



ENVIRONMENTAL MANAGEMENT PROGRAMME

REVISION 2

for

KENHARDT PV2 BATTERY ENERGY STORAGE SYSTEM

on

Remaining Extent of Onder Rugzeer Farm 168

In terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended & Environmental Impact Regulations 2014

Prepared for Applicant: Scatec Solar SA 350 (Pty) Ltd

By: Cape EAPrac

Report Reference: KAI663/26

Department Reference: 14/12/16/3/3/2/838

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PURPOSE OF THIS REPORT:

For implementation by EPC & O&M / BESS contractor

APPLICANT:

Scatec Solar SA 350 (Pty) Ltd

CAPE EAPRAC REFERENCE NO:

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ENVIRONMENTAL MANAGEMENT PROGRAMME

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2010

Kenhardt PV2– Battery Energy Storage System

Remaining Extent of Onder Rugzeer Farm 168.

Submitted for:

Stakeholder Review & Comment

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ORDER OF REPORT

Environmental Management Programme - Legislated Requirements Checklist

Environmental Management Programme for Battery Energy Storage– Main Report

- Appendix A:** Site Development Plan (Scatec Solar SA 350 (Pty) Ltd, 2020).
- Appendix B:** Environmental Management Programme for main facility (CSIR, 2015)
- Appendix C:** Environmental Authorisation for main facility (DEA, 07.08/2017)
- Appendix D:** Battery Energy Storage Risk Assessment (Cape EAPrac, 2020)

ENVIRONMENTAL MANAGEMENT PROGRAMME LEGISLATIVE REQUIREMENTS

Appendix 4 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Management Programme (EMPr). The checklist below serves as a summary of how these requirements were incorporated into this EMPr.

Compliance checklists in terms of these requirements are included in table 1 below.

Table 1: EMPr compliance with Appendix 4 of Regulation 982

Requirement	Description
<p>Details of the EAP who prepared the EMPr; and;</p> <p>The expertise of the EAP to prepare an EMPr, including a curriculum vitae.</p>	<p>This EMPr was prepared by Dale Holder of Cape EAPrac who has more than 13 years' experience as an Environmental Assessment Practitioner. A company profile of Cape EAPrac as well as the CV of the EAP is attached to the Amendment Assessment Report.</p>
<p>A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.</p>	<p>This EMP covers all aspects of the project as currently under assessment, namely the addition of a battery energy storage system for the Authorised Kenhardt PV 1.</p> <p>This EMPr for the Battery Energy Storage System must be read in conjunction with the EMPr for the overall facility attached in Appendix B of this report. The main facility EMPr attached in Appendix B deals with the other components of the authorised development such as:</p> <ul style="list-style-type: none"> • PV Arrays and Mounting Structures; • inverter stations; • on-site substation; • grid connection • auxiliary buildings, • laydown area; • internal electrical reticulation network (underground cabling); • internal road / track network; • access road; • electrified perimeter fencing.
<p>A map at an appropriate scale which superimposes 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</p>	<p>The Site Development Plan attached in Appendix A, includes the sensitive features identified by participating specialists and indicates how these have been incorporated.</p> <p>The "exclusion areas" identified on this SDP as well as all areas outside of the perimeter fencing of the BESS are considered as no go areas for construction activities. Please refer to the main facility EMPr attached in appendix B for details relating to the environmental sensitivities applicable to the remainder of the development.</p>

Requirement	Description
<p>A description of the impact management objectives, 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 the phases of the development including –</p> <ul style="list-style-type: none"> (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities. 	<p><u>Section 3 of this EMPr.</u></p>
<p>A description and identification of impact management outcomes required for the aspects contemplated above.</p>	<p><u>Table 5 in section 2 of the EMPR</u></p>
<p>A description of the proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to –</p> <ul style="list-style-type: none"> (i) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable. 	<p><u>Throughout the report. Summarised in Section 13 of the EMPr.</u></p>
<p>The method of monitoring the implantation of the impact management actions contemplated above.</p>	<p><u>Section 8.</u></p>
<p>The frequency of monitoring the implementation of the impact management actions contemplated above.</p>	<p><u>Section 8.</u></p>
<p>An indication of the persons who will be responsible for the implementation of the impact management actions.</p>	<p><u>Figures 1 & 2 and Section 8</u></p>
<p>The time periods within which the impact management actions must be implemented.</p>	<p>Throughout the EMPr</p>
<p>The mechanism for monitoring compliance with the impact management actions.</p>	<p><u>Section 8</u></p>
<p>A program for reporting on compliance, considering the requirements as prescribed in the Regulations.</p>	<p><u>Section 8</u></p>
<p>An environmental awareness plan describing the way –</p>	<p><u>Section 4.2 and 4.3</u></p>

Requirement	Description
(i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	
Any specific information that may be required by the competent authority.	During the pre-application meeting for the proposed project, the competent authority requested that a high-level risk assessment form part of the revised EMPr for the facility. This high-level risk assessment is attached in Appendix D.

DEA COMMENT ON EMPR

The competent authority provided the following comment with regards to the EMPr

Comment	Response / Reference
(e)(i) Please be informed that the following content must be incorporated within the EMPr's as indicated in Appendix 4 of the EIA regulations 2014, as amended:	Compliance with these requirements are detailed in the remainder of this table.
(a) Details of the EAP who prepared the EMPr and the expertise of the EAP to prepare and EMPr, including a curriculum vitae.	This EMPr was prepared by Dale Holder of Cape EAPrac who has more than 13 years' experience as an Environmental Assessment Practitioner. A company profile of Cape EAPrac as well as the CV of the EAP is attached to the Amendment Assessment Report
(b) A map at an appropriate scale which superimposes the proposed activity, its associated infrastructure, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	As confirmed by all participating specialists, the proposed BESS Amendments do not encroach on any of the sensitive features identified in their original studies. Compliance with this condition remains the same as for the overall facility EMPr (Appendix C)
(c) A 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 – - Planning and design; - Pre construction activities; - Construction activities; - Rehabilitation and; - Operation	The environmental management outcomes are summarised at the beginning of each section and the actions to achieve those outcomes are dealt with beneath each outcome.
(d) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) of appendix 4 of the EIA regulations 2014, as amended, will be achieved.	The environmental management outcomes are summarised at the beginning of each section and the actions to achieve those outcomes are dealt with beneath each outcome.
(e) Where applicable, include actions to – avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.	This is included in the BESS Risk Assessment Appendix D.
(g) Comply with any applicable provisions of the Act, regarding closure, where applicable.	The legislative requirements applicable to the project are summarised in section 3
(h) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable.	The applicant will be responsible for these provisions during the decommissioning stage. Construction phase

Comment	Response / Reference
	rehabilitation in respect of the proposed amendments are limited for the scope of the proposed amendments.
l) The method of monitoring the implementation of the impact management actions.	This is detailed in section 7 of the report
J) The frequency of monitoring the implementation of the impact management actions.	This is detailed in section 7 of the report
k) An indication of the persons who will be responsible for the implementation of the impact management actions.	This is detailed in section 1.3 of the report
l) The time periods which the impact management actions must be implemented.	These are applicable to the applicable phase to which they apply.
m) The mechanism for monitoring compliance with the impact management actions	This is detailed in section 7 of the report
n) A programme for reporting on compliance, taking into account the requirements as prescribed by the regulations.	This is detailed in section 7 of the report

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Figure 3: Location of the proposed BESS within the Authorised Footprint of Kenhardt PV2. **Error! Bookmark not defined.**

ABBREVIATIONS

AC	Alternating Current
Alt.	Alternative
BESS	Battery Energy Storage System
CARA	Conservation of Agricultural Resources Act (43 of 1983)
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
DEFF	Department of Environment Forestry and Fisheries
DEANC	Department of Environmental Affairs & Nature Conservation (Northern Cape)
DEIR	Draft Environmental Impact Report
DoE	Department of Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Impact Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
ESA	Environmental Site Agent / Ecological Support Area
EMPr	Environmental Management Programme
ER	Engineers Representative
ha	Hectare
I&APs	Interested and Affected Parties
IPP	Independent Power Producer
KI / Klt	Kilo Litre
Km	Kilometre
Km/h	Kilometres per hour
kV	Kilo Volt
LLRC	Low Level River Crossing
lt	Litre
m	Metre
m²	Metres squared
m³	Metres cubed
MW	Mega Watt
No.	Number
PM	Post Meridiem; "Afternoon"
PV	Photovoltaic
REds	Road Environmental Dust Suppressant
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SKA SA	Square Kilometre Array South Africa
WULA	Water Use Licence Application

1. INTRODUCTION

Cape EAPrac has been appointed by the Applicant, Scatec Solar SA 350 (Pty) Ltd, as the independent **Environmental Assessment Practitioner** (EAP) responsible for the revision of the **Environmental Management Programme** (EMPr) for the Kenhardt PV2 development on the Remaining Extent of Onder Rugzeer Farm 168. The purpose of this revision is to include the relevant environmental management actions and outcomes associated with the proposed addition of a Battery Energy Storage System (BESS) within the authorised footprint of the facility.

This EMPr deals specifically with the proposed BESS, and must be read in conjunction with the EMPr for the main facility as appended in Appendix B. The provisions within the original EMPr (Appendix B) and the existing Environmental Authorisation (EA) remain in force and are applicable to the remainder of the Facility. Furthermore, this EMPr must be read in conjunction with the BESS Risk Assessment attached in Appendix D as well as the amendment to the original EA (once it is issued).

This EMPr is a management tool used to minimise and mitigate the potential environmental impacts associated with the BESS, while at the same time, maximising the benefits.

A detailed description of the proposed project and a description of the affected environment are provided in the Amendment Assessment Report compiled by Cape EAPrac (KAI663/20) which should be referred to where necessary.

This EMPr is submitted in compliance with the National Environmental Management Act (NEMA, Act 107 of 1998, as amended) for the proposed amendment to the EA for this facility.

It must be noted that the EA for this facility includes a condition (condition 16) that requires that the final EMPr be submitted to the competent authority for decision making. This condition remains in force regardless of the submission of this Revised EMPr.

1.1. EMPr Approval & Revisions

This EMPr must be read in conjunction with the original EMPr (Appendix B) and once authorised, becomes a legally binding document. Contravention with this document constitutes a contravention with the Environmental Authorisation as amended.

The EMPr may however require further amendments at certain stages through the lifespan of the project. The incidences which may require the amendment of this document include:

- Incorporation of conditions of approval contained in the Environmental Authorisation or any amendment thereto;
- Outcome of a technology specific BESS risk assessment;
- Changes in environmental legislation;
- Results of post-construction monitoring and audit;
- Per instruction from the competent authority; and
- Changes in technology and best practice principles.

Should an amendment of any of the EMPr objectives be required, an application for this must be submitted to the competent authority and approved before such changes are implemented. Changes to the EMPr actions may be affected without the need for an amendment process,

subject to approval by the ECO. In such an instance, a formal amendment will have to be affected as part of the first environmental audit report.

1.2. Contractual Obligation

This EMPr must be included in ALL tender and contract documentation associated with this project. It must be noted that this EMPr is relevant and binding on the activities associated with the construction and operation of the BESS. The overall EMPr in Appendix B is relevant and binding on the remainder of the activities associated with the development as a whole.

For the Construction phase, the EPC Contractor (including any sub-contractors) must ensure that sufficient budget is allocated to the implementation of this EMPr until such time as final rehabilitation is completed.

For the operational phase, the O&M Contractor (including any sub-contractors) must ensure that sufficient budget is allocated to the Operational requirements in this EMPr.

1.3. Organisational Requirements

In order to ensure effective implementation of the EMPr, it is necessary to identify and define the organisational structure for the implementation of this document.

The proposed organisational structure during **construction** is as follows:

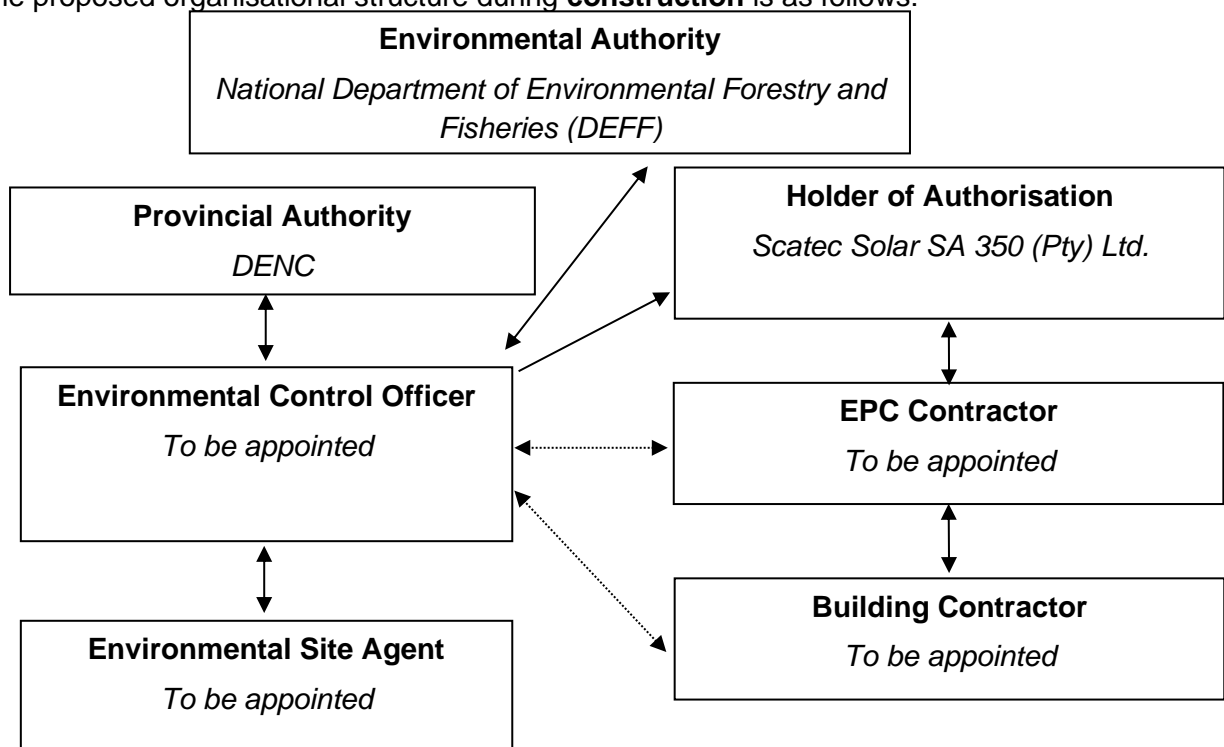


Figure 1: EMPr organisational structure during the construction phase

The proposed organisational structure during the **operation** of the facility is as follows:

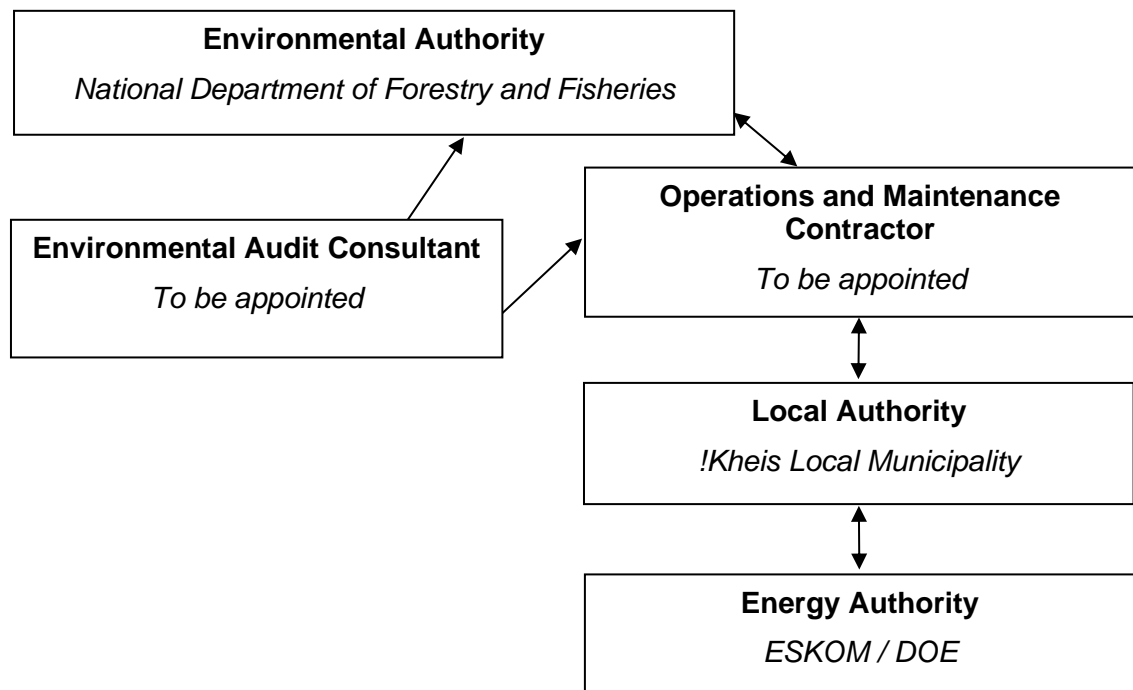


Figure 2: EMPr organisational structure during the operation phase.

This Organisational chart should be updated once the relevant parties are appointed in terms of this EMPr.

Details regarding the roles and responsibilities of the various parties in these organisational structures are included in Section 2 below.

1.4. Project Proposal

The proposal associated with this amendment includes the construction and operation of a BESS of up to 6ha within the authorised footprint of the facility.

The positioning of the BESS followed a risk adverse approach whereby the sensitive features identified by participating specialists were avoided when determining its position within the authorised project footprint.

1.5. Approach to the EMPr

This EMPr addresses the environmental management of the four key phases of the project, namely:

- The design and pre-construction phase;
- The construction phase;
- The operation phase; and
- The closure and decommissioning phase.

These four phases can generally be categorised as follows.

1.5.1 Pre-construction Phase

The pre-construction phase of the development refers to the final layout design considerations and the site preparation (fine-scale design and placement, survey of development site and

associated infrastructure, demarcation of no-go areas, establishment of site camp and laydown area).

1.5.2 Construction Phase

The construction phase of the development refers to the vegetation and earthworks as well as the actual construction of the BESS.

1.5.3 Operation Phase

The operational phase commences once the facility starts providing power into the national grid (Contract Operational Date). There may be a stage where both construction and operation activities overlap i.e. occur on site at the same time. The operation phase includes the monitoring and maintenance activities required for the efficient functioning of the facility.

1.5.4 Closure and Decommissioning Phase

Closure and decommissioning refer to the decommissioning and recycling of the BESS at the end of their operational lifespan (after the period defined in the Power Purchase Agreement, or before).

2 ROLES AND RESPONSIBILITIES

Throughout the lifespan of this project, several individuals and entities will fulfil various roles and responsibilities to ensure the effective implementation of this EMPr. The key roles and responsibilities are detailed in the table below.

Table 2: Roles and responsibilities regarding the implementation of this EMPr.

Responsible Parties	Role and responsibilities
Environmental Authority – National Department of Environment, Forestry and Fisheries.	<p><u>Role</u></p> <p>The National Department of Environment, Forestry and Fisheries is the competent / delegated authority responsible for compliance with the relevant environmental legislation, namely the National Environmental Management Act and other Specific Environmental Management Acts (SEMA's)</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> • Ensure overall compliance with the Environmental Authorisation (EA) & EMPr. • Review this document and any revisions thereof. • Undertake site audits at their discretion. • Review ECO Reports. • Review Audit Reports • Review Incident Reports. • Enforce legal mechanisms for contraventions of this EMPr and EA.
Holder of the Authorisation – Scatec Solar SA 350 (Pty) Ltd.	<p><u>Role</u></p> <p>The holder of the Authorisation is ultimately responsible and legally liable for ensuring compliance with all statutory requirements relating to the solar facility.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> • Ensuring compliance with the conditions set out in the Environmental Authorisation and the amendment thereto (BESS amendment) issued in terms of the NEMA, as well as those prescribed by other relevant legislation and guidelines. • Compliance with the requirements set out in this EMPr. • Ensuring all other permits, permissions and licences from all other statutory departments are in place. E.g.: Permit from provincial Department of Environmental Affairs & Nature Conservation (DEANC) to translocate or remove <i>protected</i> plants.
Environmental Control Officer (ECO) – To be appointed	<p><u>Role</u></p> <p>The ECO fulfils an advisory role to monitor, guide and report compliance with the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> • Revise, update and amend the EMPr if necessary and submit the amendments to the competent authority for consideration. • Ensure all relevant persons have a copy of the EMPr and any amendments thereof. • Advise the employer's representative on any additional environmental authorisations and permits that may be required. • Facilitate the Environmental Education / Induction Training with the contract staff. • Review and comment on Method Statements relevant to environmental management and make recommendations to the employer's representative. • Report any non-compliance with the EMPr or EA to the employer's representative and competent authority if necessary. • Undertake regular site inspections in compliance with this EMPr. • Monitor, audit and verify that all works comply with the EA and the EMPr. • Keep record of EMPr implementation, monitoring and audits, including a full photographic record of works.

	<ul style="list-style-type: none"> • Comply and submit regular Environmental Control Reports to the competent authority, as well as employer's representative and/ holder of the authorisation. • Report any environmental incidents or environmental impacts immediately to the employer's representative and the competent authority if necessary. • Report any environmental incidents or environmental impacts immediately to the employer's representative and the competent authority if necessary. • Assist the contractor and employer's representative planning for and implementing environmentally sensitive problem solving. • Advise the employer's representative on suggested "stop work" orders.
Environmental Site Agent (ESA) – To be appointed	<p><u>Role</u></p> <p>To assist the ECO with the day to day implementation and monitoring of the environmental management actions that are taking place on site. The EAS should also be independent of the EPC contractor</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> • Day to day environmental control of contractors on site during the construction phase. • Monitoring of construction management activities during the construction phase. • Weekly reporting to the ECO.
Employers Representative – To be appointed	<p><u>Role</u></p> <p>The Employer's representative role is likely to be fulfilled by the project engineer /project engineer and assumes overall delegated responsibility for compliance with this EMPr, the EA, the conditions of the Planning Approval, Conditions of the WULA and all applicable legislation for the duration of the construction phase.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> • Issue site instructions to the contractor based on the advice of the ECO. • Ensure that all detailed design incorporates the requirements of the EMPr and EA. • Ensure that the EMPr is included in all tender documents issued to prospective contractors and sub-contractors. • Ensure the EMPr is included in final contract documents. • Ensure that the Tenderers/Contractors adequately provide for compliance with the EMPr in their submissions. • Ensure that the EMPr is fully implemented by the relevant persons. • Ensure the contractor provides the necessary method statements. • Be accountable, to the competent authority for any contravention or non-compliance by the Contractor. • Assist the contractor with input from the ECO in finding environmentally responsible solutions to problems. • Undertake regular site audits, site visits and inspections to ensure that the requirements of the EMPr are implemented • Give instructions on any procedures and corrective actions on advice from the ECO. • Report environmental incidents or non-compliance with the EA or EMPr to the environmental authority. • Issue spot fines, penalties or 'stop-work' orders for contravention of the EMPr and give instructions regarding corrective action.
Landowner – Van Niekerk Gesintrust represented by Andre Van Niekerk	<p><u>Role</u></p> <p>The landowner is responsible for compliance with legislation applicable to the management of the remainder of the property.</p> <p><u>Responsibilities</u></p> <p>E.g.: In terms of the National Veld & Forest Fires Act (101 of 1998) - an owner on whose land is subject to a risk of veldfire or whose land or part of it coincides with the border of the Republic, must prepare and maintain a firebreak on his or her land as close as possible to the border.</p>

3 LEGISLATIVE FRAMEWORK

The applicable legislation remains the same as what was considered in the Final Environmental Impact Assessment Report and EMPr for Kenhardt PV2 and as such it is not re-described in this Revised EMPr.

The table below lists the applicable legislation and describes whether any additional considerations are applicable to the amendment (i.e. that were not considered in the final EIR).

Table 3: Legislation applicable to Kenhardt PV2 including any additional considerations applicable to the amendment of the EA to include the BESS.

Legislation	Additional considerations for Kenhardt PV2
NATIONAL LEGISLATION	
The Constitution of the Republic of South Africa	No additional considerations applicable to the amendment
National Environmental Management Act (NEMA)	This application is being undertaken in terms of this legislation. No additional activities listed in terms of this legislation are applicable to the Amendment.
National Environmental Management: Biodiversity (Act 10 of 2004)	The proposed positioning of the BESS within the authorised footprint remains on vegetation type classified as least concern in terms of this legislation (Bushmanland Arid Grassland Grassland). No additional impact or permitting requirements (TOPS permits) are applicable to this amendment. The Ecological specialist Simon Bundy confirmed that no threatened or protected species were observed to occur within the footprint of the BESS.
Conservation of Agricultural Resources Act – CARA (Act 43 of 1983):	No additional considerations applicable to the amendment.
The Subdivision of Agricultural Land, Act 70 Of 1970	No additional considerations applicable to the amendment
National Water Act, No 36 of 1998	No additional considerations applicable to the amendment
National Forests Act (No. 84 of 1998):	No additional considerations applicable to the amendment
National Heritage Resources Act, 25 of 1998	SAHRA have approved the development footprint in terms of Section 38 of the National Heritage Resources Act. This authorised footprint remains unchanged and it is thus unlikely that further approval in terms of the NHRA will be applicable. SAHRA will however be given an opportunity to comment on this revised EMPr.
National Energy Act (No. 34 of 2008)	No additional considerations applicable to the amendment.
PROVINCIAL LEGISLATION	
Northern Cape Nature Conservation Act, No. 9 of 2009	No additional considerations applicable to the amendment
Nature and Environmental Conservation Ordinance, No 19 of 1974	No additional considerations applicable to the amendment
Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)	SARAO provided comment on the main facility. SARAO and SKAsa will be given an opportunity to provide additional comment on this proposed amendment.
Northern Cape Provincial Spatial Development Framework (PSDF) 2012	No additional considerations applicable to the amendment.
GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS	
National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)	No additional considerations applicable to the amendment. The project footprint remains unchanged and thus outside of any protected area expansion focus areas.
Critical Biodiversity Areas	No additional considerations applicable to this amendment. The project footprint remains unchanged and thus still outside of any critical biodiversity areas.
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)	No additional considerations applicable to the amendment

Legislation	Additional considerations for Kenhardt PV2
White Paper on the Energy Policy of the Republic of South Africa (1998)	No additional considerations applicable to the amendment
Integrated Energy Plan (IEP), 2015	No additional considerations applicable to the amendment.
Integrated Resource Plan for Electricity (2010-2030)	No additional considerations applicable to the amendment
National Development Plan 2030 (2012)	No additional considerations applicable to the amendment.
Strategic Infrastructure Projects (SIPs)	No additional considerations applicable to the amendment.
The Convention on the Conservation of Migratory Species of Wild Animals	No additional considerations applicable to the amendment.
Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa	No additional considerations applicable to the amendment. The monitoring regime remains the same as was assessed.
Environmental Impact Assessment Guideline for Renewable Energy Projects	No additional considerations applicable to the amendment.
Sustainability Imperative	No additional considerations applicable to the amendment.

Section 24N of NEMA deals with the Principles of Environmental Management, which are summarised in the Table below.

Table 4: Compliance with Section 24N of NEMA

EMPr Provision	Report Reference
Information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts in respect of planning & design .	This is addressed in Sections 4 ,
Information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts in respect of pre-construction and construction activities .	This is addressed in Sections 4 .
Information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts in respect of the operation or undertaking the activity in question.	This is addressed in Sections 6
Information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts in respect of the rehabilitation of the environment.	This is addressed in Section 6 & 7 of this EMPr – It has also been dealt with under construction requirements for the specific reason that these works must take place during the construction phase.
Information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts in respect of closure , if applicable	This is dealt with in Section 7 of the EMPr.
Details and expertise of the person who prepared the EMPr.	These details are included at the beginning of the report (after cover page and report conditions).
A detailed description of the aspects of the activity that are covered by the EMPr.	This is dealt with under the introduction in Section 1 , this EMPr.

EMPr Provision	Report Reference
Information identifying the persons who will be responsible for the implementation of the measures addressed in the EMPr.	This is dealt with in Section 2 , of this EMPr.
Information in respect of mechanisms proposed for monitoring compliance with the EMPr and for reporting on the compliance.	This is dealt with in Section 8 of this EMPr.
Measures to rehabilitate the affected environment.	This is dealt with in Sections 5 & 6 of this EMPr as well as in appendix D-G.
Description of the manner in which pollution will be prevented and remedied.	This is dealt with throughout the EMPr, but specifically in Sections 5 & 7
The EMPr must furthermore, where appropriate;	
Set out time periods within which measures must be implemented.	This is dealt with throughout the EMPr and summarised in section 13 .
Contain measures regulating responsibilities for any environmental damage.	This is dealt with is 14 of this EMPr.
Develop an environmental awareness plan describing the way the applicant intends to inform his or her Employees of any environmental risks and how to deal with these risks in order to avoid pollution or degradation of the environment.	This is dealt with in Sections 4.3 & 4.4 of the EMPr.

In addition to the above, the Holder of the Authorisation (in this case the holder of the amendment of the EA to incorporate BESS) is bound by “Duty of Care”, as described in Section 28 of NEMA (107 of 1998, as amended), which “...*obliges every person who causes, has caused or may cause significant environmental degradation to take reasonable measures to prevent such degradation from occurring, continuing or recurring*”. Thus, all mitigation measures recommended by the relevant authorities and specialists must be implemented to avoid occurrence, continuation or repeat of environmental degradation.

4 DESIGN & PRE-CONSTRUCTION PHASE

The following management considerations are to be adopted and implemented during the design and pre-construction phase of the BESS.

- A detailed technology specific risk assessment (for the selected equipment) must be developed to replace the generic risk assessment in Appendix D of this EMPr.
- All personnel who will be handling the BESS Units must receive appropriate training.
- All hardware needs to be sourced from reputable manufacturers.
- A standard operating procedure for delivery and handling of the BESS units must be developed and implemented.
- All BESS Units to be inspected prior to delivery to site.
- Development and implementation of Thermal Management Plan.
- Appropriate warnings and Standard Operating Procedure for emergency events must be developed and must be provided to the local emergency services and the applicable staff on site.
- Prior to commencement of the activity, a dedicated Battery Recycling Programme must be compiled and adopted.

All other pre-construction provisions as detailed in the main EMPr (Appendix B) must be adopted and implemented, these must include all the outcomes and actions summarised in section 12 of the main facility's EMPr.

5 CONSTRUCTION PHASE ENVIRONMENTAL MANAGEMENT

The items contained in this section of the EMPr must be implemented during the construction phase of the development of the Kenhardt PV2 Development.

5.1 Water Supply

OUTCOME: To ensure water used during construction of the BESS is lawfully and sustainably utilised.

The contractor must ensure a supply of water is available on site for sanitation, drinking, and dust suppression during the construction of the BESS.

Water used for dust suppression on gravel roads must be of a quality compliant with the General Special Effluent Standards (31/03/2009): Temperature: max.25⁰C, pH: between 5.5 and 7.5 and conductivity: not be increased more than 15% above the intake water and not exceed 250 milli-Siemens per metre (determined at 25⁰C). The water used for dust suppression is likely to be borehole water / municipal water, and not treated effluent. This item is specific to water supply during the construction phase.

5.2 Topsoil Handling

OUTCOME: To ensure that the handling of topsoil does not result in the pollution or loss of the resource.

In terms of best practice and for rehabilitation purposes, it is essential that a 150mm layer of topsoil from the affected BESS footprint be stripped and stockpiled prior to the commencement of construction activities in each area.

Topsoil is of utmost importance for use in rehabilitation of disturbed areas and should therefore under no circumstances be mixed with sub-soils. Since the panels are to be installed using low impact pile installation, topsoil from underneath the panel arrays must be left in situ.

The following actions regarding topsoil handling must be considered:

- A minimum 300mm layer of topsoil or in shallow surface areas, up to bedrock level must be stripped from BESS Footprint (i.e. within the BESS perimeter fence);
- The topsoil stockpile site must be approved by the ECO and may not be within the sensitive areas as defined by the participating specialists;
- The topsoil stockpile must be within the approved footprint of the total development;
- The topsoil may not be stockpiled within any of the remaining natural areas. An existing disturbed area should rather be chosen for this purpose;
- The topsoil stockpile must be protected from erosion and dust as indicated by the ECO and this EMPr;
- The topsoil must be replaced into disturbed areas. It is important to note that rehabilitation in the BESS area will be extremely limited, so topsoil stripped from this area can be used for rehabilitation on the remainder of the PV Plant;

- The topsoil stockpile mustn't be deeper than 1m;
- A minimum buffer area of 20m should be around the topsoil stockpile in which no work may take place;
- The topsoil stockpile must be barricaded to inhibit unwanted vehicle movement around it and
- Topsoil must be moved once when stockpiling and back to disturbed areas during rehabilitation, no double handling.

5.3 Transport & Traffic Management

OUTCOME: To ensure that delivery of BESS equipment to site does not generate unacceptable traffic impacts.

The Transport Study and Traffic Management plan in section 7 (pg 36) of the main facility EMPr (Appendix B) must adopted and implemented.

5.4 Concrete Management

OUTCOME: To ensure that the handling of concrete does not result in pollution of soil or water resources.

Proper concrete management is of utmost importance. Concrete works are likely to be quite extensive within the BESS footprint (but limited for the remainder of the development).

Cement powder has a high alkaline pH that may contaminate and adversely affect both soil pH and water pH negatively. A rapid change in pH can have consequences on the functioning of soil and water organisms, as well as on the botanical component.

The use of ready-mix trucks delivering concrete directly to site is recommended. Mass batching of concrete on site should be limited as far as possible.

The following actions must be implemented regarding the delivery of concrete to site:

- Trucks should deliver pre-mixed concrete to the site and pour the concrete directly into the prepared excavations (i.e. the foundations of the BESS).
- When concrete trucks have unloaded, there is a requirement to wash out the inside of the concrete drum. Water can be provided to the trucks for this purpose (at the discretion of the contractor). Concrete suppliers may **NOT** dispose of this wash water anywhere on site. Trucks should return to their depot for this purpose; and
- Any spillages of concrete outside of the excavations (including haulage routes) must be cleaned up immediately by the supplier.

5.5 Cable Trenches

OUTCOME: To ensure that trenching activities between the BESS and the Substation / PV field are restricted and do not result in loss of topsoil resources.

All AC cabling should run parallel to the BESS Access road as far as possible. There will also be limited trenching associated with the DC cabling.

Cable trench excavation, cable laying and backfill must be carried out in a systematic and continuous operation, **minimising the length of trench open at any one time** in order to reduce the risk of runoff. Cable trenches must be backfilled in such a manner as to prevent the trench from acting as a ditch or a conduit for water flow. In this regard, cable trenches should follow the contours of the land as far as possible.

The following actions must be implemented by the contractor:

- Trenching shall be kept to a minimum through the use of single trenches for multiple service provision (including communication cabling and AC cabling in the same trenches);
- The planning and selection should be done in approximation to the SDP and cognisance shall be given to minimising the potential for soil erosion;
- Trench routes with permitted working areas shall be clearly defined and marked with prior to excavation;
- The stripping and separation of topsoil and subsoil shall occur as stipulated by the Engineer's Representative (ER). Soil shall be stockpiled for use as backfilling as directed by the ER with input from the ECO;
- Trench lengths shall be kept as short as practically possible before backfilling and compacting;
- Trenches shall be backfilled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an area approved by the ER with input from the ECO;
- Stockpiled topsoil must be replaced at the top of excavated trenches (except where these fall within an area to be hard surfaced); and
- Open trenches must be inspected daily for faunal entrapment (small mammals and reptiles). These are to be removed before backfilling of the trenches.
- Topsoil may not be used for bedding or blanket material in trenches. Bedding and Blanket Material must be obtained from a commercial source.

5.6 Management of archaeological resources

OUTCOME: To ensure that works within the BESS area do not result in significant loss of archaeological resources.

Should any archaeological and/or paleontological remains, including (but not limited to) fossil bones, fossil shells, coins, indigenous ceramics, colonial ceramics, marine shell heaps, stone artefacts, bone remains, rock art, rock engravings and any antiquity be discovered during construction, the ECO should safeguard these (preferably *in situ*) and report the find immediately to the South African Heritage Resources Council (SAHRA) and the Northern Cape Heritage Resources Authority (NCHRA), so that they are not disturbed further until the necessary guidance and approval have been obtained and the appropriate action (e.g. recording, sampling or collection) can be taken by a professional archaeologist or palaeontologist.

5.7 Noise Management

OUTCOME: To ensure nuisance from noise and vibration does not occur.

Although the proposed development is located outside of an urban area, the following noise management actions are applicable to the construction phase of the BESS due to its proximity to agricultural activities.

- It is recommended that noise generation be kept to a minimum and that construction activities be confined to normal working hours (08:00 - 17:00 on workdays). Should the Contractor / Engineer wish to deviate from these work hours, this must be discussed during the Pre-Construction / Initial Environmental Compliance Workshop with the ECO and recorded in the necessary Method Statements;
- Provide baffle and noise screens on noisy machines as necessary;
- Provide absorptive linings to the interior of engine compartments;
- Ensure machinery is properly maintained (fasten loose panels, replace defective silencers);
- Switch off machinery immediately when not in use; and
- Reduce impact noise by careful handling.

The Contractor shall be responsible for compliance with the relevant legislation with respect to noise *inter alia* Section 25 of ECA (73 of 1989) and standards applicable to noise nuisances in the Occupational Health and Safety Act (No. 85 of 1993).

5.8 Dust Control & Management

OUTCOME: To ensure there is no health risk or loss of amenity due to emission of dust to the environment, as a result of the construction of the BESS.

Every effort to minimize dust pollution on the site must be undertaken. The contractor must implement the following measures with regards to the management of dust on site:

The following actions are required in this regard.

- Construction vehicles must adhere to speed limits and minimization of haul roads must be implemented;
- During dry, dusty periods haul roads should be kept dampened to prevent excess dust. No potable water may be used for damping haul roads;
- All vehicles used to deliver or remove loose material (sand, soil, gravel etc.) to and from site must be covered with a 60% shade cloth to avoid dust blowing from the vehicle.
- As an alternative, products such as Road Environment Dust Suppressants (REDS) would be recommended in order to minimize the use of water to control dust pollution. This is to be determined by the ECO during construction as required;
- Exposed stockpile materials must be adequately protected against wind (covered) and should be sited in consideration of the prevailing wind conditions;
- Dust nuisances shall comply with the applicable standards according to the Occupational Health and Safety (Act No. 85 of 1993). The contractor shall be solely responsible for the control of dust arising from the contractor's operations and for any costs against the Employer for damages resulting from dust;
- The contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities to the satisfaction of the ER;

- Removal of vegetation shall be avoided until such time as soil stripping is required and similarly exposed surfaces shall be re-vegetated or stabilised as soon as is practically possible;
- Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present;
- During high wind conditions the site manager, with input from the ECO, must evaluate the situation and make recommendations as to whether dust damping measures are adequate, or whether work should cease altogether until the wind speed drops to an acceptable level;
- Where possible, soil stockpiles shall be 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 shall be implemented at the discretion of the site manager.
- Vehicle speeds shall not exceed 40km/h along dust roads or 20km/h when traversing unconsolidated and non-vegetated areas.
- Should water be used for dust suppression on the BESS access road or platform, it must be of a quality compliant with the General Special Effluent Standards (31/03/2009): Temperature: max.25⁰C, pH: between 5.5 and 7.5 and conductivity: not be increased more than 15% above the intake water and not exceed 250 milli-Siemens per metre (determined at 25⁰C). The water used for dust suppression must be sourced from a licenced resource.
- Dust monitoring must be done 2 months prior to construction to get a baseline and continue during construction.

5.9 Security Fencing

OUTCOME: To ensure that fencing protects project assets while limiting impact on faunal passages.

As the BESS is completely contained within the total perimeter of the facility, the additional fences surrounding the BESS footprint do not have to comply with the faunal requirements relating to the height of electrified strands as detailed in the Project EMPr (Appendix B).

5.10 Blasting

OUTCOME: To ensure any unlikely blasting activities do not disturb sensitive environmental nor social features.

It is unlikely that blasting will be required. Should blasting be required for construction of the BESS foundations or AC trenching, the following actions must be implemented:

- No blasting may take place within 50m of a borehole without approval of a suitably qualified engineering geologist;
- A current and valid authorisation shall be obtained from the relevant authorities and copied to the ER prior to any blasting activity;
- A method statement shall be required for any blasting related activities;
- All laws and regulations applicable to blasting activities shall be adhered to at all times;
- A qualified and registered blaster shall supervise all blasting and rock splitting operations at all times;

- The contractor shall ensure that appropriate pre-blast monitoring records are in place (i.e. photographic and inspection records of structures in close proximity to the blast area);
- The contractor shall allow for good quality vibration monitoring equipment and record keeping on site at all times during blasting operations;
- The contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on site;
- The contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting / drilling shall be repaired at the contractor's expense to the satisfaction of the ER and the ECO;
- The contractor shall ensure that adequate warning is provided immediately prior to all blasting. All signals shall also be clearly given;
- The contractor shall use blast mats for cover material during blasting. Topsoil may not be used as blast cover;
- During demolition, the contractor shall ensure, where possible, that trees in the area are not damaged;
- Appropriate blast shaping techniques shall be employed to aid in the landscaping of blast areas, and a method statement to be approved by the ER, shall be required in this regard; and
- At least one week prior to blasting, the relevant occupants/owners of surrounding land shall be notified by the contractor and any concerns addressed.

5.11 Stormwater, Wash water and Erosion Management

OUTCOME: To ensure that stormwater and wash water do not cause erosion or pollution of the receiving environment.

The Stormwater, Erosion and Wash water Management Plan that formed part of the original Environmental Process must be adopted and implemented by the holder of the EA amendment. The following key actions are required:

- To limit soil erosion, construction activities (more specifically clearing of land) should be limited to the dry season (May to October) as far as possible.
- Construction activities should be limited to areas outside of the 1:100-year flood line.
- Upstream and downstream berms, for each construction site, should be implemented during the pre-construction and construction phases of the project. Upstream diversions will ensure limited surface flows through construction areas. Downstream berms will ensure that sediments eroded from within the construction site will be trapped, therefore reducing the impact to the downstream receiving environment. It is recommended that the berms are constructed out of a non-erodible material, such as sandbags with plastic liners.
- Materials excavated during the construction phase should be deposited in areas outside of drainage lines and stormwater channels. This will ensure minimal contact between concentrated stormwater runoff and the excavated materials.
- Machinery used during the construction process should be regularly (at least daily) checked for oil leaks. During periods where the machinery is not in use, drip trays should be placed under the machinery to contain any spillages.

- Fuels and hydrocarbon stores used during the construction phase should be lined and banded such that spills from the store areas will not enter the receiving environment.
- Clearing of vegetation for construction purposes must be undertaken in accordance with a method statement. The method statement must include the method of clearing, recovery of and disposal of vegetation.
- Any pollution of land or watercourses that may occur in the unlikely event of BESS unit failure must be cleaned up by a qualified service provider and rehabilitated to its original state.

5.12 Fire Management and Protection

OUTCOME: To reduce the risk of fire to infrastructure and environment.

A BESS thermal / fire management plan and risk assessment must be developed prior to commencement of construction. These plans must be specific to the specific technology service providers and will be for the purpose of preventing equipment and environmental damage as a result of equipment fires.

As far as wildfires are concerned, the solar development site is arid, with sparse vegetation cover, and fires are not a natural phenomenon in the area. However, under exceptional circumstances, such as following years of very high rainfall, sufficient biomass may build up to carry fires. Therefore, management of plant biomass in areas surrounding the BESS will be required. Utilisation of non-selective herbicides for the management of biomass is prohibited on site.

The following general actions (specific BESS actions to be included in the management plan referred to above) must however be considered with regards to fire protection on site:

- No fires for cooking or heating should be allowed within the perimeter of the BESS;
- **No fuelwood collection** should be allowed on-site;
- The **total removal of all invasive alien vegetation** should take place on the entire project site in order to decrease the fire risk – Although there were few invasive plants identified during the environmental process, these may establish to a degree as a result of site disturbance;
- Cigarette butts may not be thrown in the veld but must be disposed of correctly. The contractor, with input from the ECO, must **designate smoking areas** (in compliance with the Tobacco Products Control Amendment Act 63 of 2008) with suitable receptacles for disposal;
- In case of an emergency, the **contact details of the local fire and emergency services** must be readily available;
- Emergency personal must be appropriately trained on how to deal with a fire as a result of the BESS;
- Contractors must ensure that **appropriate firefighting equipment and suitably qualified/experienced personal** are available on site at all times, as per the specifications defined by the health and safety representative / consultant;
- The fire risk on site is a point of discussion that must take place as part of the pre-construction compliance workshop and the environmental induction training prior to commencement of construction;

- The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection; and
- A standard operating procedure for both BESS and wildfires must be developed prior to construction of these facilities.

5.13 Sanitation during Construction

OUTCOME: To ensure safe and healthy sanitation for construction staff without increasing pollution risk.

Portable chemical ablution facilities must be made available for the use by construction staff for the duration of the construction period. The following actions must be implemented in this regard:

- Toilet and washing facilities must be available to the site personnel at all times;
- These facilities must be situated within the site camp and away from any washes or drainage lines;
- One toilet for every 15 personnel is required;
- The facilities must be serviced on a regular basis to prevent any overflow or spillage;
- The servicing contractor must dispose of the waste in an approved manner (e.g. via the municipal wastewater treatment system);
- The ECO must be provided with the service providers' details and the service schedule for the site;
- The toilets should be secured to ensure that they do not blow over in windy conditions;
- All toilet facilities must be removed from site on completion of the contract period; and
- Should the construction period be interrupted by a builder's break, the toilets should be emptied prior to the break.

Sanitation during operation is discussed above under the design criteria in Section 4.7.

5.14 Fuel Storage

OUTCOME: To ensure lawful fuel storage that does not cause soil and water pollution.

Fuel storage may not take place within the BESS footprint, but rather at the nearby Site Camp / Laydown area. The following actions must be implemented with regards to fuel storage:

- Temporary fuel storage must take place within the contractors site camp in an area approved by the ECO;
- No storage of fuel may take place on any other portion of the site;
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up immediately in the appropriate manner, as related to the nature of the spill;
- Mobile fuel units used to refuel plant on site must make use of drip trays when refuelling;
- Storage facilities may not be located within 60m of the on-site drainage lines or where there is a potential for any spilled fuel to enter a watercourse or groundwater;
- Fuel storage facilities should be located on flat ground. No cut and fill should take place immediately on or adjacent to fuel storage areas;

- All storage tanks should be double lined and be ISO 9001 certified;
- All storage tanks must be enclosed by bund walls;
- Bund walls must be constructed to contain at least 110% of the total capacity of the storage tanks;
- Bund walls must be constructed of impermeable material or lined to ensure that petroleum products cannot escape;
- In the event that the bunded area is a pit that is dug and lined with plastic, adjustments must be made to allow for invertebrates to escape as the plastic doesn't provide any traction and become pitfall traps.
- A suitable material should be placed in the base of the bund walls to soak up any accidental spillages;
- The tanks should be locked and secured when not in use;
- Automatic shut-off nozzles are required on all dispensing units;
- Storage tanks should be drained within one week of completion of activities (only unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction program extends over the builder's shutdown, the contractor must ensure that storage tanks are emptied prior to this period;
- All storage tanks, containers and related equipment should be regularly maintained to ensure safe storage and dispensing of material. The Engineer is to sign off on the condition and integrity of the storage tanks;
- Defective hoses, valves and containment structures should be promptly repaired;
- Vehicle and equipment fuelling should be undertaken on a hard-impermeable surface, over drip pans or bund walls to ensure spilled fuel or toxic liquids are captured and cleaned up;
- The area must be totally rehabilitated on completion of the contract and all contaminated material must be carefully removed and disposed of at a licensed dumping site for that purpose; and
- Spill kits must be made available on-site for the clean-up of spills.
- Should the BESS include Inverters/transformers that are not contained within the bunded battery containers, these must also be bunded to 110% of their capacity

5.15 Construction Waste Management

OUTCOME: To ensure the management of waste is both lawful and sustainable.

5.15.1 Litter management

Wind and scavenger proof bins must be installed within the BESS footprint and must be emptied on a weekly basis.

5.15.2 Construction Rubble and Waste

All construction rubble must be disposed of at an approved site established and registered for this purpose (no construction rubble may be spoiled anywhere on site). A list must be compiled before construction of any existing building rubble on site to avoid disputes. NO construction rubble may be used as fill in landscaping or any other areas on site.

5.15.3 Scrap Metal

Recycling of scrap metal is recommended. Scrap metal must be disposed of off-site at suitable facilities (e.g. municipal dump registered for this purpose).

5.15.4 Hazardous Waste

All hazardous waste (including chemicals, bitumen, fuel, lubricants, oils, paints etc.) shall be disposed of at an approved / registered hazardous-waste landfill site. The Contractor shall provide disposal certificates to the ECO.

Used oil and grease must be removed from site to an approved used oil recycling company.

Under NO circumstances may any hazardous waste be spoiled on the site.

Major services and maintenance of construction and delivery vehicles should take place off-site.

Washing of construction and personal vehicles are strictly prohibited on site unless it is done on an impermeable surface that flows into an evaporation pit. The contents of the pit will then be carted off site at the end of the project.

Damaged BESS units are considered hazardous and may be considered a waste product. Any damaged units must be removed from site by the original equipment manufacturer or a designated service provider. No repair to damaged units may take place on site.

5.16 Theft and Other Crime

OUTCOME: To ensure that activities on site do not increase the criminal activity of the area.

An increase in crime during the construction phase is often a concern. In the case of the proposed development, this is likely to be negligible due to the extremely remote nature of the site. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor. Considering this, contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site. It is recommended that the contractor develop a **jobsite security plan** prior to commencement of construction. This jobsite security plan should consider protection of the construction site from both internal and external crime elements, as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant. **A copy of the jobsite security plan should be included in the first environmental control report to be submitted to the competent authority.**

It is likely that the Contractor's Site Camp PV Footprint and the PV Laydown area/s will be fenced with a temporary fence to avoid theft during construction. The BESS area will however be fenced off by a permanent fence.

Additional security measures during construction could include CCTV camera surveillance and security guards.

The following actions are relevant in this regard (refer to Section 5.9 above for details of the facility permanent fencing):

- All portable construction equipment and material must be locked away within the Contractor's Site Camp overnight and during holiday periods;
- Fuel storage tanks must be locked when not in use;
- All unassembled / un-installed PV materials must be locked within the fenced Laydown areas overnight and during holiday periods; and

- The minimum amount of lighting should be used at night and this should be of the low-UV emitting kind that attracts less insects.

It must be noted the **collection, hunting or harvesting of any plants or animals** at the site is **strictly forbidden**, and thus any person found undertaking any of these actions will be considered guilty of committing a crime. Any incidents of such crimes on nature must be reported to the ECO immediately.

5.17 Plant Rescue and Protection.

OUTCOME: To reduce the impact on protected and sensitive botanical features.

The following environmental management actions applicable to the construction phase of the BESS are applicable.

5.17.1 Identification of species of conservation concern

The ToPS (Threatened and Protected Species) regulations provide for the regulation of activities which may directly or indirectly impact threatened and protected species. Such species are identified under NEMBA as well as by the National Red Data List of Plants. At a provincial level, the Northern Cape Nature Conservation Act (2009) also provides lists of species which are protected within the province. Species listed under the National Red Data List of Plants as well as those protected under the provincial legislation must be specified on permit applications required for site clearing.

A permit application must be made for any of these species within the BESS footprint and any requirements of this permit once issued must be complied with.

5.17.2 Mitigation & avoidance options

Where listed plant species fall within the BESS footprint it is unlikely that avoidance will be possible. In this case, translocation of these should take place. However, not all species are suitable for translocation as only certain types of plants are able to survive the disturbance. Suitable candidates for translocation include most geophytes and succulents. Although there are exceptions, many woody species do not survive translocation well and it is generally not recommended to try and attempt to translocate such species.

5.18 Vegetation Clearing

OUTCOME: To ensure that vegetation is minimised and restricted to the development footprint.

It is unlikely that any vegetation will be left within the footprint of the BESS. Vegetation cleared within the footprint of the BESS must be stockpiled for use in the rehabilitation of the remainder of the site.

5.19 Animal Rescue & Protection

OUTCOME: To reduce the direct impact on animals affected by the construction activities.

Any animals (including snakes, tortoises and lizards) directly threatened by the clearing or construction activities should be removed to a safe location outside of the construction area by the ECO or other suitably qualified/experienced person.

All trenches and open excavations should be inspected daily (first thing in the morning) for any trapped fauna (particularly small mammals and reptiles). These should be removed to a safe location outside of the construction area by the ECO or other suitably qualified / experienced person.

5.20 Re-Vegetation & Habitat Restoration

OUTCOME: To restore habitat disturbed during construction activities.

As the BESS footprint will not include any undeveloped habitat, no revegetation actions will be required.

Any temporary laydown utilised for the BESS must be rehabilitated back to a natural state.

5.21 Alien Plant Management Plan

OUTCOME: To manage alien species in compliance with the AIS regulations.

The Kenhardt PV2 site is currently very lightly invaded by alien species. The density of alien species within the intact vegetation is generally very low and is restricted to disturbed areas around watering points and kraal sites. The total removal of all AIS must take place on the entire BESS footprint.

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.

5.22 Open Space Management

OUTCOME: To manage the undeveloped portions of the footprint to promote ecological diversity.

No open space will remain within the footprint of the BESS and as such, no additional actions for the BESS will be required.

6 OPERATIONAL PHASE ENVIRONMENTAL MANAGEMENT

The following environmental requirements are to be adopted and implemented during the operation phase of the BESS

6.1 End of Life Recycling of Battery Components

OUTCOME: To ensure that Battery components that have reached their end of life do not cause environmental degradation as a result of their disposal.

A dedicated battery recycling plan must be developed and implemented for the project. No battery components may be disposed of on site or at any landfill.

Units should ideally be sent back to the original equipment manufacturers in compliance with the battery recycling plan.

6.2 Management of Emergency Incidents

OUTCOME: To ensure that in the unlikely event of failure of any of BESS units, such failure does not result in environmental degradation or pollution.

The actions detailed in the detailed risk assessment, once compiled by the original equipment manufacturers must be implemented in this regard.

7 CLOSURE & DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT

After the lifespan of the facility (20-25 years), there is a possibility that the entire facility, including the BESS, will be decommissioned, and closed (although other options for continuation may be investigated).

Appendix 5 of Regulation 982 of the 2014 EIA Regulations contains the required contents of a Closure Plan. The table below shows the minimum requirements for a closure plan. The operating entity for this facility must ensure that the closure plan complies with these requirements as well as any other legislative requirements that may come into effect during the lifecycle of the project.

Table 5: Legislative requirements for a closure plan

Requirement	
(1)	A closure plan must include -
(a)	Details of -

Requirement
(i) The EAP who prepared the closure plan; and (ii) The expertise of that EAP.
(b) Closure objectives.
(c) Proposed mechanisms for monitoring compliance with and performance assessment against the closure plan and reporting thereon.
(d) Measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity and associated closure to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development including a handover report, where applicable.
(e) Information on any proposed avoidance, management and mitigation measures that will be taken to address the environmental impacts resulting from the undertaking of the closure activity.
(f) A description of the way it intends to – (i) Modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation during closure; (ii) Remedy the cause of pollution or degradation and migration of pollutants during closure. (iii) Comply with any prescribed environmental management standards or practises; or (iv) Comply with any applicable provisions of the Act regarding closure.
(g) Time periods within which the measure contemplated in the closure plan must be implemented.
(h) The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of closure.
(i) Details of all public participation processes conducted in terms of regulation 41 of the Regulation, including – (i) Copies of any representations and comments received from registered interested and affected parties; (ii) A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; (iii) The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants; (iv) Where applicable, an indication of the amendments made to the plan as a result of public participation processes conduction in terms of regulation 41 of these Regulations.
(j) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.

Within a period of at least 12 months prior to the planned closure and decommissioning of the site, a Closure Plan must be prepared and submitted to the Local Planning Authority as well as the Provincial and National Environmental Authorities (the Northern Cape Department of Environmental Affairs & Nature Conservation (DEANC) and the Department of Environment Forestry and Fisheries (DEFF)) for input and approval. This plan must provide detail pertaining to the recycling and disposal of BESS components, site restoration, soil replacement, landscaping, pro-active conservation, and a timeframe for implementation. Furthermore, the plan must comply with any additional legislation and guidelines that may be applicable at the time.

8 MONITORING AND AUDITING

Environmental monitoring and audits are fundamental in ensuring the implementation of the management actions contained within this EMP, environmentally sustainable development and maintenance of the PV facility, including the BESS.

To promote transparency and cooperative governance, the results of relevant audits should be submitted to:

- The operators of the facility;
- The local authority;
- The provincial environmental authority: Department of Environmental Affairs & Nature Conservation (DENC);
- The national environmental authority: Department of Environment of Environment Forestry, and Fisheries (DEFF); and
- Eskom.

The results of the audit must be recorded in an environmental audit report and any non-compliance must be formally recorded, along with the response-action required or undertaken. Each non-compliance incident report must be issued to the relevant person(s), so that the appropriate corrective and preventative action is taken within an agreed upon timeframe.

Appendix 7 of Regulation 982 of the 2014 EIA Regulations contains the required contents of an Environmental Audit Report. The table below shows the legislated requirements of an audit reports, and all relevant environmental audits undertaken as part of this development (during construction and operation) should comply with these requirements.

Table 6: Legislative requirements for an Audit report.

(1) An Environmental audit report prepared in terms of these Regulations must contain:
(a) Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.
(b)Details of – (i) The independent person who prepared the environmental audit report; and (ii) The expertise of independent person that compiled the environmental audit report.
(c) A declaration that the independent auditor is independent in a form as may be specified by the competent authority.
(d) An indication of the scope of, and the purpose for which, the environmental audit report was prepared.
(e) A description of the methodology adopted in preparing the environmental audit report.
(f) An indication of the ability of the EMP, and where applicable the closure plan to – (i) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an on-going basis; (ii) Sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and

(iii) Ensure compliance with the provisions of environmental authorisation, EMPr, and where applicable, the closure plan.
(g) A description of any assumptions made, and any uncertainties or gaps in knowledge.
(h) A description of a consultation process that was undertaken during the course of carrying out the environmental audit report.
(i) A summary and copies of any comments that were received during any consultation process
(j) Any other information requested by the competent authority.

8.1 ECO Construction Monitoring

The ECO is responsible for environmental monitoring during construction as per the requirements of this EMPr. The monthly environmental monitoring reports compiled by the ECO, as well as the photographic record of works, must be submitted to the operators of the facility, the local authority, the provincial environmental authority, the national environmental authority and Eskom.

8.2 Recording and Reporting to the DEFF.

The following recording and reporting requirements are required:

- The holder of the authorisation must keep all records relating to monitoring and auditing on site and make it available for inspection to any relevant and competent authority in respect of this development.

All documentation e.g. Audit/monitoring/compliance reports and notifications required to be submitted to the department in terms of the EA, must be submitted to the Director: Compliance monitoring.

8.3 Environmental Audit Report

The holder of the EA must submit an environmental audit report to the department within 30 days of completion of the construction phase (i.e. within 30 Days of site handover) and within 30 days of completion of rehabilitation activities.

This environmental audit report must:

- Be compiled an independent environmental auditor;
- Indicate the date of the audit, the name of the auditor and the outcome of the audit;
- Evaluate compliance with the requirements of the approved EMPr and the Environmental Authorisation;
- Include measures to be implemented to attend to any non-compliances or degradation noted;
- Include copies of approvals granted by other authorities relevant to the development for the reporting period;
- Highlight any outstanding environmental issues that must be addressed, along with recommendations for ensuring these issues are appropriately addressed;
- Include a copy of the EA and the approved EMPr;

- Include all documentation such as waste disposal certificates, hazardous waste landfill site licences etc, pertaining to this authorisation; and
- Include evidence of adherence to the conditions of this authorisation and the EMPr where relevant such as training records and attendance registers.

9 METHOD STATEMENTS

Method statements are written submissions by the Contractor to the Engineer and ECO in response to the requirements of this EMPr or in response to a request by the Engineer or ECO. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.

The Contractor shall not commence the activity for which a method statement is required until the Engineer and ECO have approved the relevant method statement.

Method statements must be submitted at least five (5) working days prior to the proposed date of commencement of the activity. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, **any damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost.**

Additional method statements can be requested at the ECO's discretion at any time during the construction phase.

The method statements should include relevant details, such as:

- Construction procedures and location on the construction site;
- Start date and duration of the specific construction procedure;
- Materials, equipment and labour to be used;
- How materials, equipment and labour would be moved to and from the development site, as well as on site during construction;
- Storage, removal and subsequent handling of all materials, excess materials and waste materials;
- Emergency procedures in case of any potential accident / incident which could occur during the procedure; and
- Compliance / non-compliance with an EMPr specification and motivation for proposed non-compliance.

9.1 Method Statements Required

Based on the specifications in this EMPr, the following method statements are likely to be required as a minimum (more method statements may be requested at any time as required under the direction of the ECO):

- Vegetation clearing and topsoil stripping, and associated stockpiling;

- Hazardous substances declaration of use, handling and storage – e.g. for fuels, chemicals, oils and any other harmful / toxic / hazardous materials;
- Battery Recycling Plan;
- Standard Operating for BESS systems;
- Cement and concrete batching;
- Traffic, transport & delivery accommodation;
- Solid waste management / control procedures;
- Stormwater and wastewater management / control systems;
- Erosion remediation and stabilisation;
- Fire control and emergency procedures; and
- Job site security plan.

10 HEALTH AND SAFETY

The Occupational Health and Safety Act (No. 85 of 1993) aims to provide for / ensure the health and safety of persons at work or in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

The main Contractor must ensure compliance with the Occupational Health and Safety Act, as well as that all subcontractors comply with the Occupational Health and Safety Act.

The following is of key importance (Section 8 of the aforesaid Act):

General duties of employers to their employees

- (1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.*
- (2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-*
 - (a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;*
 - (b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;*
 - (c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;*
 - (d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;*

- (e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;*
- (f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;*
- (g) taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;*
- (h) enforcing such measures as may be necessary in the interest of health and safety;*
- (i) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and*
- (j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).*

11 CONTRACTORS CODE OF CONDUCT

The Contractor's Code of Conduct is a document to be drawn up by the solar facility Developer and provided to all contractors or subcontractors that undertake any service on site. This code of conduct should include generic conduct rules for construction and operation activities on the PV facility and must be signed by all contractors. **This code of conduct does not exonerate contractors from complying with this EMPr or the EMPr for the overall facility and must not be viewed as a stand-alone document.**

The following general template is suggested for this Code of Conduct document and must be adapted and updated to include the provisions of this EMPr, recommendations of participating specialists, conditions of approval of the Environmental Authorisation, conditions imposed by the Local Authority (as part of the rezoning and consent use), as well as the all service agreements.

11.1 Objectives

To ensure compliance with the Conditions of the Environmental Authorisation, the Environmental Management Programme (EMPr), recommendations of participating specialists, conditions imposed by the Local Authority as part of the rezoning and subdivision, as well as the service agreements.

- To ensure the least possible damage to:
 - Existing infrastructure on and adjacent to the site;
 - Indigenous flora and fauna (biophysical environment); and
 - Water quality of surface and groundwater on and surrounding the site. Particularly the water quality entering and exiting the on-site washes/minor drainage lines;

- Construction and development are undertaken with due consideration to all environmental factors; and
- Where such damage occurs, provision is made for re-instatement and rehabilitation;

11.2 Acceptance of Requirements

In order to achieve these objectives, the Developer and Contractor bind themselves jointly and severally to fulfil and comply with all the obligations contained herein, as well as prescriptions and obligations contained in other documents controlling the development of the PV facility inclusive of the BESS.

11.3 Contractor's Pre-Construction Obligations

Contractors may not commence any construction on the facility until:

- The Contractor and the ECO have carried out a joint site inspection (this is to be done as part of the pre-construction compliance workshop as detailed in the EMPr);
- A qualified ecologist has undertaken an inspection of the final development footprint and determined the number, species and extent of protected / listed plant species within the BESS footprint;
- A permit for the removal or relocation-and-transplant of these protected / listed plant species has been obtained from the Kimberly office of the Northern Cape Department of Environmental Affairs & Nature Conservation (DEANC);
- Search and rescue of sensitive plants, within the development footprint has been carried out and signed off by the ECO (where this is necessary);
- The construction and no-go areas are suitably demarcated to the satisfaction of the ECO;
- Where necessary, approval of Building / Construction Plans has been obtained from the local authority; and
- All contract staff has attended the required environmental induction training and on-going environmental education sessions, as necessary.

11.4 Contractor's Obligations during Construction

- The Contractor is required to comply with the necessary Health and Safety requirements as required by the Occupational Health and Safety Act of 1993;
- The Contractor must comply with the construction requirements as detailed in the EMPr, including the attached original EMPr (Appendix B), EA conditions (Appendix C) and Risk Assessment.
- The contractor must comply with all the requirements detailed in the Environmental Authorisation;
- All conditions, processes and fees as prescribed by the Local Authority must be complied with; and
- The Contractor shall only be permitted to erect a single signboard which must comply with legislative requirements.

12 NON-COMPLIANCE

Should any person commit an action of non-compliance he/she may be convicted of an offence, in terms of Sub-regulation (1) of the National Environmental Management Act, to

imprisonment for a period not exceeding two years or to a fine not exceeding an amount prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

Apart from a fine resulting from any legal mechanism, the ECO may advise the ER to impose a penalty for non-compliance in terms of this Environmental Management Programme (EMPr). The procedure detailed below is for a spot fine in terms of this EMPr and does not detail the procedure for fining in terms of any other legal mechanism.

12.1 Procedures

The contractor shall comply with the environmental specifications and requirements of this EMPr, the Environmental Authorisation (EA) and Section 28 of NEMA, on an on-going basis and any failure on his part to do so will entitle the ER to impose a penalty.

In the event of non-compliance, the following recommended process shall be followed:

- The ECO shall issue a notice of non-compliance to the ER, stating the nature and magnitude of the contravention. A copy shall be provided to the Project Developer / Proponent.
- The ER will issue this notice to the Contractor.
- The Contractor shall act to correct the transgression within the period specified by the ER.
- The Contractor shall provide the ER with a written statement describing the actions to be taken to discontinue the non-compliance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the Project Developer / Proponent.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the ER shall impose a monetary penalty (spot fine) based on the conditions of contract.
- Should the transgression be a blatant disregard of conditions of the EMPr or EA, the ER (on advice from the ECO) can at their discretion immediately issue a fine and require the remediation (without first giving the contractor a chance to remediate)
- In the case of non-compliance giving rise to physical environmental damage or destruction, the ER shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMPr, disagreement regarding the implementation or method of implementation of conditions of the EMPr or EA etc. any party shall be entitled to require that the issue be referred to specialists for determination.
- The ER on advice from the ECO shall always have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.

12.2 Offences and Penalties

Any avoidable non-compliance with the conditions of the EMPr shall be considered sufficient ground for the imposition of a penalty by the Engineer.

Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas;
- Catching and killing of wild animals, and removal or damage to conservation-worthy plant species;
- Open fires outside of the contractor camp site and insufficient fire control;
- Unauthorised damage to natural vegetation;
- Unauthorised camp establishment (including stockpiling, storage, etc.);
- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
- Insufficient solid waste management (including clean-up of litter, unauthorised dumping etc.);
- Erosion due to negligence / non-performance;
- Excessive cement / concrete spillage / contamination; and
- Non-induction of staff.

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