kiwano substation to Upington substation.

The PV facility proposed for Kiwano will include the following associated infrastructure:

- Total site area for PV installation up to 1,150,000 m^2 (115 hectares) to allow for the construction of a PV facility with capacity of 58 MW.
- Solar PV modules, up to a total of 450,000 m^2, that convert solar radiation directly into electricity. The solar PV modules will be elevated above the ground and will be mounted on either fixed tilt systems or tracking systems (comprised of galvanised steel and aluminium). The Solar PV modules will be placed in rows in such a way that there is allowance for a perimeter road and security fencing along the site boundary, and access roads in between the PV module rows.
- Inverter stations, each occupying a footprint up to approximately 30 m^2, with up to 60 Inverter stations installed on the site. Each Inverter station will contain an inverter, step-up transformer, and switchgear. The Inverter stations will be distributed on the site, located alongside its associated Solar PV module arrays. The Inverter station will perform conversion of DC (direct current) to AC (alternating current), and step-up the LV voltage of the inverter to 22 kV, to allow the electricity to be fed into the Kiwano substation. Inverter stations will connect several arrays of Solar PV modules and will be placed along the internal roads for easy accessibility and maintenance.
- Below ground electrical cables with trenching - connecting PV arrays, Inverter stations, O&M buildings, and 132kV Kiwano substation.
- Adequately designed foundations and mounting structures that will support the Solar PV modules and Inverter stations.
- Where possible, existing roads that provide access to the Kiwano site will be used, upgraded, and extended as necessary. For Site A, an access road, approximately 6 m wide and estimated up to 5 km long, will be required to provide access to the PV site. For Site B, a new access road from the existing D3276 road to the site will be required, approximately 6 m wide and estimated up to 1 km long. The existing D3276 road will require upgrading, approximately 6 m wide and estimated up to 4 km long (from N14 to site access road).
- A perimeter road around the site, approximately 5 m wide and 4.5 km in length.
- Internal roads for access to the Inverter stations, approximately 5 m wide and 18 km total length.
- Internal roads/paths between the Solar PV module rows, approximately 2-3 m wide, to allow access to the Solar PV modules for operations and maintenance activities.
- Infrastructure required for the operation and maintenance of the Kiwano PV Plant installation:
    - Meteorological Station
    - O&M Building – comprising control room, server room, security equipment room, offices, boardroom, kitchen, and ablution facilities (including sewage infrastructure)
    - Spares Warehouse and Workshop
    - Hazardous Chemical Store
    - Security Building
    - Parking areas and roads

- Small diameter water supply pipeline connecting existing municipality pipeline, approximately 5 km long.
- Stormwater channels
- Perimeter fencing of the Kiwano site, with access gates. Detailed requirements will be determined following the security risk assessment.
- Temporary laydown area, occupying a footprint up to 100,000 m^2 (10 hectares). The laydown area will be used during construction and rehabilitated thereafter. The laydown area will also accommodate water storage tanks or lined ponds (estimated 815 kl/month for the first 3 months and 408 kl/month for the remaining 21 months, until construction is completed).
- Temporary concrete batching plant, occupying a footprint up to 10,000 m^2 (1 hectare). The concrete batching plant area will be used during construction and rehabilitated thereafter.
- Temporary site construction office area, occupying a footprint up to 10,000 m^2 (1 hectare). This area will accommodate the offices for construction contractors during construction and rehabilitated thereafter.

7.1.5 Project location:

The proposed overhead powerline will traverse the following properties:

NO	FARM NAME (if applicable)	FARM NUMBER (if applicable)	PORTION NAME	PORTION NUMBER	LATITUDE	LONGITUDE
0	Keimoes	1080	n/a	Remainder	Start point: 28°30'18.07"S Middle point: 28°31'30.32"S End point: 28°32'39.18"S	Start Point: 21° 8'6.42"E Middle point: 21° 8'16.96"E End point: 21° 8'13.05"E

7.16 Preliminary technical specification of the overhead transmission and distribution:

- Length – Approximately 5,5km
- Tower parameters
  - Number and types of towers - Information will be available at the detailed design stage
  - Tower spacing (mean and maximum) - Information will be available at the detailed design stage
  - Tower height (lowest, mean and height – Up to 24m
  - Conductor attachment height (mean)- Information will be available at the detailed design stage
  - Minimum ground clearance – Information is not available at this stage.

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features in the surrounding landscape. The overhead transmission and distribution profile shall be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions shall be used.

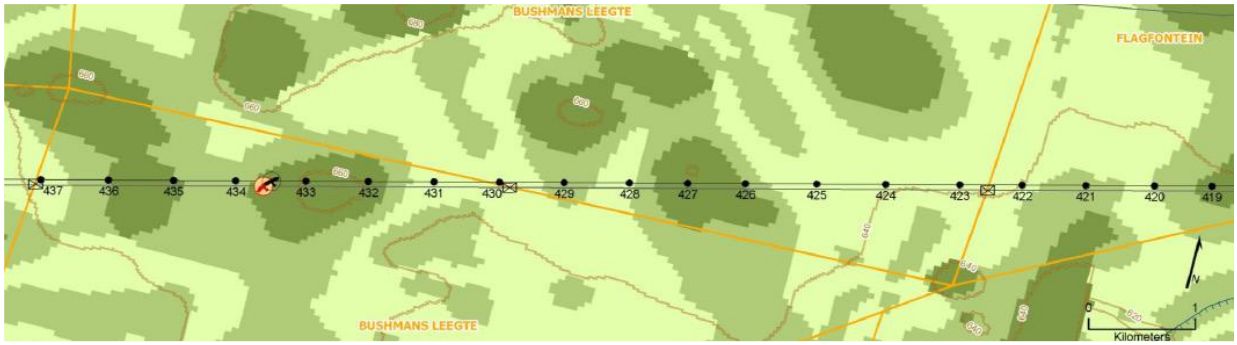

Figure 1: Example of an environmental sensitivity map in the context of a final overhead transmission and distribution profile

7.3 Sub-section 3: Declaration

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 days prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Signature Proponent/applicant/ holder of EA Date:

---------- 16/01/2023 ----------

7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

APPENDIX I-3: PROJECT TEAM CV's

EAP's CV

Details of Independent Environmental Assessment Practitioner (EAP)

Zitholele Consulting offers Specialist Consulting Services in the fields of Engineering, Environmental Management, Waste Management, and Strategic Communication. The Zitholele team comprises of highly-skilled, experienced, professionally registered technical personnel and senior management members that are capable of undertaking large, complex, and multi-disciplinary assignments in both the public and private sectors. Zitholele is one of the top Environmental Management consultancies in South Africa, having undertaken Impact Assessments and other Environmental Management Services in the Industrial, Power, Agricultural, Water, and Waste sectors. Zitholele utilises international best practice methodologies for quantitative impact assessment, risk assessment and consideration of alternatives.

Zitholele has a formidable track record and comprises highly qualified and experienced technical staff viz, Environmental Scientists and Environmental Control Officers (ECO's). The team members have broad experience in terms of working on a range of environmental projects within the public and private sector across South Africa. Refer to the table below for the contact details of the EAP who prepared the amended EMPr.

Details of the Independent Environmental Assessment Practitioner (EAP)

Project EAP:	**Zitholele Consulting (Pty) Ltd**		
Contact Person:	Ms. Natasha Lalie		
Qualifications	Master of Science (Environment and Society), IAIASa Member (Member No: 6920) and Professional Registered EAP with Environmental Assessment Practitioners Association of South Africa (EAPASA) (Registration No: 2021/3611)		
Role in Project:	Project management and coordination Process management Specialist team management Public Participation Co-Ordinator and liaisons Compilation of Amended EMPr		
Physical Address:	Building 1, Maxwell Office Park, Magwa Crescent West, Waterfall City, Midrand		
Postal Address:	P.O. Box 6002, Halfway House, 1685		
Postal code:	1685	**Fax:**	+27 86 674 6121
Telephone:	011 207 2060	**Cell:**	-
Email:	natashal@zitholele.co.za		
Expertise to undertake the EMPr amendment process:	Ms. Natasha Lalie has been an Environmental Assessment Practitioner (EAP) for nineteen years. She has undertaken numerous Screening and Feasibility Studies, Basic Assessment Reports, Scoping Reports, Environmental Impact Reports (EIR's), Environmental Management Programmes (EMPr's) and Public Participation Processes, as required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended and the EIA Regulations of 2006, 2010 and 2014. She has also undertaken Integrated Water Use Licence Applications (IWULA's) for a number of projects, as required by the National Water Act, 1998 (Act No. 36 of 1998). She has been involved in a wide range of projects, which included Waste Management License Applications, industrial, township establishments, mixed-use development, solar PV developments, transmission power lines, road upgrades, infrastructure developments, change of land use, lodge developments, proposed bulk water pipelines, proposed transmission power lines, public transportation, proposed filling stations, shopping centre developments and so on. She has worked extensively in South Africa, particularly in KwaZulu-Natal, Eastern Cape and Gauteng.		

ZITHOLELE CONSULTING

Professional Registrations:

- (EAPASA) Environmental Assessment Practitioners Association of South Africa

Position:

Senior Environmental Scientist

Specialisation:

- Screening Assessments
- Basic Assessments
- Scoping and Environmental Impact Reports (S&EIR'S)
- Water Use License Applications (WULA)
- Waste Management Licenses (WML)

Education:

- MSc. Environment and Society, 2002 University of Pretoria
- BSc. Hons, Geography, 2000 University of Kwa-Zulu Natal
- BSc. Botany and Geography, 1999 University of Kwa-Zulu Natal

Ms. Natasha Lalie

KEY EXPERIENCE

Ms. Natasha Lalie is an Environmental Assessment Practitioner (EAP) with 18 years of experience. She has undertaken numerous Exemption Applications, Screening Assessments, Basic Assessment Reports (BAR's), Scoping Reports, Environmental Impact Reports (EIR's) and Environmental Management Programmes (EMPr's), as required by the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment (EIA) Regulations of 2006, 2010 and 2014 (as amended). Natasha has also undertaken Integrated Water Use Licence Applications (IWULA's) for a number of projects, as required by the National Water Act, 1998 (Act No. 36 of 1998). She has been involved in a wide range of projects, which included waste management, industrial, township establishments, mixed-use development, road upgrades, infrastructure developments, dam construction, change of land use, lodge developments, proposed bulk water pipelines, proposed transmission power lines, renewable energy projects, tourism and recreation, proposed filling stations and shopping centre developments.

PROJECT EXPERIENCE

2020 Polihali Dam and Appurtenant Works, Lesotho
Updating of the Construction Environmental Management Plan, Compilation of Environmental Specifications and Environmental Baseline Report for construction of the dam and appurtenant works for Lesotho Highlands Development Authority, Lesotho.

2018 Ngqeleni Electrification Phase 3, Eastern Cape
Basic Assessment (BA), General Authorisation (GA), Permit for construction in Coastal Conservation Area (CCA) and management of permit application for removal of Protected Trees in a natural forest for the proposed electrification of three villages i.e Egoli, Ntshintshani and Mdzweni, near Port St. Johns, Eastern Cape.

2018 Proposed upgrade of Collingwood School, Bluff, KwaZulu-Natal
Project Management for Screening Assessment

2018 - Proposed Advanced Water Treatment Demonstration Project, KwaZulu-Natal
Compilation of Final Scoping Report and Integrated WULA for the project site located at Central Waste Water Treatment Works (CWWTW) at Bluff.

2018 Proposed Support Precinct 2 Development, La Mercy, eThekwini, KwaZulu-Natal
Scoping and Environmental Impact Report (S&EIR) for the project located at La Mercy, eThekwini, KwaZulu-Natal

2017 Inyaninga Human Settlements Development, KwaZulu-Natal
S&EIR, Amendment of Environmental Authorisation (EA) and WULA for a mixed-use development in Tongaat, KwaZulu-Natal

2017 Proposed Trade Zone 2 development, La Mercy, KwaZulu-Natal
S&EIR for the project located at La Mercy, eThekwini, KwaZulu-Natal

2017 Proposed construction of the eThekwini Bus Rapid Transit (BRT), Phase 1 Route C1A from MR577 to the Chris Hani Road Interchange for the eThekwini Municipality, KwaZulu-Natal
IWULA for several wetland crossings
Compilation of IWULA and Integrated Water and Waste Management Plan (IWWMP) for Section 21(c) and 21(i) water use activities.

2016 Northern Aqueduct Phase 5, KwaZulu-Natal
BA and Water Use License Application (WULA) for the proposed Northern Aqueduct Phase 5 from Reservoir Hills to Duffs Road, Avoca, KwaZulu-Natal

2016 Phase 1A: Proposed Upgrade of Gravel Roads off Main Road, between Shakas Head and Shakas Rock, KwaDukuza Local Municipality, KwaZulu-Natal
Compilation of Screening Report and Specialist Management. Compilation of, and submission of EIA Enquiry with KZN EDTEA.

2016 Phase 1B: Proposed Proposed upgrade of Old Fort Road, upper Salt Rock Road and the western extent of Sheffield Beach Road, KwaDukuza, KwaZulu-Natal
Compilation of Screening Report and Specialist Management

2015 Proposed Okanhandja medical facility, Namibia
Compile Final Scoping Report and interpretation of Specialist Studies.

2014 – Proposed upgrade of N2 between Mthunzini Toll Plaza to the Empangeni T-Junction, , KwaZulu-Natal
BA, IWULA, Mining Permit Application and Mining Permit EMPr

PROJECT EXPERIENCE (continued)

2014 Proposed construction of the Botshabelo Interchange, Manguang Local Municipality, Free State
Basic Assessment and Specialist management.
2012 Lower Thukela Bulk Water Supply Scheme, KwaZulu-Natal
Scoping and Environmental Impact Reporting (S&EIR) process for the proposed Lower Thukela Bulk Water Supply Scheme from Mandini to KwaDukuza, KwaZulu-Natal
2013 -Proposed Transnet Waste Tyre Storage Facility, Bayhead, KwaZulu-Natal

BA and Waste Management License (WML)

2013 Proposed expansion of the Wastewater Treatment Works in Prospecton, KwaZulu-Natal
S&EIR Process for WML.
2013 Proposed Wastewater Treatment Works for a snack facility in Prospecton, KwaZulu-Natal BA for WML
2013 Proposed Giant Flag Development, Graaf-Reinet, E. Cape
S&EIR process
2012 Proposed construction of various solar plants in Northern Cape, Free State and Mpumalanga
Public Participation Process Practitioner.
2010 Proposed eThekwini Variable Message Signs (VMS) and surveillance cameras along the N2 and N3 falling within the eThekwini Municipal Boundary, KwaZulu-Natal
BA process.
2010 Proposed Construction of Four Causeways in the Ugu District Municipality, KwaZulu-Natal
Project Management and BA process.
2009 Proposed upgrade of Road P73 near Mthwalume, , KwaZulu-Natal
Project Management and Basic Assessment process.
2009 Proposed upgrade and construction of local roads and causeways at DC21 in Ugu District Municipality, KwaZulu-Natal
Project Management and Basic Assessment process.
2009 Proposed P58 road upgrade in Izingolweni near Port Shepstone, KwaZulu-Natal
Project Management and Basic Assessment process.
2008 Proposed extension of the existing emergency storage dam at the Alton macerator site in Richards Bay, Umhlathuze Local Municipality, KwaZulu-Natal
Project Management and Basic Assessment process.
2008 Proposed upgrade of the existing Sugar Ray Xulu Stadium, Clarement, KwaZulu-Natal
Project Management and Basic Assessment process.
2008 Proposed construction of Qoloqolo Pedestrian Bridge in Mthwalume, KwaZulu-Natal
Project Management and Basic Assessment process.
2008 Proposed Spencer – Tabor 275 KV transmission power line, near Duiwelskloof, Limpopo
Compilation of Scoping and EIR.
2008 Proposed residential resort and golf course at the K'Shani Nature Reserve in Mpumalanga
Compilation of Scoping and EIR.
2006 Proposed township establishment: Annlin Extension 117 in Tshwane, Gauteng
Compilation of Exemption Report.
2006 Proposed road upgrade at the Road D374 and Road D540 Intersection at Muldersdrift in Gauteng
Compilation of Exemption Report.

2005 **Proposed change of land use from "Agricultural" to "Residential 5", Gauteng**
Compilation of Exemption Report.
2005 **Proposed establishment of lodges on a portion of the farm Lekkergoed, Limpopo**
Compilation of Scoping Report
2005 **Proposed establishment of Pomona Extension 81, Pomona, Gauteng**
Compilation of Scoping Report
2005 **Proposed establishment of a residential development in Pomona Extension 1, Gauteng**
Compilation of Scoping Report
2005 **Proposed township establishment - "Cashan Ext. 17, Rustenburg, North-West Province**
Compilation of Scoping Report
2005 **Proposed office park/light industrial development in Jetpark, Gauteng**
Compilation of Scoping Report
2005 **Proposed upgrading of a homestead at the Rietvlei Nature Reserve, Tshwane, Gauteng**
Compilation of Exemption Report.
2005 **Proposed upgrade of the existing gravel roads at the Lesetlheng Village**
Compilation of Exemption Report.
2004 **Proposed upgrading and re-alignment of Road D2721 between Sonop and Segwaelane Townships, Brits, North West Province**
Compilation of Scoping Report
2004 **Proposed Bushlodge at the Marakele Park (Pty) Ltd, Limpopo Province**
Compilation of Scoping Report
2004 **Compost handling facility, in Bartlett, Boksburg, Gauteng**
Compilation of Scoping Report
2004 **Proposed establishment of a resort in Swartruggens, North West Province**
Compilation of Scoping Report.
2004 **Proposed shopping centre in Kempton Park; Gauteng**
Compilation of Scoping Report.
2004 **Proposed Mixed-Use Development on Forest Farm, Gauteng**
Compilation of Scoping Report.
2004 **Township Establishment in Brakfontein, Centurion, Gauteng**
Compilation of Scoping Report.
2004 **Rezoning and alienation of a park in Laudium, Tshwane, Gauteng**
Compilation of Exemption Report.
2004 **Rezoning and alienation of a park in Meyers Park, Tshwane, Gauteng**
Compilation of Exemption Report.
2004 **Proposed desilting of the Alberton Dam, Gauteng**
Compilation of Scoping Report.
2003 **Widening of London Road and the upgrading of a bridge across the Jukskei River, Alexandra, Gauteng**
Compilation of Exemption Report.
2003-2004 **Proposed Waste Transfer Station in Nigel, Gauteng**
Application for Waste Disposal Site Permit under Section 20 of the Environment Conservation Act, 1989 (Act No.73 of 1989, and Addendum to the Scoping Report and EMPr. Compilation of Operational and Monitoring Plan
2003 **Sustainable Rural Settlement, Mogale City, Gauteng**
Compilation of Concept Document.

PROFESSIONAL SOCIETIES

Registered EAP – EAPASA

EMPLOYMENT RECORD

2021 - Present	Zitholele Consulting	Senior Environmental Scientist
2015 - 2021	Gibb Engineering and Architecture (Pty) Ltd	Senior Environmental Scientist
2007 - 2015	Strategic Environmental Focus (Pty) Ltd	Environmental Manager (Durban Office)
2003 - 2007	Strategic Environmental Focus (Pty) Ltd	Environmental Manager (Pretoria Office)

ZITHOLELE CONSULTING

Professional Registrations:

- (SACNASP) South African Council for Natural Scientific Professions
- (IAIAsa) International Association for Impact Assessment – South Africa

Position:

- Environmental Divisional Head

Occupation:

- Senior Environmental Scientist

Specialisation:

- Environmental and Social Impact Assessments
- Water Use Licence Applications
- Waste Management Licence Applications
- Environmental Compliance Audits
- Estuarine Ecological Assessments
- Project Management and GIS

Education:

- Ph.D., Zoology, 2012 Nelson Mandela Metropolitan University
- M.Sc., Zoology, 2003 University of Port Elizabeth
- B.Sc. Hons, Zoology, 2001 University of Port Elizabeth
- B.Sc., Zoology and Botany, 2000 University of PE

Dr. Mathys Vosloo

KEY EXPERIENCE

Dr. Mathys Vosloo is a well-qualified and technically proficient environmental and natural scientist with more than 16 years environmental management experience. His experience include Environmental Impact Assessments (EIAs), Water Use Licence Applications (WULAs), Waste Management Licence (WML) Applications Environmental Management Programmes, environmental compliance auditing and environmental compliance monitoring and reporting.

Mathys has managed and executed several large-scale multi-disciplenary construction projects, such as the development of Ash Disposal Facilities, Flue gas Desulphurisation (FGD) development, and large linear projects including 132kV and 400kV power line power lines development projects.

Mathys also has substantial experience in Geographical Information Systems (GIS), and creating and analysing digital terrain models. Further experience include strategic waste management projects, State Of the Environment Reporting (SOER), Strategic Environmental Assessments (SEA) and feasibility studies.

Mathys' experience in natural science include estuarine ecological assessments, contributions to Water Resource Classificationa and Resource Quality Objectives studies.

PROJECT EXPERIENCE

2021 Carlswald Pipeline Upgrade R 143 245
Basic Assessment and Water Use Licence Application for the proposed upgrade of a water pipeline in Carlswald, Gauteng Province.

2020 - 2021 Kap River Nature Reserve Upgrade Screening R 46 000
Environmental Screening for the proposed upgrade of the Kap River Nature Reserve to accommodate local tourists for a natural environment experience.

2020 – 2021 Lanseria WWTW Biodiversity Offset R 1.83m
Biodiversity Offset process for the Lanseria Wastewater Treatment Works Development outside Lanseria.

2020 - 2021 Lanseria WWTW Part 2 EA Amendment R 200 000
Part 2 Environmental Authorisation Amendment process for the Lanseria Wastewater Treatment Works Development Environmental Authorisation.

2020 - 2021 Lanseria WWTW WUL Amendment R 30 000
Water Use Licence (WUL) Amendment process for the Lanseria Wastewater Treatment Works Development WUL.

PROJECT EXPERIENCE (continued)

2019 – 2021 PPP for Springfield Greenfields Coal Mine **R 354 000**
Public Participation Process (PPP) for the EIA Phase of the Springfield greenfield coal mining operations located between Vereeniging and Meyerton, Gauteng.

2020 Zimalco EMPr Update and SWMMP **R 33 300**
EMPr update and compilation of Stormwater Monitoring and Management Plan for the Recycling of Hazardous Waste at the Zimalco Aluminium Waste Management Facility.

2019 – 2021 Thukela Catchment WRC & RQOs: Estuary Compent **R 150 000**
Determination of Water Resource Classes and Associated Resource Quality Objectives in the Thukela Catchment: Estuary Component.

2019 ACED Environmental Compliance Audits **R 115 600**
Environmental Compliance Audits for African Clean Energy development (ACED)'s Bokamoso, Droogfontein II, Waterloo and Zeerust Photovolteic Energy Facilities.

2019 NCP Chlorchem Three Wastes Classification **R 134 000**
Waste Classification, Safety Data Sheets and Waste Manifests for NCP Chlorchem's Chlorine / Caustic, Chlorinated Paraffin and Ferric Plant waste streams, Gauteng Province.

2019 Boksburg Foundry Environmental Compliance Audit **R 12 000**
External Compliance Audit of Boksburg Foundry's Waste Management Licence, Environmental Authorisation and Environmental Management Programme.

2019 Hendrina Power Station AEL Audit **R 19 750**
Environmental Compliance Audit for Hendrina Power Station's existing Atmospheric Emission Licence, Mpumalanga Province.

2019 Matimba Dust Fall-out Monitoring **R 160 000**
Management and Review of Dust Fall-out Monitoring (2018 to 2020) at Medupi Power Station, Limpopo Province.

2019 BA and WULA for Bushkoppies WWTW expansion **R 36 000**
Basic Assessment and Water Use Licence Application for the proposed expansion of the existing Bushkoppies Wastewater Treatment Works, Gauteng Province.

2019 Eskom Telecomunications Legal Audit **R 36 000**
Environmental Legal Compliance Audit for Eskom Telecommunications' Simmerpan Facility, Gauteng Province.

2019 NCP Chlorchem Waste Assessment **R 128 000**
Waste Assessment of Waste Sources at NCP Chlorchem's North Dump, South Dump and Little Gorge.

2018 Hendrina PS AEL and WML Audit **R 28 000**
Environmental Compliance Audit for Hendrina Power Station's existing Atmospheric Emission Licence and Waste Management Licence, Mpumalanga Province.

2018 Arnot PS IWUL Audit **R 40 000**
Integrated Water Use Licence Compliance Audit for Arnot Power Station, Mpumalanga Province.

2018 – 2020 Medupi Dust Fall-out Monitoring **R 430 000**
Management and Review of Dust Fall-out Monitoring (2018 to 2020) at Medupi Power Station, Limpopo Province.

2018 - 2019 WML for Fibre Recovery PLant **R 120 000**
Waste Management Licence and Basic Assessment Process for the development of a Cellulosic Fibre Recovery Plant in Wadeville, Germiston.

2018 - 2019 WULA for Consol Glass Furnace Development **R 50 000**
Water Use Licence Application for the development of an additional furnace at Consol Glass plant in Nigel, Gauteng Province.

PROJECT EXPERIENCE (continued)

2018 - 2019 Consol Glass MES Postponement Applications R 324 000
Applications for postponement of Minimum Emission Standards Compliance timeframes for Consol Glass Plants in Nigel, Wadeville and Clayville, Gauteng Province.

2017 - 2019 Medupi PS FGD EIA, WML Variation and WULA R 5.9 million
Environmental Impact Assessment, Waste Management Licence Variation and Water Use Licence Application for the Medupi Power Station's Flue Gas Desulphurisation Plant and associated infrastructure, Limpopo Province.

2018 - 2019 Duvha PS Integrated Water Use Licence and WUL Amendment R 566 000
Water Use Licence Application and amendment of existing water uses at the Eskom Duvha Power Station, Mpumalanga Province.

2017 - 2018 Wetland Offset Plan and Public Participation for Kusile PS 60year Ash Disposal Facility R 2.8m
Public participation process for Wetland Offset Strategy and Wetland Offset implementation Plan for the Kusile Power Station 60year Ash Disposal Facility.

2017 - 2019 BA for KEMJV slimes pipeline R 230 000
Basic Assessment for construction of slimes pipeline for Kimberley Ekapa Mine Joint Venture, Northern Cape.

2016 – 2018 Medupi Dust Fall-out Monitoring R 390 000
Management and Review of Dust Fall-out Monitoring (2016 to 2018) at Medupi Power Station, Limpopo Province.

2016 - 2017 Asbestos Mine Rehabilitation Programme R 1.3 million
Undertaking environmental site investigations and project scoping for the rehabilitation of 10 derelict and abandoned asbestos mines in Limpopo and Mpumalanga Provinces.

2018 Kusile PS Gypsum Waste Classification R 46 000
Waste Classification of gypsum from Kusile Power Station's Flue gas Desulphurisation Plant, Mpumalanga Province.

2016 - 2017 Eskom Ash WML Exemption Application R 1.9 million
Motivation for the application for exemption of waste management activity licences for specific uses of pulverised coal fired boiler ash in terms of GN R. 634.

2016 - 2017 EA Amendment for Kuruman Powerline Upgrade R 60 000
EA Amendment application i.t.o. EIA 2014 regulations for amendment to the approved 132 kV powerline corridor between Hotazel, Kuruman and Kathu, Northern Cape.

2016 Breede-Gourits CMS: Estuarine component R 81 000
Estuary Situation Assessment to inform the Breede-Gourits Catchment Management Strategy for Breede-Gourits Water Management Area.

2016 - 2017 BA for Tshepisong Extension 4 development R 198 000
Basic Assessment for Mixed Business and Residential Development within Portion 64 of Farm Vlakfontein 238 IQ, Tshepisong Extension 4, Johannesburg West, Gauteng Province.

2016 - 2017 BA for Patensie Housing Development R 283 000
Basic Assessment for the Patensie Housing Development, Eastern Cape.

2016 Specialist Walkdown for Kuruman Powerline upgrade R 355 000
Specialist walkdown of approved 132 kV powerline servitude between Hotazel and Kuruman, Northern Cape.

2016 Solar Park EA Amendment R 248 000
Environmental Authorisation (EA) Amendment application i.t.o. EIA 2014 regulations for amendments to the Solar Park to Nieuwehoop 400 kV power line corridor near Upington, Northern Cape.

2015 - 2016 Solar Park WULA and Specialist Walkdown R 547 000
Water Use Licence Applications and specialist servitude walkdowns for Solar Park to Nieuwehoop 400 kV powerline development near Upington, Northern Cape.

PROJECT EXPERIENCE (continued)

2015 - 2016 BA Clanwilliam Weirs **R 409 000**
Proposed Re-alignment of the Bulshoek Dam and Doring River Weirs near Clanwilliam, Western Cape.

2014 - 2016 EIA Koffiefontein Slimes Dam **R1 million**
EIA for the new Koffiefontein Slimes Dam Development, Kimberley.

2014 - 2015 BA and WULA Kuruman Upgrade **R1.3 million**
BA and WULA for 132kV power line upgrade from Hotazel to Kuruman and Kathu, Northern Cape.

2013 - 2016 EIA Kendal 30 year Ash Disposal Facility **R6 million**
EIA, WMLA and WULA for a new Ash Disposal Facility for Kendal Power Station near Ogies in Mpumalanga.

2013 - 2014 Design of 3 canals **R 700 000**
3 x BAs for the proposed prevention of water ingress into previously mined out areas in the Witwatersrand Mining Basin (canalisation of 3 streams), Gauteng.

2013 - 2014 BA for Vaalbank Switching Station **R 380 000**
Basic Assessment for Vaalbank Switching Station and 2 x 88 kV Powerlines, Free State.

2012 - 2015 EIA Solar Park **R5 million**
EIA, EMP &WULA for the Solar Park 132/400 kV Sub Station and Associated lines, Northern Cape.

2012 - 2015 Kusile 60 year Ash Disposal Facility **R11 million**
EIA, WML and WULA for the 60 year Ash Disposal Project near Balmoral in Mpumalanga.

2012 - 2015 WULA Wilge Pipeline **R 900 000**
WULA for the sewage and water pipeline from Wilge Township to Phola, Mpumalanga.

2012 BA Kouga Dam Wall **R 250 000**
The rehabilitation of the Kouga Dam wall and associated mining activities.

2012 EMP City of Cape Town Stormwater **R1.5 million**
Maintenance and management interventions undertaken by the City of Cape Town in its surface stormwater systems.

2012 BA Melkhout Powerlines **R 100 000**
The installation of 132kV transmission lines from Melkhout to Dieprivier, including the construction of a new substation at Dieprivier, Cacadu District.

2012 BA Diepriver Powerlines **R 100 000**
The installation of 132kV transmission lines from Dieprivier to Kareedouw, including the extension of the existing substation at Kareedouw, Cacadu District.

2012 BA Patensie Powerlines **R 100 000**
The installation of 132kV transmission lines from Melkhout to Patensie, including the construction of a new substation at Patensie, Cacadu District.

2012 Mmnthatha River System
Catchment delineation and stream calculation for the Mnthatha River System, GIBB Durban.

2011 - 2012 PRASA Passenger rail and shunting yard proposed sites
Environmental Screening for the PRASA passenger rail and shunting yard proposed sites in Cape Town, Gauteng and Durban.

2010 - 2012 ATTP Flow Limiters installation
NMBM Assistance to the poor (ATTP) and schools leakages repairs and flow limiters installation.

2010 - 2012 ATTP Database ManagementFlow Limiters installation **R4 million**
NMBM Assistance to the poor (ATTP) and schools leakages repairs and flow limiters installation database management.

PROJECT EXPERIENCE (continued)

2010 - 2011 Nelson Mandela Bay Provincial Department of Housing
Nelson Mandela Bay and Cradock low cost housing rectification audits. Management of incoming and outgoing GIS data and GIS mapping, Provincial Department of Housing.

2010 - 2011 ECO Bulk Stormwater Infrastructure Motherwell
Installation of bulk storm water infrastructure in Motherwell NU29 and 30 and Implementation of an artificial wetland at the Motherwell stormwater canal outlet structure.

2010 BA McAdam Street Upgrade **R 60 000**
The extension of McAdam Street from Worraker to Mangold Street, NMBM.

2009 - 2011 EIA Motherwell Housing Development **R 270 000**
Motherwell NU 31 housing development, NMBM.

2009 - 2011 Coega Integrated Stormwater Management Plan
Coega IDZ Eastern Sector Integrated Stormwater Management Plan, Coega Development Corporation.

2009 - 2011 EIA KougaWind Farm **R 350 000**
Kouga 300 MW wind farm, Kouga Local Municipality.

2009 - 2010 ECO Swartkops River Artificial Wetland
Swartkops River, NMBM.

2009 - 2010 ECO Humewood Road Upgrade
Realignment of the S-bend section of Humewood Road in Humewood.

2009 - 2010 ECO Paapenkuils Sewer Augmentation
Paapenkuils Main Sewer Augmentation in Port Elizabeth NMBM.

2009 - 2010 SOER State of the Environment Report **R 350 000**
NMBM State of the Environment Report.

2009 - 2010 ISWMP Coega IDZ **R 350 000**
Coega IDZ Eastern Sector Integrated Stormwater Management Plan, CDC.

2009 - 2010 SOER Flood Plain and Spatial Analysis
Nelson Mandela Metropolitan Municipality SOER flood plain and spatial analysis, NMBM.

2009 - 2010 EIA – Red Cap Developments
Kouga Local Municipality wind farm development EIA, RedCap Developments.

2008 - 2009 Port Harcourt City Open Space System Plan
Port Harcourt City Open Space System Plan, Government of Nigeria.

2008 - 2009 ECO Kwazakhele stormwater infrastructure
Construction of stormwater detention ponds and upgrading of stormwater infrastructure in Kwazakhele, Phase 3.

2008 ECO Sherwood Road Upgrade
Upgrading of Devon and Fairley Roads in Port Elizabeth, NMBM.

2008 OR Tambo District Municipality water conservation and demand management
OR Tambo District Municipality water conservation and demand management.

2008 SOER Eden District Municipality
Eden District Municipality SOER, Eden District Municipality.

2008 Kouga Local Municipality catchment and flood attenuation analysis
Jeffreys Bay Marina Martinique catchment and flood attenuation analysis, Kouga Local Municipality.

2008 EIA Bethelsdorp Housing Development **R 230 000**
Bethelsdorp Phase 3 social housing development, NMBM.

2008 BA Beacon Maritime Navigational Structure Upgrade **R 60 000**
Beacon maritime navigational structure upgrading, NMBM.

PROJECT EXPERIENCE (continued)

2008 **BA Moffet Dam Rehabilitation** **R 60 000**
Moffet Dam breach remedial works, Kouga Local Municipality.

2008 **BA Pollok Beach light mast installation** **R 50 000**
Pollok Beach light mast installation, NMBM.

2008 **BA Humewood Road Re-alignment** **R 60 000**
Humewood Road re-alignment along the S-bend section, NMBM.

2008 **SOER Hessequa Local Municipality** **R 200 000**
Hessequa Local Municipality State of the Environment Summary Report.

2008 **SEA Coastline redevelopment** **R 250 000**
North End Coastline redevelopment SEA, NMBM.

2008 **Mzimkhulu River catchment and flood attenuation analysis**
Mzimkhulu River catchment and flood attenuation analysis, Umzimkhulu Municipality.

2008 **PE Paapenkuils River catchment and flood attenuation analysis**
Port Elizabeth Paapenkuils River catchment and flood attenuation analysis, NMBM.

2007 - 2008 **ECO Mavuso Road Upgrade**
Construction of Mavuso Road in Kwazakhele, NMBM.

2007 **BA Jagersfontein Chicken Farm** **R 40 000**
Jagersfontein farm 432 commercial production of chicken and operation of an abattoir, Kouga Local Municipality.

2007 **BA Zwide Roads Upgrade** **R 55 000**
Tarring of roads in Zwide, NMBM.

2007 **BA McAdam Street Construction** **R 40 000**
Construction and extension of McAdam Street, NMBM.

2007 **BA Tygerbay Reconstructiontion** **R 60 000**
Repair and reconstruction of water retaining structures at Tyger Bay EIA NMBM.

2007 **BA Lorraine Infill development** **R 40 000**
Erf 306 Lorraine Infill development, NMBM.

2007 **BA Sherwood Roads Upgrade** **R 40 000**
Tarring of roads in Sherwood, NMBM.

2007 **BA Zwide Roads Upgrade** **R 40 000**
Tarring of Ntsele, Mkutuka, Nanto and Vabaza Streets in Zwide, NMBM.

2007 **BA Pollok Beach Parking Lot** **R 50 000**
Pollok Beach, Summerstrand, parking lot relocation, NMBM.

2007 **BA Uitenhage Roads Upgrade** **R 40 000**
Tarring of Dube, Grootboom and Luzipho Streets in Uitenhage, NMBM.

2007 **BA PE ICC Site Assessment** **R 150 000**
Port Elizabeth International Convention Centre Rapid site assessment, NMBM.

2007 **EIA Exemptions Applications Motherwell**
Motherwell/Coega outfall canal upgrade.

2007 **EIA Exemptions Applications Lorraine Infill Development**
Erf 17, Lorraine, infill development.

2007 **EIA Exemptions Applications Korsten Upgrade**
Korsten Modal Interchange Upgrade.

2007 **GIS SANRAL outdoor advertising opportunities**
SANRAL outdoor advertising opportunities in the Eastern Cape, SANRAL.

PROJECT EXPERIENCE (continued)

2007 Coega Integrated Stormwater Plan

Coega Integrated Stormwater Plan, Coega Development Corporation.

2007 Uitenhage Stormwater Master Plan

Uitenhage Stormwater Master Plan, NMBM.

2006 Nelson Mandela Metropolitan University exchange programme

Analyses and identification of nematode collected samples from the Mngazi Estuary in the Eastern Cape (former Transkei), South Africa, University of Ghent, Belgium – Nelson Mandela Metropolitan University exchange programme.

2005 - 2006 Berg River Reserve Determination Study R 150 000

Hyperbenthos and zooplankton field assessment in Berg River estuary.

2005 Olifants River Reserve Determination Study, Western Cape R 300 000

Specialised field ecologist - Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Olifants River estuary for the Olifants River Reserve Determination study, Western Cape., Contracted sampling for CSIR Stellenbosch (Environmentek).

2004- 2005 DWAF - Kromme and Seekoei Estuary Reserve Determination Study R 200 000

Specialised field ecologist - Kromme and Seekoei Estuary Catchment Reserve Study. Contracted sampling for Department of Water Affairs and Forestry (DWAF).

2003 - 2004 Berg River Baseline Monitoring Program (UCT) R 350 000

Berg River Baseline Monitoring Program (UCT). Collecting subtidal macrozoobenthos.

2002 - 2006 University of Port Elizabeth Ecological analysis R4 million

Specialised field ecologist - Field assessment: subtidal macrozoobenthic and hyperbenthic invertebrates, zooplankton, microzooplankton, meiofauna at Mngazi and Mngazana River estuaries.

2002 - 2003 University of Port Elizabeth Ecological analysis

Ecological analysis of the functioning Sundays, Swartkops, Kromme, and Gamtoos estuaries using Ecopath with Ecosim, and assessment of the impact of recreational fishing on these ecosystems. MSc dissertation, University of Port Elizabeth.

2002 Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Rooiels R 400 000

Specialised field ecologist - Field assessment: subtidal macrozoobenthos, hyperbenthos and zooplankton in Rooiels, Palmiet, Heuningnes, Breede, Klein Brak and Kaaimans River estuaries, Western Cape.

2002 Field Assessment - intertidal invertebrates Eastern Cape R 150 000

Specialised field ecologist - Field assessment: intertidal invertebrates in Kabeljous, Gamtoos, Swartkops, Sundays and Kariga River estuaries, Eastern Cape.

PAPERS, PUBLICATIONS, PRESENTATIONS AND PROFESSIONAL SOCIETIES

PAPERS, PUBLICATIONS

1. Vosloo, M C and Hendricks, M G J. 2017. Marine and estuarine nematodes in South Africa, Book Chapter. In *Nematology in South Africa: A view from the 21st Century*. Fourie, Spaull, Jones, Daneel, De Waele (Eds).
2. Vosloo, M.C. 2012. Network analysis of trophic linkages in two sub-tropical estuaries along the south-east coast of South Africa. PhD thesis, Nelson Mandela Metropolitan University.
3. Vosloo, M.C. 2009. Marine and estuarine meiofauna: Contribution to the National Marine Ecosystem Diagnostic Analysis. Agulhas and Somali Current Large Marine Ecosystems.
4. Vosloo, M.C. 2004. A comparative assessment of the impact of recreational and subsistence fishing on selected Eastern Cape estuarine ecosystems using the Ecopath modelling approach. MSc Dissertation, University of Port Elizabeth, Port Elizabeth.

PROFESSIONAL SOCIETIES

1. Member of International Association for Impact Assessment – South Africa (IAIAsa)
2. Registered member of South African Council for Natural Scientific Professions, (SACNASP)

EMPLOYMENT RECORD

2018 - Present	Zitholele Consulting	Environmental Divisional Manager
2013 - 2017	Zitholele Consulting	Manager: Licencing and Permitting, Senior Environmental Consultant
2012	GIBB Engineering and Science	Senior Environmental Scientist
2007 – 2011	GIBB Engineering and Science	Environmental Scientist
2008 – 2011	Nelson Mandela Metropolitan University	Postgraduate (part-time) Student
2005 – 2007	Nelson Mandela Metropolitan University	Full time Postgraduate (PhD) Student
2001 - 2003	University of Port Elizabeth	Full time postgraduate (MSc) Student
2006	University of Ghent, Belgium	Exchange Ecologist

APPENDIX I-4: GRIEVANCE MECHANISM GUIDELINE

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GRIEVANCE MECHANISM AND PROCESS

1. Purpose

The aim of the Grievance Mechanism is to ensure that grievances or concerns raised by stakeholders are addressed in a manner that:

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

This plan should be updated through the project development process to ensure relevance at all project stages.

2. Procedure for receiving and resolving grievances

The process of receiving and resolving grievances must be handled in a courteous and respectful manner by all parties involved in the process at all times. These procedures should be updated as and when required to ensure that the Grievance Mechanism remain relevant for the project and effective in providing the required processes throughout the construction, operation and decommissioning phases of the project. The proposed procedure for receiving and resolving grievances are stipulated below:

- Local landowners, communities and authorities must be informed in writing by the Developer of the grievance mechanism and the process by which grievances can be brought to the attention of the Developer through its designated representative. This must be undertaken with the commencement of the construction phase.
- A company representative must be appointed as the contact person to which grievances can be directed. The name and contact details of the contact person must be provided to local landowners, communities and authorities when requested.
- Project related grievances relating to the construction, operation and or decommissioning phases must be addressed in writing to the contact person. The contact person should assist local landowners and/ or communities who may lack resources to submit/prepare written grievances, by recording grievances and completing written grievance notices where applicable, translating requests or concerns or by facilitating contact with relevant parties who can address the raised concerns. The following information should be obtained, as far as possible, regarding each written grievance, which may act as both acknowledgement of receipt as well as record of grievance received:
    - The name and contact details of the complainant;
    - The nature of the grievance;
    - Date raised, received, and for which the meeting was arranged;
    - Persons elected to attend the meeting (which will depend on the grievance); and

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  - A clear statement that the grievance procedure is, in itself, not a legal process. Should such avenues be desired, they must be conducted in a separate process and do not form part of this grievance mechanism.

- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and, if required, agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed and only if required).
- A grievance register must be kept on site (in electronic format, so as to facilitate editing and updating), and shall be made available to all parties wishing to gain access thereto.
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting, as well as a suitable venue. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or Developer are entitled to invite their legal representatives to attend the meeting/s, it should be made clear to all the parties involved in the process that the grievance mechanism process is not a legal process, and that if the Complainant invites legal representatives, the cost will be their responsibility. It is therefore recommended that the involvement of legal representatives be limited as far as possible, as a matter of last resort, and that this process be primarily aimed at stakeholder relationship management as opposed to an arbitration or litigation mechanism.
- The meeting should be chaired by the Developer's representative appointed to address grievances.
- The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- Draft copies of the minutes must be made available to the Complainant and the Developer within 5 working days of the meeting being held. Unless otherwise agreed, comments on the draft minutes must be forwarded to the company representative managing the grievance resolution process within 5 working days of receipt of the draft minutes.
- The meeting agenda must contain agenda points addressing the discussion of the grievance, avoidance and mitigation measures available and proposed by all parties, as well as a clear indication of the future actions and responsibilities, in order to put into effect the proposed measures and interventions to successfully resolve the grievance.
- In the event that the grievance is resolved to the satisfaction of all parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the Developer regarding the grievance, an independent mediator must be appointed to assist with resolving the issue. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.

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- In the event that the parties agree to appoint a mediator, the Developer will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Developer, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Developer. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- In the event of the grievance, with the assistance of the mediator, is resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- If the dispute is not resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Developer for comment before being finalised and signed by all parties, which signature may not be unreasonably withheld by either party. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.
- A Complaint is closed out when no further action is required or possible. Closure status must be classified and captured following mediation or successful resolution in the Complaints Register as follows:
    - Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
    - Unresolved. Complaints where it has not been possible to reach an agreed resolution despite mediation.
    - Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Developer, either party may be entitled to legal action as an appropriate option, however, this grievance mechanisms aims to avoid such interactions by addressing the grievances within a reasonable timeframe, and to mutual satisfaction, where possible.

APPENDIX I-5: PLANT RESCUE AND PROTECTION PLAN

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the plant rescue and protection plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the PV Facility on listed and protected plant species and their habitats and to provide guidance on search and rescue of species of conservation concern.

2. RELEVANT ASPECTS OF THE SITE

The selected study area falls within the original extent of the Kalahari Karroid Shrubland (Unit Nkb 5) and the Bushmanland Arid Grassland (Unit Nkb 3) as defined by Mucina and Rutherford (2006). The former unit consists of flat, gravel plains, while the latter unit consists of Extensive to irregular plains on a slightly sloping plateau. In terms of vegetation structure, the Kalahari Karroid Shrubland has Karoo-related elements (shrubs) mixed with northern floristic elements, while the Bushmanland Arid Grassland is sparsely vegetated by grassland dominated by *Stipagrostis* species (Mucina and Rutherford 2006).

A total of 295 indigenous plant species have been recorded in the Kiwano Area according to the BODATSA database. Only 52 indigenous species could be confirmed to be present on site. A large portion of the study site is homogenous in terms of floristic structure and species composition. Some areas of interest include flat rocky areas, which, although searched, did not support a different assemblage of species. Only some drainage lines were found on site, with species that do not vary from the surrounding vegetation but are rather the same species growing more densely.

No red data species (species regarded as threatened by the SANBI Red List of South African Species (2017)) were recorded in the study site.

The following plants encountered on the study site are protected:

Northern Cape Nature Conservation Act no. 9 of 2009:

- *Boscia albitrunca* (Schedule 2)
- *Boscia foetida* (Schedule 2)
- *Euphorbia braunsii* (Schedule 2)
- Family Iridaceae (Schedule 2)

Protected Trees (National Forest Act no. 84 of 1998)

- *Boscia albitrunca* (National Tree no.: 122)
- *Boscia foetida*

3. PRINCIPLES FOR SEARCH AND RESCUE

Successful plant rescue can only be achieved if:

» Species can be removed from their original habitat with minimal damage to the plant, especially the roots.
» All plants removed are safely stored and treated according to their specific requirements prior to being transplanted again.
» They are relocated into a suitable habitat and protected from further damage and all disturbances to aid their re-establishment.
» Timing of planting activities is planned with the onset of the growing season.
» Steps are taken where necessary to aid the initial establishment of vegetation, including occasional watering.

The following principles apply in terms of plant rescue and protection:

» A permit is required from the Northern Cape Department of Environment and Nature Conservation to translocate (including gathering, collecting and plucking flora and their seeds) or destroy (including picking, cutting, chopping, damaging or destroying flora) any listed and protected species identified by the ecological walkthrough survey undertaken for the optimised final Kiwano Battery Energy Storage System and Solar Photovoltaic Project layout, even if they do not leave the property. This permit should be obtained prior to any search and rescue operations being undertaken.
» Where suitable species are identified, a search and rescue operation of these species should be undertaken within the development footprint, where these species would be affected, and prior to the commencement of construction.
» As far as possible, timing of search and rescue activities should be planned with the onset of the growing season.
» Affected individuals should be translocated to a similar habitat outside of the development footprint and marked and recorded for monitoring purposes. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device.
» The rescued plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat.
» Rescued plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed. Re-planting into the wild

must cause as little disturbance as possible to existing natural ecosystems. The position of the rescued individual/s must be recorded to aid in future monitoring of that plant as noted earlier.

- During construction, the Environmental Control Officer (ECO)/ Contractor's Environmental Officer (EO)/ Environmental Representative must monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by the Environmental Control Officer (ECO)/ Contractor's Environmental Officer (EO/ SHE Representative) and any listed species present which are able to survive translocation should be translocated to a safe site.
- Any listed species suitable for translocation observed within the development footprint, and that would be affected, that were not previously observed be translocated to a safe site.
- The collecting of plants of their parts should be strictly forbidden. Staff should be informed of the legal and conservation aspects of harvesting plants from the wild as part of the environmental induction training.
- Sensitive habitats and area outside project development should be clearly demarcated as no go areas during the construction and operational phase to avoid accidental impacts.

The following principles apply in terms of the translocation of provincially protected trees:

- A permit for protected trees is required from the Department of Agriculture and Forestry to translocate (including gathering, collecting and plucking flora and their seeds) any listed protected tree species identified by the ecological walkthrough survey undertaken for the optimised final Kiwano Battery Energy Storage System and Solar Photovoltaic Project layout, even if they do not leave the property. This permit should be obtained prior to any search and rescue operations being undertaken.
- The establishment of a healthy layer of organic material over the surface of the expected root ball, including the use of earthworms and earthworm castings. It should be noted that the use of earthworms castings during the relocation process has been scientifically proven as an effective additive to increase root development.
- The organic material on the root ball will be inspected on a regular basis and additional materials may be added as needed. The inspection of the organic material should be included in a monthly or quarterly report.
- Irrigation of the outer root ball will be required to encourage new root development. The irrigation frequency will be a weekly/ monthly basis depending to the water requirement and available through rainfall events. This may be adjusted during the continuous monitoring.

- Irrigation will be monitored on a monthly basis. Monitoring may be done using the soil probe or using moisture metering.
- The preparation of the relocation site will be required to be made ready before cutting of the tree root balls.
- Small specimens of the protected trees must also be relocated.
- Seeds from protected trees must be harvested and then germinated and grown in a controlled environment. Thereafter, the seedlings must be translocated to a nursery that is set up for the purpose of plant relocation.
- The relocated trees must be irrigated consistently, thoroughly and regularly without breaks in the schedule regardless of the season and stoppages in the work schedule throughout the relocation process for a lengthy period of time (i.e. 1 year to 2 years), depending on the size of the tree. The lager trees require longer time to develop new roots. A single lapse in the irrigation schedule during this period may result in a dead tree.
- The volume of water applied during each irrigation schedule on each tree must be inspected for consistency and be adjusted if needed throughout the duration of the project. The individual tree inspected at each monitoring must be identified and recorded. If an individual tree appears to be suffering, it must monitored separately from the other trees.
- The entire root balls of the relocated trees must be mulched with wood chips at an initial depth of about 15 cm, thereafter this mulch must be maintained at a depth of about 10 cm for a minimum of 5 years following the relocation.
- The root balls of the relocated trees must be monitored with a soil probe by trained individual or with at least moisture meters set at different depths of the ball (one set at about 30 cm in depth and other one set at 60-91 cm depth depending on the size of the tree) during the entire transplant period;.
- It is recommended that the relocated trees be fertilised on a annual basis (March/September) with fertilizer containing Nitrogen, Phosphorus and Potassium in order promote root development and growth.
- Following the transplanting, weekly records of monitoring must be kept for the period of the first 3 months.
- The volumes of water applied on the protected trees must be adjusted based on this monitoring. After 3 months records must be kept and made available for review for a minimum of 2 years for smaller trees at the time of transplant.
- For larger trees at the time of transplant, the volume of water applied must be monitored and records must be maintained for 5 years.
- An annual report on the survival status of the relocated trees must be done for 5 years.
- The report at the end of the 5th year, must be done by the competent personal and must include a recommendation concerning any continuing monitoring or special care.

4. PRINCIPLES FOR THE DESTRUCTION OF PROTECTED TREES

A permit for protected trees is required from the Department of Agriculture and Forestry to destroy (including picking, cutting, chopping, damaging or destroying flora) any listed and protected species identified by the ecological walkthrough survey undertaken for the optimised final Kiwano Battery Energy Storage System and Solar Photovoltaic Project layout, even if they do not leave the property. This permit should be obtained prior to any destruction operations being undertaken.

The permit for protected trees form is designed to provide for the following categories of cutting, destruction or damage of protected trees:

» Deforestation for change of land use: This can be for infrastructure development (e.g. a new urban development in a natural environment like a woodland, or for agricultural land use change (e.g. conversion of woodland into cultivated lands), or mining.
» Selective cutting/destruction or transplanting of individual trees or seedlings: This includes the cutting/destruction of single trees from amongst other trees, and the control of bush encroachment by herbicides, which is also a selective destruction process.
» The disturbance of a tree: This includes for instance the undercutting of the root system by earth removal works, e.g. for excavations, road-building, construction of buildings, etc.
» The pruning or delimbing (debranching) of trees: This category provides for instance for pruning of branches, or the removal of parts of the tree for some or other reason, e.g. where a branch is dangerous to a building

APPENDIX I-6: REVEGETATION AND REHABILITATION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the rehabilitation plan is to ensure that areas cleared or impacted during construction activities of the Kiwano Battery Energy Storage System and Solar Photovoltaic Project are rehabilitated with a plant cover that reduces the risk or erosion from these areas as well as restores some ecosystem function. The purpose of the rehabilitation plan for the site can be summarised as follows:

» Achieve long-term stabilisation of all disturbed areas to minimise erosion potential.
» Re-vegetate all disturbed areas with suitable local plant species.
» Minimise visual impact of disturbed areas.
» Ensure that disturbed areas are safe for future uses.

This Revegetation and Rehabilitation Plan should be closely aligned with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Plant Management Plan, and Plant Rescue and Protection Plan. Prior to commencement of construction, a detailed Rehabilitation Plan and Method Statement for the site should be compiled with the aid of a Rehabilitation Specialist.

2. RELEVANT ASPECTS OF THE SITE

The selected study area falls within the original extent of the Kalahari Karroid Shrubland (Unit Nkb 5) and the Bushmanland Arid Grassland (Unit Nkb 3) as defined by Mucina and Rutherford (2006). The former unit consists of flat, gravel plains, while the latter unit consists of Extensive to irregular plains on a slightly sloping plateau. In terms of vegetation structure, the Kalahari Karroid Shrubland has Karoo-related elements (shrubs) mixed with northern floristic elements, while the Bushmanland Arid Grassland is sparsely vegetated by grassland dominated by *Stipagrostis* species (Mucina and Rutherford 2006). Although the two habitat types (Transformed, Karroid Grassland (Site Alternative A) and Karroid Grassland (Site Alternative B)) of each of the alternative sites are overall the same, with the same dominant species as well as many of the same species, the numbers of geophytic species recorded from Site Alternative B were much higher, indicating that this site is somewhat more sensitive from a floristic perspective. No difference was noted in terms of faunal composition between the two alternatives. In such cases, areas with high numbers of potentially conservation important species should be avoided in favour of the site with the least number of conservation important species. In addition, sites closer to existing infrastructure (such as site alternative A) are preferred as fragmentation is thus kept to a smaller overall area.

A total of 295 indigenous plant species have been recorded in the Kiwano area according to the BODATSA database. Only 52 indigenous species could be confirmed to be present on site. A large portion of the study site is homogenous, in terms of floristic structure and species composition. Some areas of interest include flat rocky areas, which, although searched, did not support a different assemblage of species. Drainage lines were found, with species that do not vary from the surrounding vegetation but are rather the same species growing more densely.

Considering the anthropogenic activities and influences within the landscape, several negative impacts to biodiversity were observed within the assessment area. These include soil erosion and loss of habitat as a result of runoff; overgrazing; litter; and loss of indigenous flora and associated edge effects from existing infrastructure.

3. REHABILITATION METHODS

» Immediately after replacing topsoils in disturbed areas, the soil surface must be revegetated with a suitable plant cover.

» It is expected that soil seed banks of indigenous vegetation will be present to initiate initial vegetation cover. However, simply applying this topsoil to a well prepared rehabilitation site does not result in the same species richness and diversity as the surrounding areas. In some areas the natural regeneration of the vegetation may be poor and the application relevant of seed to enhance vegetation recovery may be required.

» Where possible, seed should be collected from plants present at the site during plant rescue operations. Indigenous seeds may also be harvested for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.

» Seed collection should be undertaken by a suitably qualified specialist who is familiar with the various seed types associated with the plant species and rehabilitation in the area.

» Seed collection may be done throughout the year as seed ripens, but can also be restricted to summer, when a large amount of the perennial seed should have ripened. The collection of unripe seeds will reduce the percentage germination thereby reducing the effectiveness of the rehabilitation efforts. Seeds should be stored in paper or canvas bags dusted with insecticide, and sown at the onset of the rainy season.

» Seed can be sown onto the soil, but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. Additional organic material may be added to the soil mix, if required, to assist with water retention during the early stages of seedling establishment.

» It should be ensured that the seed mix is as diverse as possible in the first season. After the first season, when pioneer plant communities have successfully established, attempts should be made to re-sow and replant the area with more perennial and woody species. It is a process that will require several follow-ups.

» Planting is dependent on species involved. Planting of species recommended for rehabilitation should be carried out as far as is practicable to coincide with the onset of the first significant rains. In general however, planting should

commence as soon as possible after construction is completed in order to minimise the potential for erosion.

» The final vegetation cover should resemble the original (non-encroached and indigenous) vegetation composition and structure as far as practicably possible.
» Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. Re-vegetation of disturbed surfaces must occur immediately after construction activities are completed.
» Once revegetated, areas should be protected to prevent trampling and erosion.
» No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated.
» Where rehabilitation sites are located within actively grazed areas, they should be fenced, this must be undertaken in consultation with the landowner.
» Fencing should be removed once a sound vegetative cover has been achieved.
» Any runnels, erosion channels or wash aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Proponent will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

» Composition and density of replanted vegetation, distinguishing between species introduced for initial revegetation only and species that are part of the pre-determined desirable end state.
» Associated nature and stability of surface soils.
» Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately.

The initial revegetation period post construction is estimated to be over a period of 6 months (minimum) to 12 months (maximum), or a time period specified by the rehabilitation specialist, particularly if planting of trees and shrubs occurs. The rehabilitation phase (including post seeding maintenance) should be at least

12 months (depending on time of seeding and rainfall) to ensure establishment of an acceptable plant cover is achieved (excluding invasive plant species or weeds).

As rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

» Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
» Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated;
» Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

If the plants have not established and the acceptable plant cover is not achieved within the specified maintenance period, maintenance of these areas shall continue until an acceptable plant cover is achieved (excluding alien plant species or weeds). Additional seeding or planting may be necessary to achieve acceptable plant cover. Hand seeding may have to be considered as an option in this case.

Monitoring of rehabilitation success and follow-up adaptive management, together with clearing of emerging alien plant species should continue for as long as considered necessary.

APPENDIX I-7: ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Kiwano Battery Energy Storage System and Solar Photovoltaic Project. The broad objectives of the plan includes the following:

» Ensure alien plants do not become dominant in parts or the whole site, through the control and management of alien and invasive species presence, dispersal & encroachment.
» Develop and implement a monitoring and eradication programme for alien and invasive species.
» Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

2. RELEVANT ASPECTS OF THE SITE

Within the project area invasive species – indigenous and alien - occur, which all have a potential of reproducing to such an extent that the ecosystem within and beyond the project area could be impaired.

The POSA database, along with the iNaturalist list of species for the area (research grade identifications) and the Mucina and Rutherford (2006) diagnostic species indicate that 295 species of indigenous plants are expected to occur within the project area and surrounding landscape. Fifteen alien invasive plants are expected to occur within the project area. A total of 52 species, representing 22 families of flora species were recorded during fieldwork within the assessment area.

The following listed alien invasive species was recorded near the study area:

Category 1b:

» *Datura* sp.

3. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared aliens must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. Over 80 alien invasive plant species have been recorded up to date within the grid representative of the Kiwano Battery Energy Storage System and Solar Photovoltaic Project, according to the POSA Database. One of these species was recorded near the site and ascribed to one of the following categories:

» Category 1: Prohibited and must be controlled.
» Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
» Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726, 18 September 2020 (updated in 24 February 2021). The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

» **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
» **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a

government sponsored invasive species management programme. No permits will be issued.

» **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Cat 2 plants to exist in riparian zones.

» **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Cat 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien species that are regulated in terms of the the National Environmental Management: Biodiversity Act, 2004 (Act no. 10 of 2004), which supercedes the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA). As a result, The Alien and Invasive Species (AIS) Regulations became law on 1 October 2014 and has since been updated on 18 September 2020.

4. ALIEN PLANT MANAGEMENT PRINCIPLES

4.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species shortly after they arrive in the project area. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When new Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

4.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and

other possible control agents should be considered in the action plans for each site/species. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

4.3. General Clearing & Guiding Principles

Alien control programs are long-term management projects and should include a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of aliens are easily dispersed across boundaries by wind or water courses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

» **Mechanical control**

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

» **Chemical Control**

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien invasion and may also be ineffective for many woody species which resprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of in a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010)

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, forestry and Fisheries.

- **Biological control**

Biological weed control consists in the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plants reproductive capacity. In certain instances, the reproductive capacity is reduced to

zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted. Biocontrol should not be performed without the input from the department as it can result in long-term damage to the surrounding habitat and vegetation.

4.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an ongoing monitoring programme for construction phase to detect and quantify any alien species that may become established and identify the problem species.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled once recorded throughout the entire site during construction and operation.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these are such that break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.
- Alien management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.

» No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.
» During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All aliens identified should be cleared using appropriate means.

4.5. Monitoring

In order to monitor the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide and assessment of the magnitude of alien invasion on site as well as an assessment of the success of the management programme.

In general, the following principles apply for monitoring:
» Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
» Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
» It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien species	Preconstruction & monthly thereafter
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

Operation Phase

Monitoring Action	Indicator	Timeframe
Document alien species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

APPENDIX I-8: TRAFFIC AND TRANSPORTATION GUIDING PRINCIPLES

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TRAFFIC AND TRANSPORTATION GUIDING PRINCIPLES

1. PURPOSE

The purpose of this Traffic and Transportation Management Guide is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Kiwano Solar PV Facility development area. The objectives of these guiding principles include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project area.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- Prior to the commencement of construction, the contractor must develop a detailed Transport Management Plan (TMP) based on relevant traffic volumes and road carry capacity.
- The transport contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the project area. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes.
- All employees must attend an environmental training program (e.g., toolbox talks) by the Environmental Officer (EO). Through this program, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
- The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.

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- Adjacent landowners must be notified of the construction schedule.
- Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
- Signs must be posted in the project area to notify landowners and others of the construction activity.
- Flagging must be provided at access points to the site and must be maintained until construction is completed on the site.
- Speed limits must be established prior to commencement of construction and enforced over all construction traffic.
- Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- Project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- Drivers must have an appropriate valid driver's license and other operation licences required by applicable legislation.
- All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear-view mirror, safety belts, signal indicators, and lenses.
- Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- No deviation from approved transportation routes must be allowed unless roads are closed for reasons outside the control of the contractor.
- Impacts on local communities must be minimised. Consideration where possible should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

3. MONITORING

- The principal contractor must ensure that all vehicles adhere to the speed limits.
- A speeding register must be kept with details of the offending driver.
- Repeat offenders must be penalised.
- Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

APPENDIX I-9: STORMWATER AND EROSION MANAGEMENT PLAN

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STORM WATER AND EROSION MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes, it is possible to develop storm water management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate storm water management are increased erosion risk and risks associated with flooding. Therefore, this Stormwater Management Guide and the Erosion Management Plan are closely linked to one another and should be managed together.

This Stormwater Management Guide addresses the management of stormwater runoff from the development area and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of stormwater management measures and infrastructure are:

- Topography and slope gradients.
- Placing of infrastructure and infrastructure design.
- Annual average rainfall.
- Rainfall intensities.

The objective of these guiding principles is therefore to provide measures to address runoff from disturbed portions of the development area, such that they:

- Do not result in concentrated flows into natural watercourses i.e., provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
- Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
- Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Stormwater Management Guide must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

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2. RELEVANT ASPECTS OF THE SITE

The topography or terrain morphology of the region is broadly described as slightly undulating plains dissected by prominent rocky chert ridges. The slope of the entire study area is generally even with very gradual drops towards the watercourses traversing the study area (hence the term undulating).

2.1. Strategic Water Source Areas

Strategic Water Source Areas (SWSAs) are defined as areas of land that:

- Supply a disproportionate (i.e., relatively large) quantity of mean annual surface water runoff in relation to their size and so are considered nationally important
- Have high groundwater recharge and where the groundwater forms a nationally important resource.
- Meet both criteria mentioned above.

They include transboundary Water Source Areas that extend into Lesotho and Swaziland. The development area is noted located in a SWSA.

Freshwater Features:

Construction of the PV facility could result in the encroachment into water resources and result in the loss or degradation of the wetland system in a 500 m regulated area, most of which are functional and provide ecological services. These disturbances could also result in the infestation and establishment of alien vegetation which would affect the functioning of the systems. Leaks and/or spillages could result in contamination of the receiving water resources. Contaminated water resources are likely to have an effect on the associated biota. An increase in stormwater runoff could result in physical changes to the receiving systems caused by erosion, run-off and also sedimentation, and the functional changes could result in changes to the vegetative structure of the systems.

3. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various stormwater management principles should be considered including:

- Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion.
- Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, and silt fences). As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary.
- Minimise the area of exposed bare soils to minimise the erosive forces of wind, water and all forms of traffic.

- Ensure that development does not increase the rate of stormwater flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development stormwater flow should not exceed the capacity of the culvert. To assist with the stormwater run-off, gravel roads should typically be graded and shaped with a 2-3% cross fall back into the slope, allowing stormwater to be channelled in a controlled manner towards the natural drainage lines and to assist with any sheet flow on the project area.
- Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point. Provide detention storage on the road and/or upstream of the stormwater culvert.
- Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
- Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the stormwater system.
- Preferably all drainage channels on the project area and contained within the larger area of the property (i.e., including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed

design phase and should be based on the underlying principles of this Stormwater Management Guide. This should include erosion control measures. Requirements for project design include:

- Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction) must be indicated within the Final/Updated Stormwater Management Plan.
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Stormwater Management Plan.
- The drainage system for the project area should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying stormwater around and away from infrastructure.
- Procedures for stormwater flow through a project area need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
- An on-site Engineer or Environmental Officer (EO) is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
- The Engineering, Procurement and Construction (EPC) Contractor holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Stormwater Control Method Statement to ensure that all construction methods adopted on the project area do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on the project area, must be indicated in the Stormwater Control Method Statement and shall ensure that no construction work takes place before the relevant stormwater control measures are in place.

An operations phase Stormwater Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

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1. PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this Erosion Management Plan, the Storm water Management Plan and the Revegetation and Habitat Rehabilitation Plan are closely linked to one another and should not operate independently but should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

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

This plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The topography or terrain morphology of the region is broadly described as slightly undulating plains dissected by prominent rocky chert ridges. The slope of the entire study area is generally even with very gradual drops towards the watercourses traversing the study area (hence the term undulating).

Soil erosion is a frequent risk associated with solar facilities on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. All areas where vegetation is removed from the soil surface in preparation for the infrastructure construction will result in exposed soil surfaces that will be prone to erosion. Both wind and water erosion are a risk, as the development area falls within a region that is characterised by a mean annual precipitation that reaches approximately 560mm.

During the operation phase, the areas where vegetation was cleared will remain at risk of soil erosion, especially during a rainfall event when runoff from the cleared surfaces will increase the risk of soil erosion in the areas directly surrounding the project area.

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

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

- Protect the land surface from erosion.

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

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

3.1. On-Site Erosion Management

General factors to consider regarding erosion risk at the project area include the following:

- Reduction of a stable vegetation cover and associated below-ground biomass that currently increases soil surface porosity, water infiltration rates and thus improves the soil moisture availability. Without the vegetation, the soil will be prone to extensive surface capping, leading to accelerated erosion and further loss of organic material and soil seed reserves from the local environment.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
- The extent of disturbance will influence the risk and consequences of erosion. Therefore, site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
- Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
- Where necessary, new roads constructed should include water diversion structures with energy dissipation features present to slow and disperse the water into the receiving area.
- Roads used for project-related activities and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.
- Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
- All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.

- Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- Activity at the project area after large rainfall events when the soils are wet and erosion risk is increased should be reduced. No driving off of hardened roads should occur at any time, and particularly immediately following large rainfall events.
- Topsoil should be removed and stored in a designated area separately from subsoil and away from construction activities. Topsoil should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation in cleared areas.
- Regular monitoring of the project area for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The Environmental Control Officer (ECO) will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

3.1.1 Erosion control mechanisms

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

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

3.2. Engineering Specifications

A detailed engineering specifications Storm water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed

design phase and should be based on the underlying principles of the Storm water Management Plan and this should include erosion control measures. Requirements for project design include:

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

3.3. Monitoring

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

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

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

- Select a system/mechanism to treat the erosion.
- Design and implement the appropriate system/mechanism.

- Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- Continue monitoring until the area has been stabilised.

4. CONCLUSION

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

During the construction phase, the contractor must prepare an Erosion Control Method Statement to ensure that all construction methods adopted on the project area do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of this plan are met before, during and after construction. The designated responsible person on the project area, must be indicated in the Method Statement and shall ensure that relevant erosion control measures are in place throughout the construction phase.

An operation phase Erosion Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

APPENDIX I-10: WASTE MANAGEMENT PLAN

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WASTE MANAGEMENT PLAN

1. PURPOSE

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

This WMP has been compiled as part of the project Environmental Management Programme (EMPr) and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated once further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages. This plan should be updated throughout the lifecycle of the Kiwano Solar PV Energy Facility, as required, in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the project should be compiled by the Contractor.

2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the Kiwano Solar PV Energy Facility will generate construction solid waste, general waste and hazardous waste during the lifetime of the facility.

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

- Concrete waste generated from spoil and excess concrete.
- Contaminated water, soil, rocks, and vegetation due to hydrocarbon spills.
- Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, and waste ink cartridges.
- Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, Polyvinyl chloride (PVC), Low-density polyethylene (LDPE)) and cardboard.
- Organic waste from food waste as well as alien and endemic vegetation removal.
- Sewage from portable toilets.

- Inert waste from spoil material from site clearance and trenching works.

2.1. Panel Cleaning

It is anticipated that the PV panels will be washed four times a year during operation. Only clean water (i.e., with no cleaning products), or non-hazardous biodegradable cleaning products, will be utilised for the washing of panels. Wastewater generated by washing panels will be collected and recycled for future use, or alternatively, in the event that an environmentally friendly non-hazardous biodegradable cleaning product is utilised, wastewater can be allowed to run-off under the panels.

2.2. Effluent and Wastewater

During the construction and operation phases, mobile chemical toilets or a conservancy tank will be placed within the development area for use by contractors. These facilities will be maintained and serviced regularly by an appropriate waste contractor. Any other effluent discharge during construction and operation will be collected in sealed containers/tanks and collected by a registered service provider (i.e., the Local Municipality/Contractor) to be disposed of at an approved facility off-site.

Alternatively, employees may be requested to utilise existing ablution facilities in close proximity to the PV Facility.

2.3. Waste

All waste generated on site will be handled in accordance with the contractor's Waste Management Plan. Solid waste generated during construction will mainly be in the form of construction material, excavated substrate and domestic solid waste. Cardboard waste will be produced from panel packaging, which will be compacted on site prior to removal. Other wastes include rubber caps on panel edges, wooden pallets, and plastic wrapping (all related to the panel packaging). Waste will be disposed of in either waste skips and/or scavenger proof recycling bins (where possible) and temporarily placed in a central location for removal by an appropriate contractor. Where possible, waste will be recycled. Non-recyclable solid construction waste will be temporarily held in skips or other appropriate waste containers to be disposed of at an appropriately licensed landfill site. Any other waste and excess material will be removed once construction is complete and disposed of at a registered waste facility.

During construction, use of the following hazardous substances is anticipated: paint, grease, petrol / diesel for trucks, cranes, bulldozers etc. Limited amounts of transformer oils and chemicals will be used. Dangerous goods required to be stored during construction (e.g., limited quantities of fuel, oil, lubricants etc.) will be stored in compliance with relevant legislation (i.e., stored on covered and bunded areas / bin, and disposed of at a registered hazardous waste site). Hazardous waste will be appropriately stored and disposed of.

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3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

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

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in Government Notice Regulation (GNR) 926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on site. Such an approach is illustrated in Figure 1.

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

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

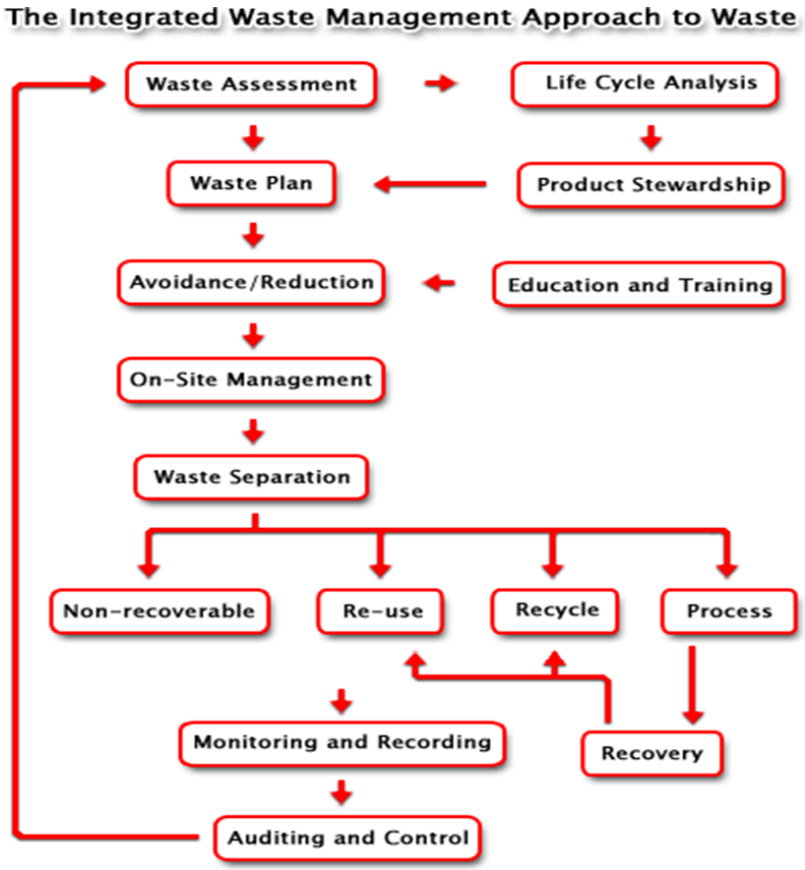

Figure 1: Integrated Waste Management Flow Diagram

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

4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer.

4.1.1. Waste Assessment / Inventory

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

4.1.2. Waste collection, handling, and storage

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e., separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- Waste manifests and waste acceptance approvals (i.e., receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- Portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable, and hazardous waste.
- A dedicated waste area must be established on the project area for the storage of all waste streams before removal from area. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e., paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to South African Bureau of Standards (SABS) requirements and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity, and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the largest tank.
- Take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.
- Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- A dedicated waste management team must be appointed by the principal contractors' Safety, Health and Environment (SHE) Officer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.

- All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

4.1.3. Management of waste storage areas

- Waste storage must be undertaken in accordance with the relevant Norms and Standards.
- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and contaminated storm water.
- Collection bins placed around the project area and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked, or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- If any leaks occur in the bund, these must be amended immediately.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- No mixing of hazardous and general waste is allowed.

4.1.4. Disposal

- Waste generated on the project area must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process, however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
- Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and Environmental Control Officer (ECO).

4.1.5. Record keeping

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

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

4.1.6. Training

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

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

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

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5. Monitoring of Waste Management Activities

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

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

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

APPENDIX I-11: EMERGENCY PREPAREDNESS PLAN

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EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of the construction phase detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

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

This WMP has been compiled as part of the project Environmental Management Programme (EMPr) and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated once further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages. This plan should be updated throughout the lifecycle of the Kiwano Solar PV Energy Facility, as required, in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the project should be compiled by the Contractor.

2. RELEVANT ASPECTS OF THE SITE

There are two site alternatives that have been assessed as part of the BA process i.e. Site A and Site B. Refer to Figure 2-2 for the location of the site alternatives. The proposed development (site alternative A and B) will be located on Erf 1080 Olyvenhouts Drift Settlement Agricultural Holding approximately 14km southwest of the Upington Central Business District (CBD). Details relating to Erf 1080

Table Error! No text of specified style in document.**-1: Development property details**

Property No. (Erf No.)	1080
Portion of Property	0
Property Type	Agricultural Holding
Holding Area	Olyvenhouts Drift Settlement Agricultural Holding
Registration Division	Gordonia RD
Surveyor-General Cadastral Code	C02800130000108000000
Zoning	Agriculture
Property Area Size (ha)	8385.57
Development Area Size (ha), excl. linear infrastructure.	~140
Property Owner	Eskom Holdings SOC Limited
Title Deed Number	T3236/2010
Registration Date	15/12/2010

Erf 1080 borders the N14 National Road at its southern boundary. Regional road R3276 turns off the N14, in a north-westward direction and bisects Erf 1080 through its interior.

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Eskom proposes to construct and install a solar PV plant, grid-scale battery storage, substation, powerline, pipeline and an access road on Olyvenhouts Drift Settlement Agricultural Holding 1080 Portion 0 in Upington, Northern Cape. A Site Layout Plan is presented in Figure 2 7. The proposed development will also include the following infrastructure:

Feeder Bay at Upington MTS

The proposed Solar PV and BESS development will utilise the existing 132kV feeder bay at Upington MTS for the Upington/Kiwano 132kV line connection. No new infrastructure will therefore be required at the Upington MTS.

Solar PV installation

Eskom propose the installation of a solar PV facility with an envisaged capacity of 58 MW. The total site area envisaged for the PV installation will measure up to approximately 1 150 000 m2 (115 hectares). The Solar PV facility will include the following infrastructure:

- Two (2) x 40 MVA 132/22 kV transformers with associated 22 kV switchgear and control plant
- Solar PV plant with the output rating of 58 MW
- Establishment of the PV plant POC on the 132 kV between the PV plant and Kiwano 132kV busbar
- Separate statistical metering points to be commissioned for the BESS plant and the PV plant
- The BESS and solar PV plant are to be positioned and configured in isolation of each other, in terms of connections and dependency

The medium voltage (MV) / low voltage (LV) transformation and LV equipment for BESS and PV must be designed by the Engineering, Procurement and Construction (EPC) Contractor, according to Eskom specifications.

The envisaged area for the solar PV modules, which will convert solar radiation directly into electricity, is expected to cover an area of approximately 450 000 m2. The solar PV modules will be elevated above the ground, and will be mounted on either fixed tilt systems, or tracking systems (comprised of galvanised steel and aluminium). The Solar PV modules will be placed in rows in such a way that there is allowance for a perimeter road and security fencing along the site boundary, and access roads in between the PV module rows.

Eskom propose to install a Battery Energy Storage System (BESS) facility with an envisaged capacity of 40 MW / 200 MWh. The BESS facility will be located in the south-eastern section of the development site (Figure 2 7) and will integrate at the proposed Kiwano substation together with the Solar PV facility. The BESS facility will include the following infrastructure:

- 2 x 40 MVA 132/22 kV transformers with associated 22 kV switchgear and control plant, and connect at Kiwano 132kV busbar
- Establish the BESS POC on the 132 kV between the BESS plant and Kiwano 132 kV busbar

- Build the BESS plant with an output rating of 40 MW / 200 MWh

The use cases for Kiwano BESS are ancillary services support and energy support. The custodian of ancillary services and energy support service is the System Operator. The BESS will have capability to charge from the proposed PV as well as from the grid. The dispatching of the BESS will be under the custodianship of the System Operator.

Generally, the BESS will be expected to charge during the low load period at night (23h00 to 04h59) and be available to provide ancillary and energy services during the day (05h00 to 22h59). The BESS is required to have flexibility for the System Operator to dispatch it for ancillary services and energy as and when required, for the good of the grid. The charging power will be limited by the capacity of the 2 x 40 MVA 132/22 kV transformation at Kiwano Substation. Thus the maximum charging rate of 80MW may not be exceeded (Eskom, 2020). It must be noted that the BESS must also be capable of charging outside the stated period when required by the System Operator.

To cater for the BESS round trip efficiency (RTE), the storage will be allowed to charge for durations longer than 5 hours to ensure that the required and contracted power and energy output of 40 MW / 200 MWh is available at the Points of Connection (POC). From the network capacity perspective, the assessments will be done such that the BESS is capable of discharging at any given time of the day via the Distribution network when dispatched to do so. The required BESS discharge capacity is 40 MW / 200 MWh for the Kiwano BESS.

In terms of the size requirements for the BESS facility, 63 m2 containers are used to store BESS infrastructure within the plant. After the BESS densities per 63 m2 container for a number of manufacturers were considered, the minimum BESS density per 63 m2 container was found to be 2 MWh. Assuming the worst-case density of 2 MWh per 63m2 container and 2 m spacing between containers, the required space for the 40 MW / 200 MWh BESS plant is 10 620 m2.

Kiwano 132 kV substation

Eskom proposes to construct a 132 kV substation with 5 feeder bays on the eastern extent of the development site. This substation will be known as the Kiwano 132 kV substation and will include the following infrastructure:

- 132kV Double Bus-Bar
- 132kV Bus-Coupler
- 132kV incomer feeder bay
- Establish 2 x 132 kV feeder bays for the BESS connection
- Establish additional 2 x 132 kV feeder bays for the PV integration
- Spatial provision for a minimum of additional 4 x 132 kV feeder bays for future use

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Kiwano Substation will be a dedicated substation to integrate the proposed BESS and PV projects into the network. No known local constraints that would prevent Kiwano BESS and PV from being able to export the 40 MW BESS and 58 MW PV were identified at the Kiwano site (Eskom, 2020).

It is further proposed that adequate space be allowed at Kiwano substation to accommodate additional 132kV line bays for future developments, should a need arise. It is envisioned that a total energy storage capacity of 340 MW / 1 360 MWh can be deployed at the proposed Kiwano substation without any additional network capacity upgrade on the Distribution network through future upgrades as capacity requirements increase with future renewable energy developments.

For the substation site requirements, the dimensions of the neighbouring Upington MTS site were assumed for Kiwano substation. Upington MTS is a 300 m x 300 m substation, therefore the Kiwano substation site is proposed to be 90 000 m2 (9 ha).

Single Twin-Tern 132 kV overhead line

The solar PV and BESS facility will include the construction of a 132kV single twin-turn overhead powerline on a double circuit support structure connecting the Kiwano substation to the Upington substation in order to evacuate power generated at the facility. Tower structures that will be utilised include S/C Angle Strain Structure at bend points along the powerline alignment, and S/C Suspension Structure for inline structures- between bend points. This line is rated at 408 MVA at 70°C templating.

The proposed line will be utilised in future to facilitate additional generation connections in the area from future and currently approved renewable projects and the Kiwano substation will be a collector substation. This will assist in avoiding having many lines running to and accessing Upington MTS which could lead to physical space constraints in future. Moreover, Upington/Kiwano 132kV line will accommodate future Kiwano BESS expansions. As such, a 132kV double circuit structure design with the provision of stringing only one circuit for the commissioning of Kiwano BESS and PV is proposed. The 2nd circuit is to be strung in future when the demand for more capacity at Kiwano materialises.

The powerline alignment has been proposed to follow existing infrastructure as closely as possible and to cover the shortest distance between the Kiwano and Upington substation as is technically feasible.

Due to the scale and nature of this development, it is anticipated that the following risks could potentially arises during the construction and operation phases:

- Fires.
- Leakage of hazardous substances.
- Storage of flammable materials and substances.
- Flood events.
- Accidents.
- Natural disasters.

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3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

I. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the Environmental Control Officer (ECO). In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

- All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
- All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
- No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.

- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

II. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk.
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

a. <u>Procedures for containing and controlling the spill (i.e. on land or in water)</u>

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

<u>Containment of Spills on Land</u>

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Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies located outside of the project site. The following methods could be used:

- Dykes - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary, and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.
- Trenches - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

b. Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c. Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

I. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.

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4. If not safe to extinguish, contain fire.
5. Notify the Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.
7. Record the incident on the company database or filing register.

II. Procedures

Because large scale fires may spread very fast it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguishers, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a. Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

- They have not been trained or instructed in the use of a fire extinguisher.
- They do not know what is burning.
- The fire is spreading rapidly.
- They do not have the proper equipment.
- They cannot do so without a means of escape.
- They may inhale toxic smoke.

b. Reporting procedures

In terms of the requirements of National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality.

- Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
- The site manager must have copies of the Report form to be completed.

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4. PROCEDURE RESPONSIBILITY

The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this Plan, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness