



## **KHAUTA CLUSTER SPV FACILITIES**

**PROPOSED DEVELOPMENT OF THE KHAUTA CLUSTER CONSISTING OF THE 165 MW, 110MW, 80MW AND 50MW PHOTOVOLTAIC SOLAR FACILITIES ON FARM, NEAR RIEBEECKSTAD, MATJHABENG LOCAL MUNICIPALITY, FREE STATE PROVINCE**

### **Environmental Management Programme**

**March 2023**

**Prepared for:**

**KHAUTA NORTH SOLAR PV FACILITY RF (PTY) LTD  
KHAUTA SOUTH SOLAR PV FACILITY RF (PTY) LTD  
KHAUTA WEST SOLAR PV FACILITY RF (PTY) LTD  
KHAUTA E NYANE SOLAR PV FACILITY RF (PTY) LTD**

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**Prepared by:**

**Enviroworks**

**Today's Impact | Tomorrow's Legacy**

# 1 EMPR DETAILS

**Title:** Environmental Management Plan for the Khauta Solar Cluster Facility, Free State Province

**Author:** Enviroworks  
Michelle Boshoff

**Specialists:**

SPECIALIST ASSESSMENT	SPECIALIST
Avifaunal Assessment	Mokgatla Molepo (Pri.Nat.Sc.) from Moira Ecological Services (Pty) Ltd
Agricultural Assessment	Dr Johann Lanz (Pri.Nat.Sc.)
Terrestrial & Aquatic Ecological Assessment	Rikus Lamprecht (Pri.Nat.Sc.) from EcoFocus Consulting (Pty) Ltd
Economic Specialist	Petrus J van Jaarsveld (ESSA #0116)
Heritage and Archaeological Assessment	Jonathan Kaplan from Agency for Cultural Resource Management (ACRM)
Palaeontological Assessment	Dr John Almond from Natura Viva CC
Terrestrial Biodiversity, Plant- and Animal Species Assessment	Mr Roy de Kock M.Sc (Pri.Nat.Sc.) from Blue Leaf Environmental (Pty) Ltd Megan Smith M.Sc Biological Sciences (Pri.Nat.Sc.; EAPASA: Registered EAP) from Enviroworks
Socio-economic Impact Assessment	Michael Leach (EAPASA Reg: 2021/3872) from Enviroworks
Visual Impact Assessment	Christoff du Plessis (BSc) from Enviroworks
Geo-technical Assessment	Outeniqua Geotechnical Services

**Client:** WKN Windcurrent SA (Pty) Ltd

**Report Status:** Environmental Management Programme submitted as part of the Draft Environmental Impact Assessment Report for authority decision-making

**Date:** February 2023

**When used as a reference this report should be cited as:** Enviroworks (2023) Environmental Management Programme: Khauta Solar Cluster Facility, Free State Province

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**DOCUMENT CONTROL**

Phase	Author	Status	Revision	Distributed on	Signature
Author	Michelle Boshoff Enviroworks	Draft	01	16 February 2023	
Review	Elana Mostert Enviroworks	Draft	01	20 February 2023	

Distributed	Jasper Dick WKN	Final	01	28 February 2023	
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**PROJECT LOCATION**

<b>DFFE Reference No:</b>	<p>14/12/16/3/3/1/2218</p> <p>14/12/16/3/3/1/2219</p> <p>14/12/16/3/3/1/2220</p> <p>14/12/16/3/3/1/2221</p>
<b>Holder of Authorisations</b>	<p>KHAUTA North Solar PV Facility RF (Pty) Ltd</p> <p>Khauta South Solar PV Facility RF (Pty) Ltd</p> <p>Khauta West Solar PV Facility RF (Pty) Ltd</p> <p>Khauta e Nyane Solar PV Facility RF (Pty) Ltd</p>
<b>Location of the Activity</b>	<ul style="list-style-type: none"> <li>• Portion 0 of Farm 81 (Kopje Alleen) - 254.31 ha in extent</li> <li>• Portion 1 of Farm 81 (Kopje Alleen) - 261.18 ha in extent</li> <li>• Portion 9 of Farm 382 (Commandants Pan) in extent 761.65ha</li> <li>• Farm 413 (Tafel Baai) in extent 85.7ha</li> <li>• Portion 12 of Farm 74 (Nooitgedacht) 832.58ha</li> <li>• Portion 3 of the Farm Kopje Alleen No. 81 in extent 254.31ha</li> <li>• Portion 3 of Farm Kopje Alleen No. 81 in extent 253.72 ha</li> <li>• Portion 9 of Farm Commandants Pan No. 382 in extent 761.65 ha</li> </ul>

## LIST OF ACRONYMS AND ABBREVIATIONS

<b>EIA</b>	-	Environmental Impact Assessment
<b>BBBEEE</b>	-	Broad-Based Black Economic Empowerment
<b>EIAR</b>	-	Environmental Impact Assessment Report
<b>CBA</b>	-	Critical Biodiversity Area
<b>CR</b>	-	Contractor's Environmental Representative
<b>DEA</b>	-	Department of Environmental Affairs
<b>DEA&amp;DP</b>	-	Department of Environmental Affairs and Development Planning
<b>DFFE</b>	-	Department of Forestry, Fisheries and Environment
<b>DoA</b>	-	Department of Agriculture
<b>DWS</b>	-	Department of Water and Sanitation
<b>DEO</b>	-	Designated Environmental Officer
<b>DWS</b>	-	Department of Water and Sanitation
<b>EA</b>	-	Environmental Authorisation
<b>ECO</b>	-	Environmental Control Officer
<b>EIA</b>	-	Environmental Impact Assessment
<b>EAP</b>	-	Environmental Assessment Practitioner
<b>EMF</b>	-	Environmental Management Framework
<b>EMPr</b>	-	Environmental Management Program Report
<b>EPC</b>	-	Engineering Procurement Contractor
<b>ESA</b>	-	Ecological Support Area
<b>GG</b>	-	Governement Gazatte
<b>GN</b>	-	Government Notice
<b>Ha</b>	-	Hectare
<b>IDP</b>	-	Integrated Development Plan
<b>I&amp;APs</b>	-	Interested and Affected Parties
<b>km<sup>2</sup></b>	-	Square kilometres
<b>kV</b>	-	Kilovolt
<b>m<sup>2</sup></b>	-	Square meters
<b>MMP</b>	-	Maintenance Management Plan

<b>MSDS</b>	-	Material Safety Data Sheet
<b>MW</b>	-	Mega Watt
<b>NCR</b>	-	Non-conformance
<b>NEMA</b>	-	National Environmental Management Act (Act No 107 of 1998)
<b>NFEPA</b>	-	National Freshwater Ecosystem Protection Assessment
<b>NHRA</b>	-	National Heritage Resources Act (Act No 25 of 1999)
<b>NIRP</b>	-	National Integrated Resource Planning
<b>NNR</b>	-	No Natural Area Remaining
<b>NSEIA</b>	-	National Spatial Biodiversity Assessment
<b>NWA</b>	-	National Water Act (Act No 36 of 1998)
<b>ONA</b>	-	Other Natural Area
<b>PM</b>	-	Project Manager
<b>PPP</b>	-	Public Participation Process
<b>PSDF</b>	-	Provincial Spatial Development Framework
<b>PV</b>	-	Photovoltaic
<b>SAHRA</b>	-	South African Heritage Resources Agency
<b>SDF</b>	-	Spatial Development Framework
<b>SHE</b>	-	Safety, Health and Environment
<b>SIP</b>	-	Strategic Integrated Projects
<b>SRK</b>	-	SRK Consulting (South Africa) (Pty) Ltd
<b>SWMP</b>	-	Stormwater Management Plan
<b>SAHRA</b>	-	South African Heritage Resources Agency
<b>SANRAL</b>	-	South African National Roads Agency Limited

## 2 ENVIRONMENTAL ASSESSMENT PRACTITIONER & SPECIALISTS

This Environmental Management Programme Report (EMPr) was prepared by Michelle Boshoff from Envioworks, the Environmental Assessment Practitioner (EAP). The sections below provide the details of the EAP and explain the EAP's expertise to prepare this EMPr.

### 2.1 Details of the EAP

<b>Business name of EAP:</b>	Envioworks
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<b>Telephone:</b>	082 893 8537
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<b>Office Tel:</b>	+27 (0)82 598 6500

### 2.2 Expertise of the EAP

<b>Name of EAP</b>	<b>Education qualifications</b>	<b>Professional affiliations</b>	<b>Experience at environmental assessments (yrs.)</b>
Michelle Boshoff	MSc. Entomology (NWU)	IAIAsa: 5602; EAPASA Reg. 2020/714; SACNASP Reg: 119286	18 years
<b>Name of EAP (Reviewer)</b>	<b>Education qualifications</b>	<b>Professional affiliations</b>	<b>Experience at environmental assessments (yrs.)</b>
Elana Mostert	MSc. Botany (SU)	IAIAsa: 5631; EAPASA: 2019/1311	5 years



## 2.3 Curriculum Vitae of the EAP



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### Michelle Boshoff

#### RELEVANT QUALIFICATIONS

- Masters of Science in Entomology: University of North West (2005)

#### Other Courses

- Plant Protection Certificate in pesticide and herbicide applications (1997)
- Training in AquaBase data management (2000)
- Integrated Environmental Management Course through University of Natal (2003)
- Introduction to Waste Management Course through Icando Environmental Management and Training Solutions (2003)
- Coastcare Induction Programme through Department of Environmental Affairs & Tourism: Marine and Coastal Management (2004)
- Environmental Law through Aldo Leopold Institute (2004)
- Air Quality Management Course through University of Natal & CSIR (2006)
- Estuary Management through WRC & University of Natal (2006)
- Introduction to Arc GIS through ESRI (2007)
- Advanced Snake Handling Course through Hartbeespoort Dam & Animal Park (2007)
- Environmental Awareness in the Workplace through Green Gain Consulting (Pty) Ltd (2008)
- Legal Liability through Legislative Compliance Specialists (2008)
- Defensive Driving through Global Training (2008)
- Occupational Health, Safety and Environment Induction Course through Rio Tinto (2008)
- Effective Incident Investigations through Intersafe (2012)
- Stakeholder Engagement Academy – Residential Course through McDanough School of Business (2012)
- Water Management Awareness through Rio Tinto (2015)
- Decision Makers in Public Participation through iap2 (2018)
- Public Participation in Impact Assessment through iap2 (2018)
- Certificate of Training: EIA Law Event through Business Success Solutions (2020)

#### REGISTRATIONS & MEMBERSHIP:

EAPASA Registered EAP: 2020/714

IAIAsa: 5602

SACNASP: 119286

#### WORK EXPERIENCE

- **September 2000 – August 2001:** Scientific assistant for impact assessments at Jasper Muller & Associates
- **September 2001 – December 2002:** Research Assistant and Part Time Lecturer at the Hydrological Research Unit, University of Zululand
- **January 2003- February 2007:** Environmental Officer and Assistant Director for Impact Assessments at the Department of Agriculture and Environmental Affairs, KwaZulu-Natal
- **March 2007 – December 2017:** Ecologist and Environmental Manager for Richards Bay Minerals, Rio Tinto
- **January 2018 – August 2022:** Environmental Consultant at SM Services & Consulting Pty Ltd
- **September 2022 – current:** Environmental Consultant at Enviroworks

#### EIASIC ASSESSMENT & EIA EXPERIENCE

##### Environmental Assessment Practitioner (EAP)

- The proposed upgrade of upper reaches of Manzanyama canal in the magisterial district of uMhlatuze, KwaZulu-Natal (2007).
- The proposed upgrade of the P700 road through Nkandla, KwaZulu-Natal (2003-2007).
- Various EIA's related road upgrades and culvert/causeway upgrades in KwaZulu-Natal (2003-2007).

- Proposed installation of an 83m<sup>3</sup> aboveground storage tank at Elbee Conveying cc, Alton, Richards EIAY, KwaZulu-Natal (2005).
- Proposed clearing of vegetation and the construction of a children home at QwaQwa, Free State (2020).
- Proposed expansion of the Zulti North Mining Right, Mbonambi Municipality, KwaZulu-Natal (2016-2018).

#### **SPECIALIST EXPERIENCE**

- Permitting and licencing compliance review for Base Toliara, Toliara, Madagascar (2019-2020).Wetland ecology of Sithebe Wetland for the management of acid mine water, Hlabane, Vryheid, KwaZulu-Natal (2003).
- Site sensitivity assessment for proposed new essential oils distillation plant in Tzaneen, Limpopo (jaar?).
- Alien weed assessment for Rainbow Chickens in Sasolburg, Free State (2020).
- Review and comment on Zulti South mining right and Environmental Authorisation Appeal. uMhlathuze Municipality, KwaZulu-Natal (2016-2017).
- Review and comment on proposed Musina-Makhado IDZ EIA and specialist studies in Makhado, Limpopo (2021).
- Review and advise on permitting requirements for mineral mine, Base Toliara in Madagascar (2018).

#### **WATER USE LICENSES**

- Proposed water abstraction from the Caledon River for Telle Bridge & Port of Entry, near Clocolan, Free State (2018).
- Proposed water use licence and IWWMP for Paula Poultry Abattoir, Brandfort, Free State (2019).
- Proposed water use licence and IWWMP for Amadeus Abattoir, Bethlehem, Free State (in progress).
- Compilation of IWWMP for Sasol Komatipoort Service Station, Komatipoort, Mpumalanga (2022).
- Compilation of IWWMP for Sasol Zebediela Service station, Polokwane, Limpopo (in progress).
- Compilation of IWWMP for Sasol Rose Haven Service Station, Pretoria, Gauteng (in progress).

#### **MEMBERSHIP TO EXTERNAL COMMITTEES**

- Chamber of Mines: Environmental Policy Committee Member (2007-2017).
- Zululand Chamber of Commerce Member (2015-2017).
- Richards Bay Clean Air Association Member (2007-2011) and Managing Director (2001-2017).
- Tugela Transfer Committee (2015-2017).
- Rio Tinto Energy & Minerals Environmental Network (2008-2017).
- Rio Tinto Legal & Closure Steercom (2009-2017).
- Ezemvelo KZN Wildlife Honorary Officer (2005-2017).

## **2.4 Specialists involved during the EIA**

In order to adequately identify and assess potential environmental impacts associated with the proposed Solar Energy Facility, the following specialist sub-consultants (**Table 1**) have provided input into this EMPr via the Environmental Impact Assessment (EIA) Report:

**Table 1: Specialists involved in the assessment.**

AREA OF EXPERTISE	SPECIALIST
Avifaunal	Mokgatla Molepo (Pri.Nat.Sc.) from Moira Ecological Services (Pty) Ltd
Agricultural	Dr Johann Lanz (Pri.Nat.Sc.)
Terrestrial & Aquatic Ecological	Rikus Lamprecht (Pri.Nat.Sc.) from EcoFocus Consulting (Pty) Ltd
Economic Desktop Assessment	Petrus J van Jaarsveld (ESSA #0116) from Urban-Econ
Heritage and Archaeological	Jonathan Kaplan from Agency for Cultural Resource Management (ACRM)
Palaeontological	Dr John Almond from Natura Viva CC

AREA OF EXPERTISE	SPECIALIST
Terrestrial Biodiversity, Plant- and Animal Species	Mr Roy de Kock M.Sc (Pri.Nat.Sc.) from Blue Leaf Environmental (Pty) Ltd Megan Smith M.Sc Biological Sciences (Pri.Nat.Sci.; EAPASA: Registered EAP) from Enviroworks
Social	Michael Leach (EAPASA Reg: 2021/3872) from Enviroworks
Visual	Christoff Du Plessis from Enviroworks (BSc, AIS 1013)
Geo-Technical Desktop Assessment	Outeniqua Geotechnical Services

### 3 INTRODUCTION

King's Landing Trading 507 (Pty) Ltd trading as Enviroworks (hereafter referred to as Enviroworks) has been appointed by WKN Windcurrent SA (Pty) Ltd compile an Environmental Management Programme (EMPr) for the Khauta Cluster solar photovoltaic (SPV) Facilities situated in the Matjhabeng Local Municipality, Welkom Registration Division District, Free State Province, in terms of the National Environmental Management Act No 107 of 1998 (NEMA).

This Environmental Management Programme<sup>1</sup> (EMPr), amongst others, describes the mitigation measures and identifies the specific role players that will be responsible for implementation of the mitigation measures, in order to ensure that impacts on the environment are minimised during the construction, operational and decommissioning phases of the proposed development of a Solar Plant with associated infrastructure, substation and Battery Energy Storage System (BESS) on the following properties:

- 165MW Khauta North on Portion 0 of Farm 81 (Kopje Alleen) and Portion 1 of Farm 81.
- 110MW Khauta South on Portion 9 of Farm Commandants Pan No. 382, Farm Tafel Baai No. 413, Portion 12 of Farm Nooitgedacht No. 74
- 80MW Khauta West on Portion 3 of the Farm Kopje Alleen No. 81
- 50MW eNyane on Portion 3 of Farm Kopje Alleen No. 81 and Portion 9 of Farm Commandants Pan No. 382.

The objectives of this EMPr include<sup>2</sup>:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation, operation and decommissioning phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Khauta Cluster Solar Energy Facilities;
- Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced;
- Ensuring that are sufficient allocation of resources on the project budget so that the scale of EMP-related activities is consistent with the significance of the project impacts;
- Propose mechanisms and frequency for monitoring compliance and prevent long-term or permanent environmental degradation;
- Verifying environmental performance through information on impacts as they occur;
- Responding to changes in project implementation not consistent in the EIA;
- Responding to unforeseen events;
- Providing feedback for continual improvement in environmental performance; and,
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the EIA process.

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<sup>1</sup> Lochner, P. 2005. *Guideline for Environmental Management Plans*. CSIR Report No ENV-S-C 2005-053 H. Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.

<sup>2</sup> Hill, R. C. 2000. Integrated Environmental Management Systems in the implementations of projects. *South African Journal of Science* 96:50-54

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

The Applicant must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the EIA process for the Khauta Cluster Solar Energy Facilities, it is important that this document be read in conjunction with the EIA report compiled for each project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process.

Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle. This EMPr must form part of the contractual agreement between the relevant Contractor(s) and the Developer/Applicant.

### 3.1 Background

The applicant proposes installing a Solar Plant, associated infrastructure, substation and BESSs at the properties mentioned above to:

- Strengthen the electricity distribution network and address current voltage and capacity constraints;
- Integrate a greater amount of renewable energy into the electricity grid; and
- Reduce the requirement for investment in new conventional generation capacity (i.e., gas, nuclear, coal) and new distribution substations and powerlines to strengthen networks.

The Solar Plant & BESS will strengthen the electricity generation and distribution network in the Riebeeckstad area and wider Welkom area, and make the electricity generated by renewable energy dispatchable.

The NEMA requires that an EMPr be submitted along with the EIA Report to demonstrate how environmental management and mitigation measures will be implemented. The EIA Report contains a detailed description of the project and its impacts.

The mitigation measures apply to the following phases of the development process:

- **The Design Phase:** These measures relate to the detailed layout, planning and design of the Solar Plant, BESS and associated infrastructure, and will largely be implemented by the planning and development team, prior to the commencement of any physical on-site activities. These mitigation measures are presented in Section 6.
- **The Construction Phase:** These mitigation measures are applicable during site preparation and construction on the site of the proposed project and must be implemented by the relevant contractors and sub-contractors. These mitigation measures are presented in Section 7.

- **The Operational Phase** (the MMP): These mitigation measures are applicable during the long-term operation and maintenance of the Solar Plant and BESS and must be implemented by the applicant or approved service providers. These mitigation measures are presented in Section 9.

As it is expected that the Solar Plant & BESS will be maintained in the long-term and not be decommissioned in the foreseeable future (>20 years), best practice measures included in EMPr but that application for decommissioning (including site-specific EMPr) will be done according to the relevant legislation and required procedure, should decommissioning be planned. The management measures listed for the various phases are either:

- Essential: best practice measures which must be implemented and are non-negotiable; or
- Best Practice: recommended to comply with best practice, with adoption dependent on the proponent's risk profile and commitment to adhere to best practice, and which must be shown to have been considered and sound reasons provided by the proponent if not implemented. These measures have been italicized for ease of reference.

*Note: The EMPr will be submitted to DFFE for approval. This document may need to be updated to ensure that all relevant conditions of authorisation are adequately captured.*

### 3.2 Content of the EMPr and MMP

The EIA Regulations, 2014, promulgated in terms of NEMA (Government Notice (GN) R 982, as amended by GN R326 and GN R517) prescribe the required content in an EMPr. These requirements and the sections of this EMPr in which they are addressed, are summarised in **Table 2**.

**Table 2: Table 1: Environmental Management Programme requirements as per Appendix 4 of the NEMA EIA Regulations, 2014 (as amended).**

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(a)	A draft environmental management programme must comply with section 24N of the Act and include –		
	details of:	Yes	Chapter 2.1
	(i) the person who prepared the environmental management programme; and (ii) the expertise of that person to prepare an environmental management programme;	Yes	Chapter 2.2
(b)	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Yes	Chapter 4
I	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;	Yes	Chapter 3
(d)	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 phases of the development including planning and design; (ii) pre-construction activities construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and, (v) where relevant, operation activities;	Yes	Chapter 6, 7 & 8
(f)	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to 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 practice) 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;	Yes	Chapter 6, 7 & 8
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	YES	Chapter 6, 7 & 8
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	YES	Chapter 6, 7 & 8

Reg.	EMPr Content	Included (Yes, No or N/A)	Report Section Reference
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	YES	Chapter 6, 7 & 8
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	YES	Chapter 6, 7 & 8
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	YES	Chapter 6, 7 & 84
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by Regulations;	YES	Chapter 5
(m)	An environmental awareness plan describing the manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work; and,  (ii) risk must be dealt with in order to avoid pollution or the degradation of the environment; and	YES	Chapter 5
(n)	Any specific information that may be required by the Competent Authority.	-	-

### 3.3 Project Description

The Applicant proposes installing a Solar Plant with associated infrastructure, a substation and BESSs at each of the Khauta Cluster SPV Facility to:

- Strengthen the electricity generation and distribution network and address current voltage and capacity constraints;
- Integrate a greater amount of renewable energy into the electricity grid; and
- Reduce the requirement for investment in new conventional generation capacity (i.e., wind, solar, gas, nuclear, coal).

The following will be implemented at each Khauta Cluster SPV Facility:

**Technology:** The need for a Battery Storage Energy System (BESS) originates from the fact that electricity is only produced by the solar field while the sun is shining, while the peak demand may not necessarily occur during daylight hours. Therefore, the storage of electricity in BESS and supply thereof during peak demand will mean that the facility is more efficient, reliable and electricity supply is more consistent. Currently, battery technology alternatives being considered are either solid state batteries or redox flow batteries

**Updated Layout Plan:** During the impacts assessment and consultation with stakeholders it was noted that some areas within the Applicant site were regarded as ecological sensitive that was noteworthy to conserve. Based on the sensitivity map the layout plan has been updated to relocate the Solar panels with associated infrastructure, the substation and BESS to an area that is already disturbed or has a low sensitivity status. The ecological sensitive area has been mapped as a no-go area to conserve and protect the identified SCC's. Refer to **Figure 2** for the updated layout plan.

**Incorporation of the specialist recommendations within the EMPr:** This document has been updated to take into consideration the recommendations of the various specialists. These recommendations informed the updated layout plan, the management measures on Chapters 6, 7, 8 and 9.

Each Khauta SPV Facility will include the following infrastructure:



- PV modules and mounting structures (monofacial or bifacial) with fixed, single or double axis tracking mounting structures;
- Associated stormwater management infrastructure;
- Battery Energy Storage System (BESS);
- Site- and internal access roads (up to 6 m wide);
- Auxiliary buildings (Control room, general office, access control and security building, kitchen area with ablution facilities, small workshop, and a store);
- Ablution facilities and associated infrastructure;
- Temporary laydown area during the construction phase (which will be a permanent laydown area for the BESS during the operational phase);
- On-site substation;
- Grid connection infrastructure including medium-voltage (MV) cabling between the project components and the facility substation (underground cabling will be used where practical);
- Perimeter fencing; and,
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.
- MV cabling will make use of internal access roads as far as possible.

The subject of this EMPr is the proposed installation of the Solar Plant with associated infrastructure, a substation & BESS at the abovementioned properties (“the project”).

### 3.4 Site Description

The Applicants is proposing the development of a commercial Solar Energy Facility and associated infrastructure on a site located across six farms, located about 4km north-east of Riebeeckstad, within the Matjhabeng Local Municipality and within the Lejweleputswa District Municipality in the Free State Province. The facilities will have a contracted capacities of up to 165MW, 0MW, 80Mw and 50MW and will be known as the Khauta Cluster SPV Facilities. The cluster consist of renewable energy projects (to be known as the Khauta Cluster), which include one 165MW Khauta North SPV Facility, one 110MW Khauta South SPV Facility, one 80MW Khauta West SPV Facility and a 50MW eNyane SPV Facility.

From a regional perspective, the identified area within the Free State Province is considered favourable for the development of a commercial Solar PV Energy Facility by virtue of prevailing solar climatic conditions, the extent of the affected properties, the availability of a direct grid connection (i.e., a point of connection of the national grid) and the availability of land on which the development can take place.

Refer to **Error! Reference source not found.** for the general site information and **Error! Reference source not found.** for the location of the proposed development. The property on which the facility is to be constructed will be leased by the applicant from the landowners for the life-span of the project (minimum of 20 years).

**Table 3: General site information for the Proposed Khauta Cluster SPV Facilities.**

Description of affected farm portion(s)	<p><u>Solar PV (SPV) Facility and Associated Infrastructure:</u></p> <ul style="list-style-type: none"> <li>• Portion 0 of Farm 81 (Kopje Alleen) - 254.31 ha in extent</li> <li>• Portion 1 of Farm 81 (Kopje Alleen) - 261.18 ha in extent</li> <li>• Portion 9 of Farm 382 (Commandants Pan) in extent 761.65ha</li> <li>• Farm 413 (Tafel Baai) in extent 85.7ha</li> <li>• Portion 12 of Farm 74 (Nooit Gedacht) in extent 832.58ha</li> <li>• Portion 3 of the Farm Kopje Alleen No. 81 in extent 254.31ha</li> <li>• Portion 3 of Farm Kopje Alleen No. 81 in extent 253.72 ha</li> <li>• Portion 9 of Farm Commandants Pan No. 382 in extent 761.65 ha</li> </ul>
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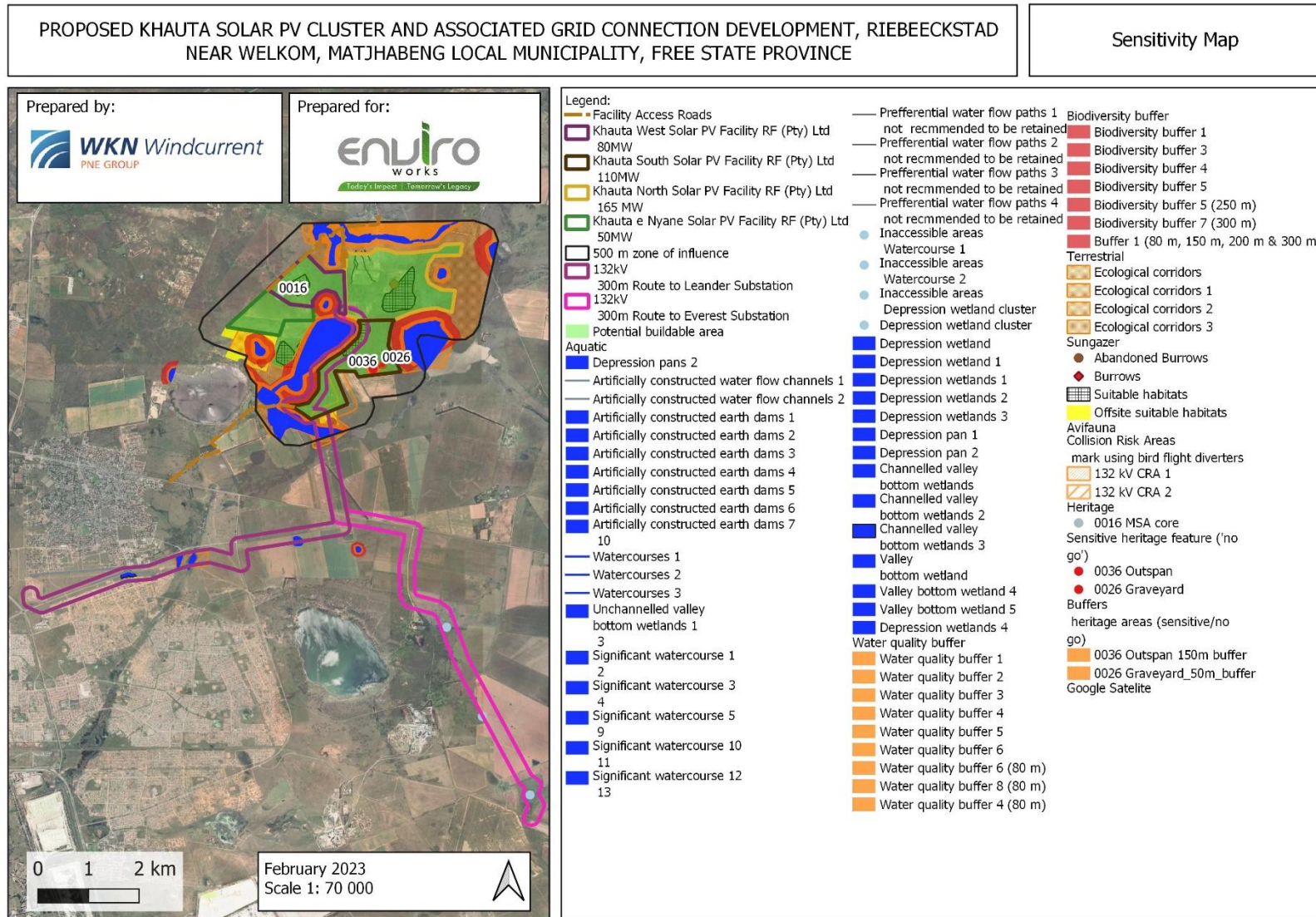
<p>21 Digit Surveyor General codes</p>	<p><u>SPV Facility and Associated Infrastructure:</u></p> <p>Portion 0 of Farm 81 (Kopje Alleen) - F0240000000008100000</p> <p>Portion 1 of Farm 81 (Kopje Alleen) - F0240000000008100001</p> <p>Portion 9 of Farm Commandants Pan No. 382; - F02400000000038200009</p> <p>Farm Tafel Baai No. 413 - F02400000000041300000</p> <p>Portion 12 of Farm Nooitgedacht No. 74 - F03900000000007400012</p> <p>Portion 3 of the Farm Kopje Alleen No. 81 - F0240000000008100003</p> <p>Portion 3 of Farm Kopje Alleen No. 81 - F0240000000008100003</p> <p>Portion 9 of Farm Commandants Pan No. 382 - F02400000000038200009</p>
<p>Title Deed</p>	<ul style="list-style-type: none"> <li>• T3378/2013 - Welkom Registration Division District, Free State Province</li> <li>• T3378/2013</li> <li>• T2214/1986</li> <li>• T8681/1975</li> <li>• T8681/1975</li> </ul>
<p>Photographs of the site</p>	<p>Refer to section 3.1</p>
<p>GPS Coordinates of the centre point of the Solar PV Facilities</p>	<ul style="list-style-type: none"> <li>• 27°52'59.55"S; and,</li> <li>• 26°52'12.76"E.</li> </ul>

The site is situated in the Matjhabeng Local Municipality, a Category B municipality in the Lejweleputswa District in the Free State Province, and is located outside the urban area of Riebeeckstad, bordered by agricultural farmland. The project area is situated within Ward 10 of the Matjhabeng Local Municipality.

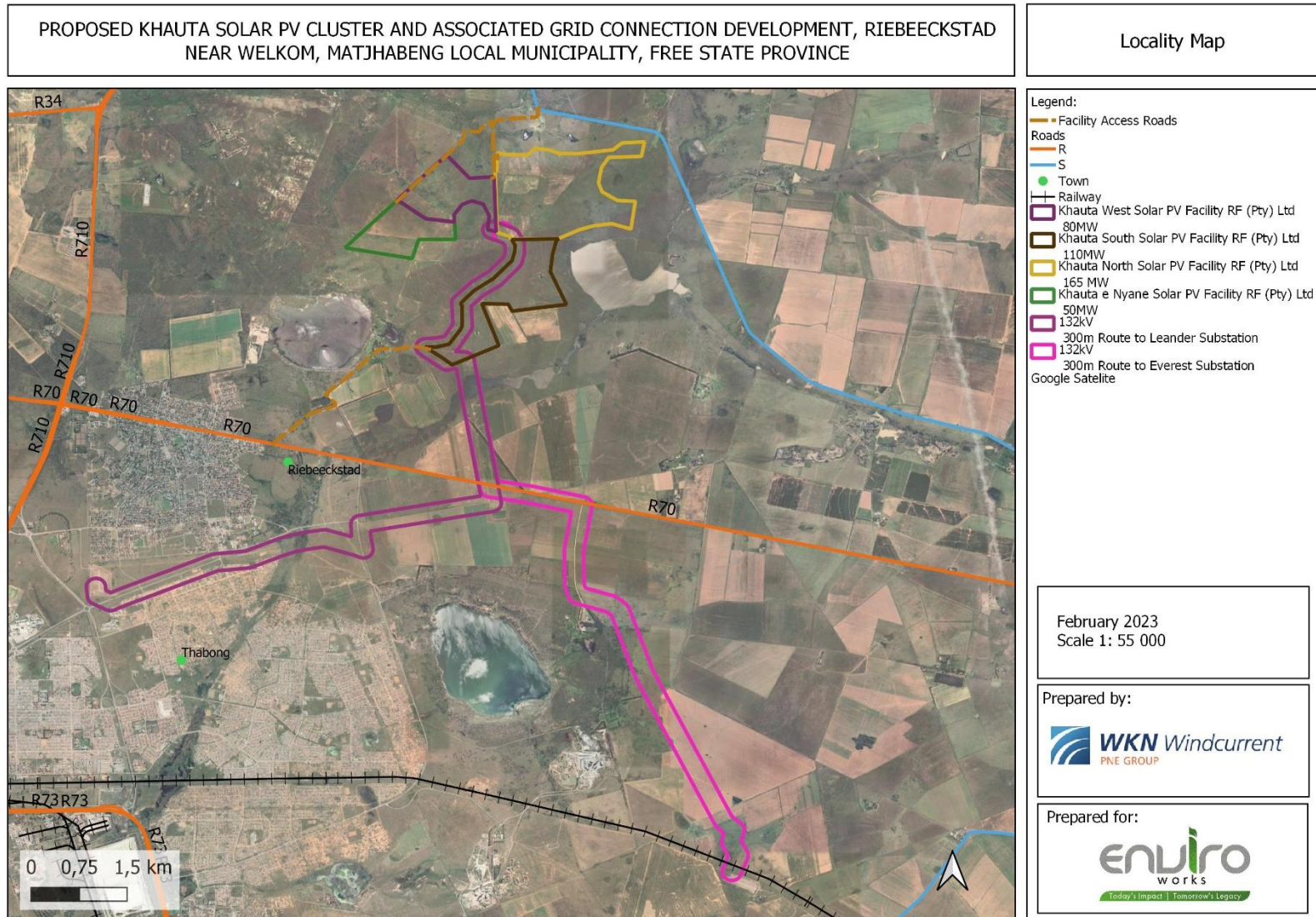
Topographically the study area is relatively flat and occurs between 1 380 and 1 400 meters above sea level (Mucina et al., 2006).

The assessment area consisted of a mosaic of mainly natural undisturbed terrestrial grassland and to a lesser extent, old historically cultivated agricultural lands, which was last cultivated approximately seven (7) years ago. The specialist findings by Dr Johann Lanz (2022) indicated that the land was assessed as being of insufficient land capability for viable and sustainable future crop production. The cropping potential of the site is limited by the combination of fairly low rainfall and shallow soils limited by dense clay and poor drainage in the subsoil.

The proposed development area and surrounding 500 m 'zone of influence' fall within the Middle Vaal Water Management Area (WMA 9). And most of the development footprint falls within the associated C25B quaternary surface water catchment- and drainage area. The watercourse and associated earth dams still house locally distinct and important aquatic and semi-aquatic habitats, which are mainly dominated by hydrophytic grass- and -graminoid species. These locally distinct and important aquatic and semi-aquatic habitats are also visibly utilised by various common and habitat-specific waterbirds, amphibian species and aquatic invertebrates as refuge and for breeding, foraging and/or persistence purposes. The basic ecosystem functionality has therefore remained predominantly unchanged.



**Figure 1: Combined Site Sensitivity Map for the Khauta SPV Cluster**



**Figure 2: Final Layout of the Khauta Cluster SPV's that exclude sensitive areas**

## 4 PROJECT COMPONENTS AND INFRASTRUCTURE

Each of the Khauta SPV Facility will compose of the following infrastructure:

- PV modules and mounting structures (monofacial or bifacial) with fixed, single or double axis tracking mounting structures;
- Associated stormwater management infrastructure;
- Battery Energy Storage System (BESS);
- Site- and internal access roads (up to 6 m wide);
- Auxiliary buildings (Control room, general office, access control and security building, kitchen area with ablution facilities, small workshop, and a store);
- Ablution facilities and associated infrastructure;
- Temporary laydown area during the construction phase (which will be a permanent laydown area for the BESS during the operational phase);
- On-site 33/132kV substation (facility substation) and associated 33/132kV collector transmission line;
- Grid connection infrastructure including medium-voltage cabling between the project components and the facility substation (underground cabling will be used where practical);
- Perimeter fencing; and,
- Rainwater and/or groundwater storage tanks and associated water transfer infrastructure.

**The main components and associated infrastructure are described in more detail in the following sections.**

## 5 ACTIVITIES AND COMPONENTS ASSOCIATED WITH EACH SOLAR ENERGY FACILITY

CONSTRUCTION PHASE	
<b>Requirements</b>	<ul style="list-style-type: none"> <li>• Project receives Environmental Authorisation (EA) from the Department of Forestry, Fisheries and Environmental Affairs (DFFE), preferred bidder allocation granted by the Department of Mineral Resources and Energy (DMRE), a generating license issued by the National Energy Regulator of South Africa (NERSA), and a Power Purchase.</li> <li>• Agreement secured with Eskom. In addition to bidding into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the developer is also considering options such as Private Power Purchase.</li> <li>• Agreements and Wheeling Agreements with Eskom to deliver the generated power to Private Off-takers.</li> <li>• The duration is expected to be 12 - 18 months for the Khauta Solar Energy Facility.</li> <li>• Create direct construction employment opportunities.</li> <li>• It is unlikely that on-site labour camps will be used. Employees to be accommodated in the nearby towns such as Riebeeckstad and Welkom and transported to and from site on a daily basis by bus.</li> <li>• Overnight on-site worker presence would be limited to security staff.</li> <li>• Waste removal and sanitation will be undertaken by a sub-contractor, where possible.</li> <li>• Waste containers, including containers for hazardous waste, will be located at easily accessible locations /solar panel positions on site when construction activities are undertaken.</li> <li>• Electricity required for construction activities will be generated by a generator. Where low voltage connections are possible, these will be considered.</li> <li>• Either borehole / municipal / dam or a combination of all 3 will be used to provide water. Should water availability at the time of construction be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as construction works.</li> </ul>
ACTIVITIES TO BE UNDERTAKEN	
<b>Conduct surveys prior to construction</b>	<ul style="list-style-type: none"> <li>• Including, but not limited to, a geotechnical survey, site survey and confirmation of the solar panel micro-siting footprint, and survey of the onsite collector substation site to determine and confirm the locations of all associated infrastructure.</li> <li>• Submit final detail design to the Competent Authority before construction commences.</li> </ul>
<b>Establishment of access roads to the site</b>	<ul style="list-style-type: none"> <li>• Internal access roads within the site will be established at the commencement of construction.</li> <li>• Existing access roads will be utilised, where possible, to minimise impact. It is unlikely that access roads will need to be upgraded as part of the proposed development, although maintenance may be required to ensure roads are in adequate condition to enable transportation of project components to site.</li> <li>• Access roads to be established between the solar panels for construction and/or maintenance activities within the development footprint.</li> <li>• Internal service road alignment will be approximately 4.5m wide. To be determined by the final micro-siting or positioning of the solar panels.</li> </ul>
<b>Undertake site preparation</b>	<ul style="list-style-type: none"> <li>• Including the clearance of vegetation at the footprint of each solar panel, establishment of the laydown areas, the establishment of internal access roads and excavations for foundations.</li> <li>• Stripping of topsoil to be stockpiled, backfilled, removed from site and/or spread on site to be undertaken in a systematic manner to reduce the risk of exposed ground being subjected erosion.</li> </ul>

	<ul style="list-style-type: none"> <li>• Include search and rescue of floral species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).</li> </ul>
<b>Establishment of laydown areas and batching plant on site</b>	<ul style="list-style-type: none"> <li>• A laydown area for the storage of solar components and civil engineering construction equipment.</li> <li>• The laydown will also accommodate building materials and equipment associated with the construction of buildings.</li> <li>• No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas.</li> </ul>
<b>Construct foundation</b>	<ul style="list-style-type: none"> <li>• Excavations to be undertaken mechanically.</li> <li>• For PV array installation vertical support posts will be driven into the ground.</li> <li>• Depending on geological conditions, the use of alternative foundations may be considered (e.g., reinforced piles).</li> </ul>
<b>Transport components and equipment to and within the site</b>	<ul style="list-style-type: none"> <li>• The components for the solar PV facility and onsite substation will be transported to site by road.</li> <li>• Components to be transported to the site in sections on flatbed trucks by the solar panel supplier. There are three viable options for the port of entry for imported components - the Port of Richard's Bay in KwaZulu-Natal, and the ports of East London and Ngqura in the Eastern Cape. At present the most feasible port of entry is deemed to be the Port of Richard's Bay in the KwaZulu- Natal Province.</li> <li>• Some of the components (i.e., substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations.</li> <li>• Typical civil engineering construction equipment will need to be brought to the site (e.g., excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.</li> <li>• Components for the establishment of the substation (including transformers) and the associated infrastructures to be transported to site.</li> <li>• Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the site.</li> </ul>
<b>Erect PV Panels and construct substation, inverters and BESS</b>	<ul style="list-style-type: none"> <li>• The construction phase involves installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical report a different foundation method, such as screw pile, helical pile, micro-pile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the project's on-site substation. This process also involves the installation of the BESS facility.</li> </ul>
<b>Connection of PV panels to the substation</b>	<ul style="list-style-type: none"> <li>• PV arrays to be connected to the on-site substation via underground electrical cables.</li> <li>• Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5m deep.</li> <li>• Underground cables are planned to follow the internal access roads, as far as possible.</li> <li>• Onsite substation to be connected to the collector substation via underground cables.</li> </ul>
<b>Establishment of ancillary infrastructure</b>	<ul style="list-style-type: none"> <li>• Site offices and maintenance buildings, including workshop areas for maintenance and storage will be required.</li> <li>• Establishment will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.</li> </ul>

<p><b>Connect facility to the power grid</b></p>	<ul style="list-style-type: none"> <li>• It is proposed that a 33/132 kV substation is constructed; hereafter, referred to as the facility substation, which will include inverter-stations, transformers, switchgear and internal electrical reticulation. It is estimated that the maximum size of the facility substation will not exceed one point one hectares (1.1 ha).</li> <li>• Three additional SPV Facilities are proposed on the adjacent farms: namely, the 50 MW Khauta e Nyane SPV Facility, 80 MW Khauta West SPV Facility and 165 MW Khauta North SPV Facility (collectively referred to as the Khauta SPV Cluster) and are concurrently being considered and assessed through separate Environmental Impact Assessment (EIA) processes.</li> <li>• The generated electricity from the Khauta SPV Cluster shall be transmitted to the North SPV Facility collector substation with a 33/132 kV Overhead Power Line linking Khauta West- and Khauta North- to Khauta South SPV Facility's substation.</li> </ul>
<p><b>Undertake site rehabilitation</b></p>	<ul style="list-style-type: none"> <li>• Commence with rehabilitation efforts once construction completed in an area, and all construction equipment is removed.</li> <li>• On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.</li> </ul>
<p><b>OPERATIONAL PHASE</b></p>	
<p><b>Requirements</b></p>	<ul style="list-style-type: none"> <li>• Duration will be 20-30 years.</li> <li>• Requirements for security and maintenance of the project.</li> <li>• Employment opportunities relating mainly to operation activities and maintenance. Approximately 10 to 25 full-time employment opportunities will be available during the operation of the Solar Energy Facility.</li> <li>• Waste containers, including containers for hazardous waste, will be located at easily accessible locations/solar panel positions on site when construction activities are undertaken. Waste removal and sanitation will be undertaken by a suitably qualified contractor.</li> <li>• Either borehole / municipal / dam or a combination of all 3 will be used to provide water. Should water availability at the time of operation be limited, water will be transported to site via water tanks. Water will be used for sanitation and potable water on site as well as operational and maintenance works.</li> </ul>
<p><b>ACTIVITIES TO BE UNDERTAKEN</b></p>	
<p><b>Operation and Maintenance</b></p>	<ul style="list-style-type: none"> <li>• Full time security, maintenance, and control room staff.</li> <li>• All solar panels will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities.</li> <li>• Solar panels to be subject to periodic maintenance and inspection.</li> <li>• Disposal of waste products (e.g., oil and other lubricants, broken panels etc) in accordance with relevant waste management legislation.</li> <li>• Areas which were disturbed during the construction phase to be utilised should a laydown area be required during operation.</li> <li>• PV panels will be washed during operation utilising clean water or non-hazardous biodegradable cleaning products. Wastewater generated by washing can be allowed to run-off under the panels.</li> </ul>
<p><b>Decommissioning Phase</b></p>	
<p><b>Requirements</b></p>	<ul style="list-style-type: none"> <li>• Decommissioning of the Khauta Custer Solar Energy Facilities infrastructure at the end of its economic life.</li> <li>• Potential for repowering of the facility, depending on the condition of the facility at the time.</li> </ul>



	<ul style="list-style-type: none"> <li>• Expected lifespan of approximately 20 - 30 years (with maintenance) before decommissioning is required.</li> <li>• Decommissioning activities to comply with the legislation relevant at the time.</li> </ul>
<b>Activities to be undertaken</b>	
<b>Site preparation</b>	<ul style="list-style-type: none"> <li>• Confirming the integrity of site access to accommodate the required equipment.</li> <li>• Preparation of the site (e.g., laydown areas and construction platform).</li> <li>• Mobilisation of construction equipment.</li> </ul>
<b>Disassemble and remove solar panels</b>	<ul style="list-style-type: none"> <li>• Disconnect the facility from the grid.</li> <li>• Dismantle all panels, mounting structures and foundations in line with all relevant legislation.</li> <li>• Recycle, repurpose and re-use as much of the decommissioned project components as possible in accordance with regulatory requirements.</li> <li>• Concrete foundations will be removed to a depth as defined by an agricultural specialist.</li> <li>• Backfill the mounting structure holes and rehabilitate the area appropriately.</li> <li>• Visible cables will be removed.</li> <li>• A final site walkthrough will be conducted to remove debris and/or waste generated within the site during the decommissioning process.</li> <li>• Rehabilitation may include top soiling, raking, and/or re-seeding (whichever is appropriate).</li> </ul>

It is expected that the areas of the project site affected by the Solar Energy Facility infrastructure (development footprint) will revert back to their original landuse (i.e., agriculture) once the Khauta Cluster Solar Energy Facilities have reached the end of its economic life and all infrastructure has been decommissioned.

## 5.1 Method Statements

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

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

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc., including a site camp plan indicating all of these).
- Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e. comply strictly to licence and legislation requirements and restrictions).
- Stipulate the stormwater management procedures recommended in the stormwater management method statement.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of the waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management:
  - Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
  - Should grey water (i.e., water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into existing facilities or sewerage systems where possible. Where no facilities are available, grey water runoff into holding tanks must be controlled to ensure there is no unacceptable seepage occurs.
- Dust and noise pollution:

- Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
- Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply):
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at the storage and handling areas.
  - All storage areas, (i.e., for harmful substances appropriately banded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.
- Fauna and flora protection process on and off site (i.e., removal to reintroduction or replanting, if necessary):
  - Rehabilitation, re-vegetation process and bush clearing.
- Incident and accident reporting protocol.
- General administration.
- Designate access road and the protocol for when roads are in use.
- Requirements on gate control protocols.

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

Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

## 5.2 Awareness and Competence

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- All employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant Method Statements and be aware of the content thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the solar facility.

- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - Records must be kept of those that have completed the relevant training.
  - Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
  - Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- Contractors and main sub-contractors should have basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- Ensuring that employee information posters, outlining the environmental “do’s” and “don’ts” (as per the environmental awareness training course) are erected at prominent locations throughout the site.

### **5.2.1 Environmental Awareness Training**

Environmental Awareness Training must be undertaken by the Engineering Procurement Contractor (EPC) Contractor and must take the form of an on-site talk and demonstration by the Environmental Officer (EO) before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the SHE Officer on site.

### **5.2.2 Induction Training**

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

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

### **5.2.3 HSE Talks**

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

## **5.3 Monitoring, Reporting & Auditing**

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. Monitoring during construction must be on-going for the duration of this phase. The Project Manager must ensure that the monitoring is conducted and reported.

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

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- Ensure adequate and appropriate interventions to address non-compliance;
- Ensure adequate and appropriate interventions to address environmental degradation;
- Provide a mechanism for the lodging and resolution of public complaints;
- Ensure appropriate and adequate record keeping related to environmental compliance;
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and,
- Aid in communication and feedback to authorities and stakeholders.

All documentation e.g., audit/monitoring/compliance reports and notifications, required to be submitted to the DFFE in terms of the Environmental Authorisation, must be submitted to the Director: Compliance Monitoring of the Department.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

### **5.3.1 Non-Compliance Reports**

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

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

### **5.3.2 Incident Reports**

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

- a) the nature of the incident;
- b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
- c) initial measures taken to minimise impacts;
- d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and

- e) measures taken and to be taken to avoid a recurrence of such incident.

### **5.3.3 Monitoring Reports**

A monitoring report will be compiled by the ECO on a monthly basis (or as dictated by the conditions of the EA) and must be submitted to the Director: Compliance Monitoring at DFFE for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out, or any other aspect as per the EIA Regulations (2014, as amended). The EPC contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DFFE regarding waste related activities.

### **5.3.4 Audit Reports**

The Developer must ensure that project compliance with the conditions of the EA is audited by an independent auditor, and that the audit reports are submitted to the Director: Compliance Monitoring at the DFFE at intervals as dictated by the conditions of the EA. Such audits must be undertaken during both the construction and operation phases of the solar facility. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation should be audited. The results must form part of the project monitoring and audit reports.

### **5.3.5 Final Audit Report**

A final environmental audit report must be compiled by an independent external auditor and be submitted to DFFE upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

## 6 MEASURE APPLICABLE TO DESIGN PHASE

### 6.1 Roles and Responsibilities

The key role players during the Design Phase of the project are:

- Applicant (the proponent); and
- Engineers responsible for the design of the proposed project.

Their roles and responsibilities during the detailed Design Phase with respect to the implementation of the EMPr are outlined below.

#### Applicant / Developer:

- Ensure that the engineering/design team is aware of and takes into consideration all relevant measures in the EMPr; and
- Confirm that all relevant environmental management measures in the EMPr have been incorporated into the project design on completion of the Design Phase.

#### Engineer / Project Manager / Site Manager:

- Take cognisance of all relevant measures in the EMPr and ensure integration thereof in the detailed design; and
- Reference the environmental management measures applicable to the Construction (Section 8) and Operational (Section 7) Phases of the project in all documents that will be applicable to future phases of the project (e.g., tender documents).

### 6.2 Environmental Management Measures

The environmental management and mitigation measures that must be implemented during the Design Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in **Table 4** below

Based on the expected presence of deep alluvial and residual soils overlying the bedrock, driven piling systems should be considered as founding solutions for the proposed solar panels. Piling systems would have to be designed to resist heave action of expansive clays. Where shallow bedrock is encountered, founding of the solar PV support structures may take place by means of pad foundations (BVi, 2021).

**Table 4: Environmental management and mitigation measures that must be implemented during the Design and Pre-Construction Phase.**

Design Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>2</sup>	Performance
<b>Authorisations</b>	1.	Ensure that all required licences and permits have been obtained before the start of construction.	• Applicant	• Before construction commences	• Keep record of all permits, licences and authorisations	• Required licences/permits on file
	2.	Detailed layout design to DFFE with preferred technology alternatives		• Keep record of correspondence	• Required correspondence on file	• Updated alternative • Detailed layout plan
<b>Environmental Compliance</b>	3.	Appoint a suitably qualified Environmental Control Officer (ECO) to oversee construction activities.	• Applicant	• Before construction commences	• Review appointment documentation	• ECO appointment documents
	4.	Include the EMPr in all tender documents to ensure that sufficient resources are allocated to environmental management by the Contractor.	• Applicant and Engineering consultants	• Prior to call for tenders	• Applicant to check tender documents and contract	• Incorporated in tender documents
	5.	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental rehabilitation.				
<b>Water supply</b>	7.	Obtain approval from local municipality / water user association / relevant authority for supply of water required during construction.	• Applicant	• Prior to construction	• Request for approval from local municipality / water use association	• Approval for water use
<b>Employment</b>	8.	Set targets for the use of local labour based on the needs of the proponent and the availability of existing skills and people that are willing to undergo training.	• Applicant	• Call for tenders	<ul style="list-style-type: none"> <li>• Applicant to check tender documents and contract</li> <li>• Keep record of how targets were determined</li> <li>• Keep record of staff by origin</li> <li>• Keep record of training provided</li> </ul>	<ul style="list-style-type: none"> <li>• Incorporated in tender documents</li> <li>• Percentage of local staff</li> <li>• Percentage of Previously Disadvantaged Individual (PDI) staff</li> <li>• Number of incidents</li> <li>• Time activities stopped</li> <li>• Number of recurring incidents</li> </ul>
	9.	Ensure that Contractors from outside the local area that tender for work meet the required targets for how many locals are given employment.				
	10.	Consider implementing labour-intensive rather than capital-intensive work methods wherever possible.				
	11.	Consider purchasing resources from local sources wherever possible.				



Design Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>2</sup>	Performance
<b>Solar panels, BESS design and associated infrastructure (including substation)</b>	12.	Design the component so that all electrolytes and active materials are encapsulated by protective covering where practical.	<ul style="list-style-type: none"> <li>Applicant and Engineering consultants</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review design documentation</li> </ul>	<ul style="list-style-type: none"> <li>BESS design</li> </ul>
	13.	Design component to have monitoring systems to detect leaks or emissions.				
	14.	Consider an aqueous electrolyte which significantly reduces the hazards associated with organics and acids.				
	15.	<b>Specific to Solid State Battery Technology:</b> Add complexing agents to electrolyte to reduce potential for air borne release of toxic bromine.				
	16.	Paint containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white).				
	17.	Do not increase the height of existing buildings, unless specifically required for operations.				
	18.	Be sensitive towards the use of glass or material with a high reflectivity which may cause glare and increase visual impacts.				
<b>BESS safety</b>	19.	Be mindful of supplier recommendations when deciding on placement (especially in relation to existing high voltage infrastructure at the substation) and stacking of battery storage containers.	<ul style="list-style-type: none"> <li>Applicant and Engineering consultants</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review design documentation</li> </ul>	<ul style="list-style-type: none"> <li>Placement of battery storage</li> </ul>
<b>Waste management</b>	20.	Develop a waste management plan, laying out: <ul style="list-style-type: none"> <li>Expected type and amount of waste;</li> <li>Measures to reduce waste;</li> <li>Type and expected volume of recyclable waste;</li> <li>Recycling facilities that will collect / receive waste;</li> <li>Type of storage for different waste types;</li> <li>Waste contractors that will collect waste.</li> </ul>	<ul style="list-style-type: none"> <li>Applicant</li> <li>Consultant team</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review of design documents</li> </ul>	<ul style="list-style-type: none"> <li>Adequate provision for waste disposal</li> </ul>
<b>Stormwater management</b>	21.	Ensure designs comply with the recommendations of the Storm Water Management Plan (SWMP) (see Appendix N3).	<ul style="list-style-type: none"> <li>Engineering consultants</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review detailed layout plans</li> </ul>	<ul style="list-style-type: none"> <li>Approval of final design</li> <li>Recommendations of SWMP included in final design</li> </ul>
	22.	Ensure that storm water originating from upgradient (stormwater that could flow across the site from external areas) is diverted around the site.				
	23.	Design stormwater infrastructure so that stormwater is kept separate from contaminated water and bunded areas.				
	24.	Design the drainage systems (of stormwater infrastructure, trenches, drains and outlets) to encourage dissipation of water, decreasing velocity of water and prevent erosion, ponding and flooding of the site and surrounding environment.				

Design Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>2</sup>	Performance
	25.	Consider secondary and tertiary containment measures due to the hazardous nature of the battery electrolytes.				
	26.	Maintain and clean bunded areas on a regular basis.				
Floral management	27.	Appoint a suitably qualified specialist to oversee search and rescue of floral species <i>into a suitable receptor site</i> . Obtain necessary approval and permits from the relevant authorities.	<ul style="list-style-type: none"> <li>Applicant</li> <li>Consultant team</li> </ul>	<ul style="list-style-type: none"> <li>Prior to the start of vegetation clearance</li> </ul>	<ul style="list-style-type: none"> <li>Appointment of vegetation specialist</li> <li>Search and Rescue Report</li> </ul>	<ul style="list-style-type: none"> <li>Permit on file</li> <li>Floral species relocated</li> </ul>
	28.	To reduce the potential loss of grassland vegetation, it is expected that areas between the solar panels be kept as natural as possible. (Terrestrial Specialist)				
	29.	Appoint a botanist / rehabilitation specialist to help with the planning of relocation of species, should this be required. .				
	30.	Avoid placing infrastructure in areas containing sensitive vegetation.				
Fauna management	31.	All suitable habitats for <i>S. giganteus</i> outside of the development footprint must be avoided. (Terrestrial Specialist)	<ul style="list-style-type: none"> <li>Applicant</li> <li>Consultant team</li> </ul>	<ul style="list-style-type: none"> <li>Prior to the start of vegetation clearance</li> </ul>	<ul style="list-style-type: none"> <li>Appointment of faunal specialist</li> </ul>	<ul style="list-style-type: none"> <li>Permit on file</li> </ul>
	32.	A pre-construction walk through of the suitable habitat for <i>S. giganteus</i> within the footprint must done to confirm the absence of the species. (Terrestrial Specialist)				
Avifauna management	33.	Undertaking sufficient pre-construction monitoring to determine the presence of threatened rare, endemic or range-restricted species. SABAP2 data is recommended to supplement adequate field surveys.	<ul style="list-style-type: none"> <li>Applicant</li> <li>Consultant team</li> </ul>	<ul style="list-style-type: none"> <li>Prior to the start of vegetation clearance</li> </ul>	<ul style="list-style-type: none"> <li>Appointment of avifaunal specialist</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring record</li> </ul>
Dust management	34.	Ensure dust management is incorporated into the construction phase.	<ul style="list-style-type: none"> <li>Applicant</li> <li>Consultant team</li> </ul>	<ul style="list-style-type: none"> <li>Prior to the start of vegetation clearance</li> </ul>	<ul style="list-style-type: none"> <li>Dust Management Plan</li> </ul>	<ul style="list-style-type: none"> <li>Dust Management Plan available</li> </ul>
Fire management	35.	Ensure that areas designed for the storage of fuel and other flammable materials comply with standard fire safety regulations.	<ul style="list-style-type: none"> <li>Engineering consultants</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review detailed layout plans</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with measures</li> </ul>
Visual impacts	36.	Paint the battery storage containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white).	<ul style="list-style-type: none"> <li>Engineering consultants</li> </ul>	<ul style="list-style-type: none"> <li>During design phase</li> </ul>	<ul style="list-style-type: none"> <li>Review detailed layout plans</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with measures</li> </ul>
	37.	Do not increase the height of existing buildings, unless specifically required for operations.				
	38.	Be sensitive towards the use of glass or material with a high reflectivity which may cause glare and increase visual impacts.				
Traffic	39.	Engage the road authorities to determine the optimal route to the site for construction vehicles and delivery vehicles.	<ul style="list-style-type: none"> <li>Applicant</li> </ul>	<ul style="list-style-type: none"> <li>Prior to construction</li> </ul>	<ul style="list-style-type: none"> <li>Correspondence with road authorities</li> </ul>	<ul style="list-style-type: none"> <li>Proof of correspondence with road authorities</li> <li>Permission to transport solar panels, battery storage containers</li> </ul>
	40.	Obtain all required approvals for transporting solar panels and battery storage containers to site (e.g., approval for abnormal load).				

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## 7 MEASURES APPLICABLE TO CONSTRUCTION PHASE

Vegetation loss of rehabilitating grassland and natural grassland will occur during the site establishment and initial construction phase. Although most of the site has been previously transformed/degraded, the footprint is still likely to fulfil important ecosystem functioning and the vegetation does represent at least some of the elements of the indigenous vegetation type.

### 7.1 Roles and Responsibilities

The key role players during the Construction Phase of the project are anticipated as follows:

- Applicant (the proponent);
- Resident Engineer (RE), who will oversee the activities of the contractors on site;
- Contractor(s) responsible for the construction of the proposed project;
- Any sub-contractors hired by Contractors; and,
- ECO.

It is acknowledged that the specific titles for these functions may vary once the project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during project implementation. The Applicant will retain responsibility for ensuring that the Contractor fully implements the provisions of the EMPr.

Key roles and responsibilities during the Construction Phase with respect to the implementation of the EMPr are outlined below.

#### **Applicant as the Developer:**

Applicant has overall responsibility for management of the project. In terms of environmental management, the proponent will:

- Appoint a suitably experienced Engineer/s and Environmental Practitioner/s who will be responsible for the overall management of activities on site during the Construction Phase;
- Appoint a suitably qualified ECO to monitor compliance with the EMPr and other environmental permits for the duration of the Construction Phase;
- Ensure that the engineers are aware of the requirements of the EMPr and relevant Method Statements (e.g., Vegetation Management, implement the EMPr and monitor the Contractor's activities on site;
- Ensure that Contractors are aware of and contractually bound to the provisions of this EMPr by including the relevant environmental management requirements in the tender and contract documents, as appropriate;
- Ensure that Contractors remedy non-compliance with the EMPr or unforeseen environmental damage timeously and to the satisfaction of the ECO and authorities (when necessary);
- Notify the authorities should non-compliance with the EMPr or unforeseen environmental damage not be remedied timeously; and,
- Ensure that suitable mobile chemical toilets are placed on-site (via Applicant or appointed contractors)

### **Resident Engineer:**

Applicant will appoint suitably qualified Engineers, who in turn will designate a suitable RE or technician/s who will be responsible for overseeing activities of the Contractor during the Construction Phase. The RE shall:

- Ensure that the Contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Relay all instructions from the ECO to the Contractor and ensure that these are fully understood and implemented;
- Report any environmental emergencies/concerns to the ECO immediately;
- Act as a point of contact for local residents and community members; and,
- Ensure that non-compliance is remedied timeously and to the satisfaction of the relevant authorities.

### **Contractors:**

Contractors will each be required to appoint or designate a Contractor's Environmental Representative (CR) who will assume responsibility for the Contractor's environmental management requirements on site and be the point of contact between the Contractor and the ECO. Each CR shall:

- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor the Contractor's activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Ensure that all employees and sub-contractors comply with the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and,
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

Contractors have a duty to demonstrate respect and care for the environment. Contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

### **Sub-contractors:**

All Sub-contractors will be required to:

- Ensure that all employees are duly informed of the EMPr and associated responsibilities and implications of this EMPr prior to commencement of construction;
- Ensure that all activities on site are undertaken in accordance with the EMPr;
- Monitor employees' activities (together with the ECO) with regard to the requirements outlined in the EMPr;
- Immediately notify the ECO of any non-compliance with the EMPr, or any other issues of environmental concern; and,
- Ensure that non-compliance is remedied timeously and to the satisfaction of the ECO.

Each Sub-contractor has a duty to demonstrate respect and care for the environment. Sub-contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation, resulting from their presence on site.

### **Environmental Control Officer:**

The ECO shall be a suitably qualified/experienced environmental professional or professional firm, appointed by the proponent, for the duration of the Construction Phase of the project. The ECO shall:

- Request Method Statements from Contractors prior to the start of relevant construction activities, where required, and approve these (as appropriate) without causing undue delay;
- Monitor, review and verify compliance with the EMPr, EA and any other environmental permit/ approval, by Contractors as well as any sub-contractors and specialist contractors;
- Undertake site inspections monthly to determine compliance with the EMPr, EA, and any other environmental permit/ approval;
- Identify areas of non-compliance and recommend corrective actions (measures) to rectify them in consultation with Applicant, the RE and the applicable Contractor, as required;
- Compile a checklist highlighting areas of non-compliance following each ECO inspection;
- Ensure follow-up and resolution of all non-compliances;
- Provide feedback for continual improvement in environmental performance;
- Respond to changes in project implementation or unanticipated site activities which are not addressed in the EMPr, and which could potentially have environmental impacts, and advise Applicant, the RE and Contractor as required; and,
- Undertake a site closure inspection, which may result in recommendations for additional clean-up and rehabilitation measures.

## 7.2 Compliance Monitoring

### 7.2.1 Method Statements

A Method Statement is a document setting out specific details regarding the plant, materials, labour and method the Contractor proposes using to carry out certain activities, usually activities that may have a detrimental effect on the environment. It is submitted by the Contractor to the RE and ECO for approval.

The purpose of a Method Statement is for the Contractor to provide additional details regarding the proposed methodology for certain activities, and for the RE and ECO to confirm that these meet the requirements of the EMPr and acceptable environmental practice. This allows the EMPr to be less prescriptive and affords the Contractor a certain amount of flexibility or to amend stipulations in the EMPr, if approved by the RE/ECO. It also provides a reference point to detect deviations from the agreed approach to an activity.

Each Method Statement must address environmental management aspects relevant to the activity and will typically provide detailed descriptions of items including, but not necessarily limited to:

- Nature, timing and location of activities;
- Procedural requirements and steps;
- Management responsibilities;
- Material and equipment requirements;
- Transportation of equipment to and from site;
- Method for moving equipment/material while on site;
- How and where material will be stored;
- Emergency response approaches, particularly related to spill containment and clean-up;
- Response to compliance/non-conformance with the requirements of the EMPr; and,
- Any other information deemed necessary by the RE/ECO.

The following list provides examples of Method Statements that may be requested from the Contractor:

- Construction site establishment;
- Environmental awareness training including the date, time and location of the course/s, the course content and provision for refresher courses;
- Material and equipment storage and delivery;
- Dust control;
- Fuel storage, dispensing and fuel spills;
- Waste management;
- Management of contaminated water;
- Stormwater management;
- Operating heavy machinery;
- Cement batching;
- Transporting equipment / containers to site; and,
- Any others requested by the RE/ECO.

The Method Statements will be submitted by the Contractor to the RE and ECO no less than 14 days prior to the intended date of commencement of an activity (or as otherwise agreed with the RE/ECO). The RE/ECO shall approve / reject the Method Statement within 2 days. An activity for which a Method Statement has been requested shall not commence until the RE/ECO has approved of such method and once approved, the Contractor shall abide by the relevant Method Statement.

### 7.2.2 Environmental Records and Report

Environmental records and reports required during the Construction Phase are listed in **Table 5**.

**Table 5: Reports required during Construction**

Report	Frequency	From	To
Environmental Checklist	Weekly	CR	ECO and Applicant
Environmental Compliance Report	Twice a month / following each inspection	ECO	RE and Applicant
Environmental Incident Report	Within 24 hours of incident occurrence	CR	ECO and Applicant
Site Closure Report	End of Contract	ECO	RE and Applicant
Statutory Environmental Audit Report 1	Within six months of commencement of the Construction Phase or as specified in the EA	Independent environmental auditor	DFFE
Statutory Environmental Audit Report 2	Within one month after completion of the Construction Phase or as specified in the EA	Independent environmental auditor	DFFE
Other Statutory Environmental Audit Reports (S34 and Appendix 7 of EIA Regs)	As specified in the EA for the period during which the environmental authorisation and EMPr remain valid.	Independent environmental auditor	DFFE

**7.2.2.1 Environmental Checklist**

The CR will undertake weekly site inspections to check on the implementation of the EMPr, EA, and any other environmental permit/approval, by the Contractor and complete a brief report/checklist after the inspection. The completed checklists shall be submitted to Applicant and the ECO at the end of each inspection. This checklist should be discussed between the CR and the ECO during the initial site inspection, and agreement reached on the preferred format and content.

**7.2.2.2 Environmental Compliance Report**

The ECO will prepare an Environmental Compliance Report following each site inspection, detailing any environmental issues, compliances, non-compliance and corrective actions to be implemented. These reports will be based on the ECO’s observations, and the weekly Environmental Checklists undertaken by the CR. Environmental Compliance Reports will be submitted to the RE and Applicant and a full record will be kept by the ECO, for submission to the Local Authority and/or DFFE on request.

When more frequent site visits are undertaken by the ECO, the frequency of progress reports will increase accordingly to allow for timeous reporting of environmental issues and actions required.

**7.2.2.3 Photographic Records**

If the ECO identifies any areas of concern, the ECO will request photographic records, which must be submitted by the Contractor for evidential purposes. The ECO shall also keep photographic records of all construction activities and areas of concern during site inspections.

**7.2.2.4 Construction Site Closure Report**

The ECO will undertake a final site closure inspection on completion of the Construction Phase. The purpose of this is to confirm compliance with all site closure requirements identified by the ECO, and that the site has been



left in an environmentally suitable condition. If outstanding environmental requirements are observed during this inspection, a further inspection must be carried out to confirm compliance. The Site Closure Report will be submitted to the RE and Applicant for evidential purposes, and to DFFE if requested.

#### *7.2.2.5 Statutory Environmental Audit Reports*

In terms of Regulation 34 of the NEMA EIA Regulations, 2014 (as amended), Applicant is required to appoint an independent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMPr and recommend improvements (if required). In terms of Regulation 34(2)(d) of the EIA Regulations, 2014 (as amended), the Environmental Audit Reports must be conducted and submitted at intervals confirmed by DFFE in the EA.

It is recommended that the first Environmental Audit Report be submitted to DFFE within six months of the commencement of the Construction Phase and a second within one month of completion of the Construction Phase. A final Environmental Audit Report will be required during the Operational Phase (see Section 8).

The Environmental Audit Report must contain all the information required in Appendix 7 of the NEMA EIA Regulations, 2014 (as amended).

### **7.2.3 Corrective Action**

Corrective action is a critical component of the implementation–review–corrective action–implementation cycle and it is through corrective action that continuous improvement can be achieved. Where repeated non-compliance is recorded, procedures may need to be altered accordingly to avoid the need for repeated corrective action.

If environmental compliance monitoring by the CR, Applicant or ECO indicates non-conformance with the EMPr or approved Method Statements, the RE or Applicant will formally notify the Contractor through the Applicant Non-conformance process (NCR) and/ or notification of Defect process detailed in the Contract. The Corrective Action Request documents:

- The nature of the non-conformance/environmental damage;
- The actions or outcomes required to correct the situation; and,
- The date by which each corrective or preventive action must be completed.

Upon receipt of the NCR, the Contractor will be required to produce a Corrective Action Plan (or similar plan), which will detail how the required actions will be implemented. The Corrective Action Plan must be submitted to the NCR initiator and ECO for approval prior to implementation. Once it has been approved, the corrective action must be carried out within the time limits stipulated in the NCR. Additional monitoring by the CR and ECO will then be required to confirm the success or failure of the corrective action.

## **7.3 Environmental Management Measures**

The environmental management and mitigation measures that must be implemented during the Construction Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out Environmental management and mitigation measures that must be implemented during the Construction. in **Table 6**.

**Table 6: Environmental management and mitigation measures that must be implemented during the Construction.**

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
<b>Site camp</b>	1.	Submit a method statement for Site Camp establishment for acceptance by Applicant and the ECO at least two weeks prior to the start of construction activities.	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Start of construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspections</li> <li>Method statement</li> </ul>	<ul style="list-style-type: none"> <li>Accepted method statement</li> <li>Site boundaries demarcated</li> <li>Signage in place</li> </ul>
	2.	Establish a suitably fenced Site Camp at the start of the contract, which will allow for site offices, vehicle, equipment, material and waste storage areas to be consolidated as much as possible. Locate the Site Camp at a position accepted by Applicant and the ECO. Provide water and / or washing facilities and ablution facilities (portable chemical toilets) at the Site Camp for personnel.				
	3.	Demarcate construction site boundaries upon establishment. Control security and access to the site. Fence off site boundaries to the satisfaction of the ECO and ensure that plant, labour and materials remain within site boundaries.				
	4.	Designate the area beyond the boundary of the site as “No go” areas for all personnel on site. No vehicles, machinery, materials or people shall be permitted in the “No go” area at any time without the express permission of the ECO.				
<b>Safety and Security</b>	5.	Ensure that emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, battery handling, etc.) are established prior to commencing construction. Submit these emergency procedures to Applicant and the ECO for approval.	<ul style="list-style-type: none"> <li>All Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection and approval by CR, RE and ECO</li> </ul>	<ul style="list-style-type: none"> <li>Number of safety/emergency incidents</li> </ul>
	6.	Make all emergency procedures available, including responsible personnel, contact details of emergency services, etc. to all the relevant personnel. Clearly demarcate emergency procedures at the relevant locations around the site.				
	7.	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances, deep excavations etc.).				
	8.	Advise the ECO of any emergencies on site, together with a record of action taken.				

<sup>3</sup> Unless otherwise indicated, monitoring will be undertaken by the ECO, supported by the authorities where the requirement is specifically stipulated in a licence or permit.

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	9.	Secure the Site Camp, particularly to restrict unauthorised access to fuels and any other hazardous substances.				
	10.	Store all construction material and equipment in locked containers within the Site Camp. Employ 24-hour security for the Site Camp.				
	38.	Liaise with the local fire-fighting department with regards to emergency procedures.				
<b>Employment (focussed on retaining exiting staff and upskilling inhouse)</b>	11.	Set targets for maintaining the use of local labour based on the availability of existing skills and people that are willing to undergo training.	<ul style="list-style-type: none"> <li>• Applicant</li> <li>• Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Prior to construction</li> </ul>	<ul style="list-style-type: none"> <li>• Keep record of how targets were determined</li> <li>• Keep record of staff by origin</li> <li>• Keep record of training provided</li> </ul>	<ul style="list-style-type: none"> <li>• Percentage of local staff</li> <li>• Percentage of PDI staff</li> </ul>
	12.	Maximise opportunities for the training of staff.				
	13.	Meet empowerment targets as per contractual requirements.				
	14.	Consider implementing labour-intensive rather than capital-intensive work methods wherever possible.				
	15.	Consider purchasing resources from local sources wherever possible.				
	16.	Develop and implement a fair and transparent labour and recruitment policy.				
	17.	Ensure gender equality in recruitment, as far as possible.				
<b>Environmental Awareness Training</b>	18.	<p>Provide environmental awareness training to all personnel on site at the start of their employment.</p> <p>Training should include discussion of:</p> <ul style="list-style-type: none"> <li>• Potential impact of construction waste and activities on the environment.</li> <li>• Suitable disposal of construction waste and litter. Emphasis must be placed on the training of staff to distinguish what waste is classified as general and hazardous to prevent the mixing of these waste streams.</li> <li>• Key measures in the EMPr relevant to worker’s activities.</li> <li>• How incidents and suggestions for improvement can be reported; and</li> <li>• Ensure that all attendees remain for the duration of the training and on completion sign an attendance register that</li> </ul>	<ul style="list-style-type: none"> <li>• All Contractors</li> </ul>	<ul style="list-style-type: none"> <li>• Before workers start working on-site</li> <li>• Before additional activities are undertaken</li> <li>• When new staff start work on site</li> </ul>	<ul style="list-style-type: none"> <li>• Check training attendance register</li> <li>• Observe whether activities are executed in line with EMPr requirements</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of workers that completed environmental training</li> <li>• Compliance of workers with EMPr</li> </ul>
	19.	Include environmental mitigation measures relevant to current activities in daily toolbox talks. Maintenance of Batteries and chemical handling will be done by appropriately trained personnel only.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
<b>Complaints Register / Grievance Mechanism</b>	20.	Maintain and disclose a complaints register. The register must record: <ul style="list-style-type: none"> <li>Complainant name and contact details;</li> <li>Date complaint was lodged;</li> <li>Person who recorded the complaint;</li> <li>Nature of the complaint;</li> <li>Actions taken to investigate the complaint and outcome of the investigation;</li> <li>Action taken to remedy the situation; and</li> <li>Date on which feedback was provided to complainant.</li> </ul>	<ul style="list-style-type: none"> <li>Applicant</li> <li>Contractor</li> </ul>	<ul style="list-style-type: none"> <li>Duration of construction activities</li> </ul>	<ul style="list-style-type: none"> <li>Keep record of all complaints</li> </ul>	<ul style="list-style-type: none"> <li>Register on site</li> <li>Complaints followed up and closed out</li> </ul>
	21.	Respond rapidly to complaints and take appropriate corrective action.				
<b>Hazardous materials</b>	22.	Design and construct hazardous material storage facilities, especially fuel storage, with suitable impermeable materials and a minimum bund containment capacity equal to 110% of the largest container. The storage volume of dangerous goods on site must not exceed 500m <sup>3</sup> .	<ul style="list-style-type: none"> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection of hazardous materials handling and storage areas</li> </ul>	<ul style="list-style-type: none"> <li>Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials</li> <li>Number of spills of hazardous materials, including waste materials</li> <li>Cost of cleaning up spills</li> <li>Evidence of contamination and leaks</li> </ul>
	23.	Ensure that contaminants (including cement) are not placed directly on the ground (e.g., mix cement on plastic sheeting).				
	24.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants.				
	25.	Avoid unnecessary use and transport of hazardous substances. guidelines to limit spillage.				
	26.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
	27.	Place appropriately sized drip trays under vehicles and equipment when not in use – ensure these are strategically placed to capture any spillage of fuel, oil, etc.				
	28.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	29.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods <sup>3</sup>	Performance Indicators
Vegetation clearing	30.	The project footprint must be demarcated before construction commences and limited to what is essential. Only clear areas as per the approved Method Statement. (Terrestrial Specialist)	<ul style="list-style-type: none"> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> <li>Appointment of vegetation specialist</li> <li>Search and Rescue Report</li> </ul>	<ul style="list-style-type: none"> <li>Size of area cleared relative to development footprint</li> <li>Size of area disturbed outside of construction site boundary</li> <li>Number of SCC relocated</li> <li>Permit on file</li> </ul>
	31.	Designate areas outside the development footprint as No-go areas and disturbance prohibited in No-go areas.				
	32.	Remove cleared vegetation off site to eliminate the fire risk unless directed differently by the Botanist or ECO.				
	33.	Ensure that no vegetation is removed without the required permits or disturbed outside the delineated construction site boundary. (Terrestrial Specialist)				
	34.	Immediately stabilize slopes that are disturbed / cleared for construction with geofabric or another appropriate erosion stabilisation technique to prevent erosion.				
	35.	Restrict the movement of construction vehicles to new and existing access roads only.				
	36.	No plants may be removed that have not been specifically earmarked as part of the demarcated footprint. (Terrestrial Specialist)				
Topsoil storage	37.	Limit construction and lay down areas to areas within the development footprint.	<ul style="list-style-type: none"> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Before construction commences</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>Incidence of Erosion</li> <li>Incidence of incorrect storage and harvesting of topsoil</li> </ul>
	38.	Designate areas outside the development footprint as "No go" areas.				
	39.	Designate and demarcate areas to be used for topsoil stockpiling.		<ul style="list-style-type: none"> <li>During vegetation clearing</li> </ul>		
	40.	Remove topsoil (up to a maximum of 30 cm depth).				
	41.	Strip and store topsoil and subsoil separately & keep clear of alien weeds.				
	42.	Stockpile topsoil prior to the commencement of construction activities (stockpile no higher than 2m) and conserve topsoil for landscaping and rehabilitation.				
	43.	Locate topsoil stockpiles in an area protected from the wind and agreed to with the ECO.				
	44.	Locate all topsoil stockpiles in areas where they will not have to be relocated prior to replacement for final rehabilitation.				
	45.	Locate topsoil stockpiles away from aggregate, cement, concrete, fuels, litter, oils, domestic and wastes.				
	46.	Ensure suitable control of run-off during the construction phase to prevent erosion of topsoil on adjacent land and undeveloped portions of the site.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	47.	Replace harvested topsoil in areas that are to be rehabilitated as soon as sections of the works are completed (i.e., not only following the completion of all works).				
<b>Concrete/Cement Work</b>	48.	Use Ready-Mix concrete rather than batching where possible.	<ul style="list-style-type: none"> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection and approval of Method Statement by Applicant and ECO.</li> </ul>	<ul style="list-style-type: none"> <li>Number of incidents of batching outside works footprint</li> <li>Contamination of water and soil</li> <li>Visible litter / waste on site.</li> </ul>
	49.	Ensure that cement truck delivery chutes are cleaned in a designated area where wastewater can be disposed of in the correct manner. A suitable washing facility is to be developed on site in consultation with the ECO.				
	50.	Batch cement in a bunded area within the boundaries of the development footprint only (where unavoidable).				
	51.	Ensure that cement is mixed on mortar boards and not directly on the ground (where unavoidable).				
	52.	Physically remove any remains of concrete, either solid, or liquid, immediately and dispose of as waste.				
	53.	Place empty cement bags in bins and dispose of bags as waste to a licensed hazardous waste disposal facility.				
	54.	Sweep / rake / stack excess aggregate / stone chip / gravel / pavers into piles and dispose at a licensed waste disposal facility.				
<b>Waste management</b>	55.	Submit a method statement for waste management.	<ul style="list-style-type: none"> <li>Applicant</li> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Before start of activities on site</li> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Availability and adherence to waste management method statement</li> <li>Visual inspection of waste collection and disposal areas</li> <li>Visual inspection of construction areas (litter)</li> <li>Check waste disposal slips</li> </ul>	<ul style="list-style-type: none"> <li>Monitor procedures to ensure the waste management method statement is implemented</li> <li>Presence of litter</li> <li>Availability of rubbish bins and skips</li> <li>Degree to which rubbish bins and skips are filled</li> <li>Total volume of general and hazardous waste storage capacity</li> <li>Total volume of general and hazardous waste stored on site</li> </ul>
	56.	Train all staff in the effects of debris and litter in the environment and appropriate disposal procedures.				
	57.	Aim to minimise waste through reducing and re-using (packaging) material.				
	58.	Collect recyclables separately and deliver these to suitable facilities or arrange for collection.				
	59.	Collect all waste in labelled bins and/or skips at the construction site.				
	60.	Prevent littering by construction staff at work sites by providing bins or waste bags in sufficient locations.				
	61.	Provide separate bins for hazardous / polluting materials and mark these clearly. Store hazardous / polluting materials on impermeable ground until it is disposed of / collected.				
	62.	Dispose of waste appropriately to prevent pollution of soil and groundwater.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	63.	Do not allow any burning or burying of waste on site. Development of site-specific method statement according to project specifications in the Handling of hazardous materials. Ensure storage area is properly bunded. Ensure MSDS is readily available. Ensure storage area is locked and secure. Ensure handling by competent persons only.				<ul style="list-style-type: none"> <li>Degree to which different waste is separated</li> <li>Frequency of waste collection</li> </ul>
<b>Stormwater management</b>	64.	Submit a method statement for Stormwater Management. The stormwater management must implement water diversion options to minimise the potential for erosion.	• Contractors	• Throughout construction	• Visual inspection	<ul style="list-style-type: none"> <li>Incidence of stormwater contamination</li> <li>Visible leaks/ water wastage</li> <li>Visible surface erosion</li> <li>Compliance with SWMP</li> </ul>
	65.	Collect stormwater from bunded areas in a suitable container and remove from the site for appropriate disposal.				
	66.	Use berms and stormwater drainage systems to prevent surface run-off from entering site excavations.				
	67.	Implement measures to maximise the infiltration of stormwater on site.				
	68.	Implement measures stipulated in the SWMP (see Appendix N3).				
	69.	Construct all drainage channels and stormwater drainage systems according to the engineer's design.				
	70.	Install temporary diversion systems / berms around the construction site or at certain problematic areas (including temporary access roads and parking bays) during construction to prevent ponding, flooding or contamination of stormwater with contaminants.				
	71.	Temporary roads should be kept to a minimum to avoid multiple access routes/roads and should only be constructed if absolutely necessary.				
	72.	Temporary parking bays/roads should consist of a compacted coarse gravel layer (if necessary).				
	73.	Any construction material stockpiles should be protected by berms (or another mechanism) to ensure that material cannot be mobilised by runoff and/or potentially block the stormwater system.				
	74.	Place oil traps under stationary machinery, only re-fuel machines at designated fuelling points, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only.				
	75.	Ensure that spill kits appropriate to the hazardous substance/s are available at all times on the site.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	76.	Draw up and strictly enforce a procedure for the storage, handling and transport of the solar panels and battery containers, and other hazardous materials on site (including fuel storage areas). This procedure should be informed by hazardous material safety data sheets and discussions with the supplier.				
	77.	Ensure vehicles and equipment are in good working order.				
	78.	Ensure that good housekeeping and maintenance rules are applied.				
	79.	Inspect the site weekly for signs of spills.				
	80.	Ensure that onsite sanitation facilities are appropriately designed, are well maintained and serviced regularly.				
	81.	Excavations filled with rainwater may be pumped out and the water released into the environment.				
	82.	Handle and store waste in such a way as to prevent mixing with water.				
<b>Erosion management</b>	83.	Ensure that all roads and tracks used for construction have the appropriate water diversion / erosion control structures.	<ul style="list-style-type: none"> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection</li> </ul>	<ul style="list-style-type: none"> <li>Visible surface erosion</li> </ul>
	84.	Stabilise slopes disturbed / cleared for construction with geofabric or another appropriate erosion stabilisation technique if erosion does occur.				
<b>Dust management</b>	85.	Submit and Implement a Dust Management Method Statement.	<ul style="list-style-type: none"> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual assessment of dust plumes</li> <li>Visual assessment of dust control measures</li> </ul>	<ul style="list-style-type: none"> <li>Visibility of dust coming off construction site</li> <li>Dust mitigation measures in place</li> <li>Number of days that dust plumes are visible</li> <li>Number of registered complaints</li> <li>Size of disturbed areas</li> </ul>
	86.	Avoid clearing of vegetation until absolutely necessary (i.e., just before excavations).				
	87.	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.				
	88.	Stabilise exposed surfaces as soon as is practically possible.				
	89.	Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				



Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	90.	Minimise dust generated off stockpiles: <ul style="list-style-type: none"> <li>• Locate piles in sheltered areas where possible;</li> <li>• Place the stockpile lengthwise into the wind;</li> <li>• Minimise the slope of the stockpile (maximum slope of 2:1);</li> <li>• Limit stockpile sizes;</li> <li>• Install barriers on three sides of the stockpile (maximum 50% material porosity) if required;</li> <li>• Limit activity to the downwind side of the pile;</li> <li>• Use the last in – first out system of stockpile management; and,</li> <li>• Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.</li> </ul>				
	91.	Limit vehicle speeds to 20 km/h on unconsolidated and non-vegetated areas.				
	92.	Cover trucks transporting loose material to or from site with tarpaulins, plastic or canvas.				
	93.	Ensure that any material spilled from trucks during transport to or from the site is cleaned up immediately.				
	94.	Use bedliners to minimise seepage and spillage of material from bottom-dumping trucks.				
	95.	Check weather reports daily and closely observe weather patterns to enable action to be taken immediately if conditions change.				
	96.	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.				
	97.	Sweep roads leading from the site if wheel washing facilities do not effectively prevent mud being deposited on access roads.				
	98.	Reduce airborne dust at construction sites through: <ul style="list-style-type: none"> <li>• Dampening dust-generating areas with non-potable water if available (and necessary);</li> <li>• Use of cloth or brush-barrier fences; and,</li> <li>• Covering dumps or stockpiles of loose material with plastic sheeting or netting, especially during windy conditions.</li> </ul>				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
<b>Noise management</b>	99.	Limit construction activities to Mondays to Saturdays between the hours of 07h00 and 18h00, or in accordance with relevant municipal bylaws, if applicable.	<ul style="list-style-type: none"> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Times during which construction takes place</li> </ul>	<ul style="list-style-type: none"> <li>Number of registered complaints</li> </ul>
	100.	Limit particularly noisy operations to Mondays to Fridays between the hours of 08h00 and 17h00.				
	101.	Control the use of radios, television sets and other such equipment used by workers to a level that does not disturb neighbouring residents/tenants.				
	102.	Maintain all generators, vehicles, vessels and other equipment in good working order to minimise exhaust fumes and excess noise.				
	103.	Investigate and respond to complaints about excessive noise and take appropriate corrective action.				
	104.	Where practical enclose diesel generators used for power supply to reduce unnecessary noise.				
<b>Fire Management</b>	105.	Ensure that no fires are permitted on or adjacent to site.	<ul style="list-style-type: none"> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Inspect attendance register for training sessions</li> <li>Inspect fire extinguishers and certificates</li> </ul>	<ul style="list-style-type: none"> <li>Number of fire incidents</li> <li>Certified extinguishers in appropriate locations</li> </ul>
	106.	Designated smoking areas with firefighting equipment must be provided.				
	107.	Ensure that sufficient fire-fighting equipment is available on site.				
	108.	Equip all hazardous substance stores and waste storage areas with fire extinguishers.				
	109.	Ensure that all personnel on site are trained and aware of the location of firefighting equipment on the site and how the equipment is operated.				
	110.	Suitably maintain firefighting equipment.				
111.	Liaise with the local fire-fighting department with regards to emergency procedures.					
<b>Transportation and refuelling</b>	112.	Undertake regular maintenance of vehicles and machinery to identify and repair minor leaks and prevent equipment failures.	<ul style="list-style-type: none"> <li>All contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspection of vehicles, barges, machinery and refuelling/maintenance areas</li> </ul>	<ul style="list-style-type: none"> <li>Number of incidents of non-compliance</li> <li>Number of leaks and spills</li> <li>Cost of cleaning up spills</li> </ul>
	113.	Undertake any on-site refuelling and maintenance of vehicles/machinery in designated areas. Line these areas with an impermeable surface, secondary containment measures and install oil traps.				
	114.	Use appropriately sized drip trays for all refuelling and/or repairs done on machinery – ensure these are strategically placed to capture any spillage of fuel, oil, etc.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	115.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	116.	Keep spill containment and clean-up equipment at all work sites and for all polluting materials used at the site.				
<b>Fauna Management</b>	117.	Flush out fauna before establishing site camp and site boundaries. All suitable habitats for <i>S. giganteus</i> outside of the development footprint must be avoided.	• Contractor	• Before construction commences	• Visual inspection	• Number of animals flushed out of area
	118.	Do not harm, catch or kill birds or animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor	• Duration of construction activities	• Visual Inspection	<ul style="list-style-type: none"> <li>• Number of animals harmed/ incidents</li> <li>• Time period trenches are left open</li> <li>• Number of incidents of animals found in trenches.</li> </ul>
	119.	Backfill trenches as soon as possible to ensure that the time the trench is exposed is kept to a minimum.				
	120.	Open trenches must be inspected on a daily basis for animals which may have fallen or become trapped.				
	121.	Search and Rescue operations should occur before the project works begin to ensure that any slow moving or burrowing species (such as moles, chameleons, snakes or tortoises) would be moved to adjacent suitable habitats by a qualified Faunal Specialist. (Terrestrial Specialist)				
<b>Protection of archaeological and paleontological resources</b>	122.	Inform employees and contractors that archaeological or paleontological artefacts, including human skeletal remains, might be exposed during construction activities.	• Contractors	• Before construction commences	• Visual inspection	<ul style="list-style-type: none"> <li>• Time to rehabilitation</li> <li>• Size of disturbed areas</li> </ul>
	123.	Empower staff to stop works on (chance) discovery of artefacts at the site.		• During earthworks		
	124.	Report the presence of artefacts, paleontological fossils, graves or human remains, fragments of fossil bone, ostrich egg and stone fragments to SAHRA.				
	125.	Stop works and obtain a permit for the removal of artefacts from the site if any are discovered during construction.				
<b>Traffic Management</b>	126.	<p>Manage construction sites and activities so as to minimise impacts on road traffic as far as possible, e.g.:</p> <ul style="list-style-type: none"> <li>• Attempt to arrange delivery of materials when it will least disrupt traffic;</li> <li>• Stagger deliveries if possible, rather than concentrating them during “rush” hours; and,</li> <li>• Keep construction materials and machinery at the construction site throughout the construction period, where possible.</li> </ul>	• All contractors operating vehicles	• Throughout construction	<ul style="list-style-type: none"> <li>• Keep record of vehicles entering the site and time they enter</li> <li>• Keep record of incidents and complaints; and,</li> <li>• Visually inspect vehicles for any overloading</li> </ul>	<ul style="list-style-type: none"> <li>• Number of incidents and complaints</li> <li>• Number of vehicles travelling to site each day</li> <li>• Condition of vehicles</li> </ul>

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	127.	Notify local authorities, road authorities and affected stakeholders prior to construction activities and transport of battery storage containers.				
	128.	Use existing roads and appropriate road signage, in accordance with the South African Traffic Safety Manual, providing flagmen, barriers etc. at the various access points when necessary.				
	129.	Ensure that large construction vehicles are suitably marked to be visible to other road users and pedestrians.				
	130.	Ensure that vehicles transporting solar panels and battery storage containers are suitably marked noting the hazardous nature of their load.				
	131.	Ensure that relevant safety measures and signage are in place when containers are delivered to site.				
	132.	Ensure that all safety measures are observed and that drivers comply with the rules of the road.				
	133.	Ensure that vehicle axle loads do not exceed the technical design capacity of roads utilised by the project.				
	134.	Investigate and respond to complaints about traffic.				
	135.	Manage construction sites and activities to minimise impacts on road traffic as far as possible, e.g., minimise the unnecessary movement of construction vehicles.				
	136.	Maintain and repair roads damaged by construction vehicles, in consultation with relevant road authorities.				
	137.	Ensure that all safety measures are observed and that drivers of construction vehicles comply with the road rules.				
	138.	Maintain and repair damage caused by trucks on or vehicles.				
<b>Visual aspects</b>	139.	Paint the battery storage containers (and where possible, associated infrastructure such as fencing) grey or brown. Avoid the use of light colours (e.g., white). Roofs to be painted grey and non-reflective.(Visual Specialist)	• Contractors	• Throughout construction	• Visual inspection	• Colour of infrastructure • Number of complaints
	140.	Limit outdoor security lighting (prefer facing down) and ensure that it is as unobtrusive as possible and screen camps with netting.				
	141.	Attach signs to existing structures to avoid free standing signs in the landscape during the construction period as much as possible. Signage, if essential, should be discrete and confined to entrance gates. No corporate or advertising signage should be permitted.				

	142.	Control litter and keep construction site as clean and neat as possible.			
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Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
<b>Ablution facilities</b>	143.	Provide ablution facilities (i.e., chemical toilets) for all site staff at a ratio of 1 toilet per 15 workers (absolute minimum 1:25).	• Contractors	• Throughout construction	• Visual inspections	• Number of incidents of staff not using facilities
	144.	Secure all temporary / portable toilets to the ground to the satisfaction of the ECO to prevent them toppling due to wind or any other cause.			• Records of waste disposal	• Number of pollution incidents
	145.	Maintain toilets in a hygienic state (i.e., toilet dispensers to be provided, toilets to be cleaned and serviced regularly (at least “twice- monthly” by an appropriate waste contractor), and toilets to be emptied before long weekends and builders’ holidays.				
	146.	Remove / appoint an appropriate Sub-Contractor to remove, accumulations of chemicals and treated sewage from the site and dispose of at an approved waste disposal site or wastewater treatment works.				
	147.	Ensure that no spillages occur when the toilets are cleaned or emptied. Repeated incidents of spillage of chemicals and or waste (i.e., more than one incident), will require toilets to be placed on a solid base with a sump.				
<b>Water conservation</b>	148.	Use water sparingly and conserve water whenever possible.	• Contractors	• Throughout construction	• Monthly water consumption records	• No evidence of water wasted • Consistent water usage
	149.	Source and maintain records of water purchased.			• Water purchased or consumed from a licensed facility/supplier	• Records of water use or purchase available
<b>Response to environmental pollution</b>	150.	Develop a spill response procedure for approval by the ECO. In the event of environmental pollution, e.g., through spillages, immediately stop the activity causing the problem.	• Contractors	• Throughout construction	• Maintain register of pollution events and response	• Number of incidents • Time activities stopped
	151.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the environment.			• Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning	• Number of recurring incidents • Availability and completeness of register and records
	152.	Repair faulty equipment as soon as possible.				
	153.	Install additional bunding / containment structures around the equipment that was the source of the leak / spillage to prevent pollution from reaching the environment in future.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	154.	Treat hydrocarbon spills, e.g., during refuelling, with adequate absorbent material, which then needs to be disposed of at a suitable hazardous waste landfill.	• Contractors	• Throughout		
<b>Invasive species control</b>	155.	Remove all alien and weed species encountered within areas disturbed by construction activities.	• Contractors	• Throughout construction	• Check evidence of alien vegetation	• Construction footprint and road reserve clear of alien vegetation
	156.	Where possible, remove alien species by hand and not with chemicals.				• Construction footprint and road reserve clear of alien vegetation
	157.	Keep footprint areas as small as possible when removing alien plant species.				
	158.	Dispose of removed alien plant material at a licensed waste disposal site.				
<b>Site rehabilitation and closure</b>	159.	Plan and make adequate financial provision for rehabilitation and restoration activities and clearly allocate timing and responsibility for environmental	• Contractor	• Prior to construction  • Once construction is complete; or  • Throughout construction if it takes place in phases / different areas sequentially	• Record of financial provisioning for rehabilitation  • Visual inspection of site  • Keep record of rehabilitation measures	• Financial provisioning for rehabilitation in place
	160.	Ensure that slopes are immediately stabilized to prevent erosion, using geofabric or other appropriate erosion stabilisation techniques.				• Rehabilitation forms an integral part of operations from start-up
	161.	Remove all construction equipment, vehicles, equipment, waste and surplus materials, including site offices, temporary fencing and diesel, from the site.				• Construction sites fully rehabilitated within five years
	162.	Clean up and remove any spills and contaminated soil in the appropriate manner.				
	163.	Ensure that no discarded materials are buried on site or on any other land not designated for this purpose.				
	164.	Ensure that affected areas are rehabilitated following construction.				
	165.	Use harvested topsoil for rehabilitation.				
	166.	Rehabilitate project areas with locally indigenous species, reseed, using anti-erosion measures such as bio-barrier or soil saver as soon as possible after activities have ceased at each area, or as directed by the Botanist.				
	167.	Replace harvested topsoil in areas that are to be rehabilitated as soon as sections of the works are completed (i.e., not only following the completion of all works).				
	168.	Rehabilitate all project areas as soon as possible after completion of activities in each area, including removing and/or remediating any contaminated soils.				

Construction Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>3</sup>	Performance Indicators
	169.	Source and maintain records of water purchased.		Throughout construction	<ul style="list-style-type: none"> <li>Keep record of purchase</li> </ul>	
	170.	Areas between the solar panels must be kept vegetated where feasible. (Terrestrial Specialist)		<ul style="list-style-type: none"> <li>Once construction</li> </ul>	<ul style="list-style-type: none"> <li>Do regular site inspections</li> </ul>	Areas between panels grassed
<b>Avifaunal Management</b>	171.	Constructing Solar PV plants close to existing power lines and, if new lines are required, motivate the need for lines to be adequately marked with anti-collision devices and bird-friendly designs to prevent electrocution. (Avifauna Specialist)	Contractor	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Visual inspections</li> </ul>	Number of incidents
	172.	Not constructing Solar PV plants in formally or informally protected areas or Important Bird Areas (IBAs), but in areas of low relevance for nature conservation. (Avifauna Specialist)				
	173.	Avoiding construction near drainage lines with trees where birds will be concentrated (Avifauna Specialist)				
	174.	Avoiding construction near large trees which serve as nesting and roosting sites for raptors and vultures. (Avifauna Specialist)				
	175.	Building solar arrays outside known waterbird flight paths (Avifauna Specialist).				
	176.	Not using chemicals/pesticides for the maintenance of land/vegetation and rather use mowing or grazing to retard vegetation growth. (Avifauna Specialist)				
	177.	Constructing new power lines in such a way that they have minimal impact on birds (i.e., bird-friendly designs, appropriate wire marking devices). (Avifauna Specialist)				
<b>Heritage Management</b>	178.	If any unmarked human burials are uncovered during construction excavations, then work in the immediate area must be halted. The find would need to be reported to the heritage authorities and will require inspection by a professional archaeologist. (Heritage Specialist)	Contractor	Throughout construction	Visual inspections	Number of incidents

## 8 MEASURES APPLICABLE TO OPERATIONAL PHASE

### 8.1 Maintenance Management Plan

The objective of the Maintenance Management Plan (MMP) is to provide environmental management measures for the ongoing maintenance of the solar panels, on-site substation, BESS, access roads, associated infrastructure and emergency repairs.

Applicant can undertake this activity during maintenance without the need for EA in terms of this MMP (once approved).

#### 8.1.1 Roles and Responsibilities

The key role players during Operational / Maintenance Phase are anticipated as follows:

- Applicant (the proponent);
- Engineer/s who will undertake operational activities and/ or oversee the activities of the contractors on site;
- Contractors / Service Providers responsible for maintenance of the BESS;
- Any sub-contractors hired by Contractors / Service Providers; and
- Applicant & Environmental Practitioners who will implement the MMP and ensure compliance.

Key roles and responsibilities during Operational / Maintenance Phase with respect to the implementation of the MMP are outlined below.

#### Applicant:

- Ensure that all contractors / service providers / staff executing work for Applicant for the project are aware of the requirements of the MMP; and
- Appoint a suitably qualified and experienced staff member/s to review the environmental performance of contractors and staff.

#### Contractors:

- Comply with the applicable environmental commitments, procedures, restrictions and guidance specified in the MMP;
- Co-operate fully in implementing applicable environmental procedures;
- Ensure that copies of the MMP are available on site;
- Ensure that all personnel on site, (including any sub-contractors and their staff) are familiar with and understand the requirements of the MMP relevant to their activities; and
- Ensure that any problems and non-conformances are remedied in a timely manner, to the satisfaction of the relevant management personnel.



### **8.1.2 Compliance and Monitoring: Maintenance Activities**

Any person appointed to undertake maintenance may be requested to submit a Method Statement for the works to be undertaken. The Method Statement will be submitted by the Contractor/ Appointed person to Applicant's Environmental Management not less than 14 days prior to the intended date of commencement of maintenance. The Applicant's Environmental Management shall approve / reject the Method Statement within 2 days. An activity covered by a Method Statement shall not commence until the Operational Manager (project initiator) and Applicant's Environmental Management has approved of such method and once approved, the Contractor/ Appointed person shall abide by the relevant Method Statement. A suitable Method Statement format can be agreed between the Operational Manager (project initiator) / Applicant's Environmental Management and Contractor/ Appointed person.

### **8.1.3 Environmental Management Measures**

The environmental management and mitigation measures that must be implemented during the Operational / Maintenance Phase, as well as responsibilities and timelines for the implementation of these measures and monitoring thereof, are laid out in Table 8-1 below.

**Table 8-1: Environmental management and mitigation measures that must be implemented during the Operational / Maintenance Phase.**

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
<b>Compliance Monitoring</b>	1.	Audit compliance with the MMP.	• Applicant	• Once every two years	• Check record of audit	• Check frequency of compliance inspections
	2.	Record and retain the audit results.	• Applicant	• Once every two years		
	3.	Appoint a suitably qualified Applicant Environmental Management staff member to periodically inspect and report on compliance with the MMP during or following physical maintenance activities.	• Applicant Environmental Management	• Annually		
	4.	Increase the frequency of compliance inspections if significant non-conformances are reported.	• Applicant	• Following non-conformances		
	5.	Appoint competent person with environmental auditing expertise to undertake an environmental audit to determine compliance with the conditions of the EA and the EMP and recommend improvements (if required) as per the specifications in S34 of the EIA Regulations, 2014 (as amended).	• Applicant	• Every three years throughout the operational phase unless the frequency is changed based on an audit recommendation by the independent auditor.	• Check record of audit	• Check frequency of compliance inspections
<b>Community</b>	6.	Respond to complaints that are made.	• Applicant	• Throughout operations	• Check compliance reports	• Check record of correspondence
<b>Maintenance of facility</b>	7.	Ensure that solar panels, battery supplier user guides, safety specifications and MSDS are filed on site at all times.	• Applicant	• Throughout operations	• Check that documents filed on site	• Documents filed on site
	8.	Operate, maintain and monitor the solar panels and BESS as per supplier specifications. Storage in secure containers to ensure/limit the potential for the occurrence of leakages. Storage area to be bunded with an appropriate volume capacity to protect from environmental contamination should accidental leakages occur. Transferal of chemicals to Batteries will be done according to best practice.			• Keep supplier specifications on file	• Incidents of malfunctioning of battery system due to non-compliance with supplier specifications
	9.	Compile method statements for approval by the Applicant's Environmental Practitioner for solar panels and battery cell, electrolyte and battery cell/ container replacement. Maintain method statements on site.	• Contractors/ Maintenance staff		• Method statements submitted and approved by Applicant	• Method statements compiled and filed on site
	10.	Ensure that all maintenance contractors/ staff are familiar with the supplier's specifications. Maintenance activities undertaken during the Operational Phase must adhere to the applicable environmental management measures provided for the Operational Phase.	• Applicant		• Method statements comply with supplier specifications.	• Incidents of malfunctioning of solar panels or battery system due to non-compliance with supplier specifications

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
	11.	Provide signage on site specifying the types of solar panels and batteries in use and the risk of exposure to hazardous material and electric shock.			• Visual inspection	• Signage on site
	12.	Provide signage on site specifying how electrical and chemical fires should be dealt with by first responders, and the potential risks to first responders (e.g., toxic fumes). Provide suitable firefighting equipment on site.			• Visual inspection	• Signage on site
	13.	Maintain strict access control to the battery storage area.			• Monitor who enters and exits the BESS area	• Incidents of unauthorised entry
	14.	Undertake regular visual checks on solar panels and BESS equipment to identify signs of damage or leaks.			• Regular checks taking place	• Incidents of damage to exterior of Batteries
<b>Waste management</b>	15.	Develop a waste management plan, laying out: <ul style="list-style-type: none"> <li>• Expected type and amount of waste;</li> <li>• Measures to reduce waste;</li> <li>• Type of storage for different waste types;</li> <li>• Waste contractors that will collect waste; and</li> <li>• Monitoring procedures to ensure the waste management plan is implemented.</li> </ul>	• Applicant	• Throughout operations	• Regular audits against plan	• Availability of plan • Extent to which plan is complied with
	16.	Ensure that service providers dispose of used Batteries and any hazardous or dangerous material properly by requesting and retaining receipts for disposal/refurbishment.	• Applicant	• Throughout operations	• Check that receipts are available for disposal/refurbishment	• Availability of disposal receipts
<b>Stormwater management</b>	17.	Ensure that stormwater is managed according to the recommendations of the approved SWMP.	• Applicant	• Throughout operations	• Visually inspect stormwater system	• Compliance with SWMP
	18.	Ensure that visible signage and emergency numbers are placed indicating who to call if any problem with stormwater or any other environmental issues is noticed.				
	19.	Clean up any spills immediately, through containment and removal of free product and appropriate disposal of contaminated soils.				
	20.	Bund all battery containers (hazardous chemicals) in accordance with legal requirements and supplier requirements.				
	21.	Ensure signage on all solar panels and battery storage areas indicating as a minimum: <ul style="list-style-type: none"> <li>• The solar panel / battery type (and chemical name/s).</li> <li>• Who to contact (immediately) if a spill or leak is detected.</li> <li>• MSDS sheets (alternatively ensure that these are available on site).</li> </ul>				
	22.	Remediate spills and repair battery leaks.				

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation Timeframe	Monitoring Methods <sup>4</sup>	Performance Indicators
	23.	Inspect the site for: <ul style="list-style-type: none"> <li>• Broken solar panels</li> <li>• Spills and leaks in/from battery storage areas.</li> <li>• Blockages in stormwater systems.</li> <li>• Litter, particularly litter in any stormwater channels, culvert, drains etc.</li> <li>• New oil or fuel stains from vehicles.</li> <li>• Full or faulty bunds and oil/water separators.</li> </ul>				
	24.	Run training courses annually for all employees that visit the site (or as needed) to inform them of the contents of this plan and how to inspect the site and who to inform if issues are noted;				
	25.	Maintain the following registers on site: <ul style="list-style-type: none"> <li>• Register of spills.</li> <li>• Incident Management records with the corrective actions taken after spills.</li> <li>• Waste disposal records.</li> <li>• Attendance registers for training courses.</li> <li>• An inventory of solar panels, battery types (and associated chemicals) on the site.</li> <li>• Record of all inspections.</li> </ul>				
<b>Hazardous materials</b>	26.	Develop (or adapt and implement) procedures for the safe transport, handling and storage of potential pollutants. Inspection of packaging for damage. Adhere to Original Equipment Manufacturer( OEM) handling, transportation and storage instructions.	• Applicant	• Throughout operations	<ul style="list-style-type: none"> <li>• Visual inspection of hazardous materials handling and storage areas</li> <li>• Emergency procedures developed</li> </ul>	<ul style="list-style-type: none"> <li>• Number of incidents of non-compliance with safety procedures concerning hazardous materials, including waste materials</li> <li>• Number of spills of hazardous materials, including waste materials</li> <li>• Cost of cleaning up spills</li> </ul>
	27.	Develop emergency procedures (in relation to fire, spills, contamination of the ground, accidents to employees, use of hazardous substances, etc.).				
	28.	Avoid unnecessary use and transport of hazardous substances.				
	29.	Keep Material Safety Data Sheets for all hazardous materials on site and ensure that they are available for reference by staff responsible for handling and storage of materials.				
	30.	Store solar panel and battery waste in secured and labelled containers prior to disposal.				
	31.	Hazardous waste must be disposed of at a licensed hazardous waste disposal facility and waste disposal manifests must be made available to the competent authority upon request.				
<b>Employment (focussing on retention of current employees)</b>	32.	Consider maximising the retainment of employee's and formalising this policy in contracts.	• Applicant	• Throughout operations	• Keep record of staff by origin	• Percentage of local staff

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
	33.	Consider purchasing resources from local sources wherever possible.		<ul style="list-style-type: none"> <li>Before new workers start for the first time</li> <li>Before new activities are undertaken</li> </ul>	<ul style="list-style-type: none"> <li>Attendance registers of training sessions</li> <li>Keep record that measure was considered and why it was (not) implemented</li> </ul>	<ul style="list-style-type: none"> <li>Percentage of goods procured locally</li> </ul>
<b>Response to environmental pollution</b>	34.	Ensure a quantity of appropriate remedial agent, capable of containing and/or remediating a hazardous spill is available on site at all times in case of an emergency spill. The material shall be capable of handling a spill of at least 200l.	<ul style="list-style-type: none"> <li>Applicant</li> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout operations</li> </ul>	<ul style="list-style-type: none"> <li>Maintain register of pollution events and response</li> <li>Following resumption of activities, frequently inspect repaired equipment to ensure proper functioning</li> </ul>	<ul style="list-style-type: none"> <li>Number of incidents</li> <li>Time activities stopped</li> <li>Number of recurring incidents</li> </ul>
	35.	Treat spills with adequate absorbent material, which then needs to be disposed of at a suitable landfill.				
	36.	Immediately remediate and rehabilitate areas in the event of a spill of an environmentally hazardous substance.				
	37.	Report all environmental incidents to the Applicant Environmental Management team and the Relevant Authority within 24 hours of an environmental incident (S30 of NEMA and S20 of NWA).				
	38.	Submit the environmental incident feedback report to the Relevant Authority within fourteen days of an environmental incident (S30 of NEMA).				
	39.	Report all environmental emergencies to the DFFE and the DESTEA Directorate: Pollution and Chemicals Management as soon as detected in accordance with S30A of NEMA and S20 of NWA.				
	40.	In the event of environmental pollution, e.g., through spillages, immediately stop the activity causing the problem.				
	41.	Only resume activity once the problem has been stopped or (in the case of spillages) the pollutant can be captured without reaching the environment.				
	42.	Repair faulty equipment as soon as possible.				
	43.	Determine if additional bunding / containment structures around the equipment is required.			<ul style="list-style-type: none"> <li>Visually inspect adequacy of bunding</li> </ul>	
<b>Fire Management</b>	44.	Prepare and annually review a fire risk assessment.	<ul style="list-style-type: none"> <li>Contractors</li> </ul>	<ul style="list-style-type: none"> <li>Throughout construction</li> </ul>	<ul style="list-style-type: none"> <li>Inspect attendance register for training sessions</li> <li>Inspect fire extinguishers and certificates</li> </ul>	<ul style="list-style-type: none"> <li>Number of fire incidents</li> <li>Certified extinguishers in appropriate locations.</li> </ul>
	45.	Ensure that no fires are permitted on or adjacent to site.				
	46.	Ensure that no smoking is permitted on the site.				
	47.	Ensure that sufficient fire-fighting equipment is available on site.				

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
	48.	Equip all hazardous substance stores and waste storage areas with fire extinguishers.				
	49.	Ensure that all personnel on site are aware of the location of firefighting equipment on the site and how the equipment is operated.				
	50.	Suitably maintain firefighting equipment.				
	51.	Liaise with the local fire-fighting department with regards to emergency procedures.				
	52.	Minimize the storage of flammable liquids on site (over and above the BESS or to fuel the BESS).				
	53.	Provide suitable emergency and safety signage on site and demarcate any areas which may pose a safety risk (including hazardous substances.). Emergency numbers for local police, fire department, Applicant and the Local Municipality must be placed in a prominent clearly visible area on site.				
	54.	Designate an emergency tipping area for waste loads identified to be on fire or otherwise deemed to be an immediate risk.				
	55.	Trim overgrown vegetation along access roads and maintain an appropriate firebreak.				
	56.	Respond to reports of the presence of alien plant species through eradication.				
	57.	Remove cuttings of alien vegetation from the site.				
<b>Protection of Flora</b>	58.	Limit vegetation clearance, pruning and the footprint of maintenance activities to what is absolutely essential.	<ul style="list-style-type: none"> <li>Contractor</li> <li>Applicant</li> </ul>	<ul style="list-style-type: none"> <li>Throughout operations</li> </ul>	<ul style="list-style-type: none"> <li>Check for unnecessary disturbances</li> </ul>	<ul style="list-style-type: none"> <li>Evidence of unnecessary disturbance</li> </ul>
	59.	Favour vegetation pruning over clearing.				
	60.	Inspect access roads annually during routine maintenance and report on the presence or absence of invasive alien plant species.				
	61.	Respond to reports of the presence of alien plant species through eradication and the application of herbicides in the Applicant servitude, where appropriate.				
	62.	Remove cuttings of alien vegetation from the site.				
	63.	Restrict laydown areas for maintenance and repair work to areas disturbed during construction of the project.				
	64.	Designate areas outside the previous construction footprint as no-go areas.				
	65.	Restrict the movement of vehicles to access roads only.				

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
Protection of Fauna	66.	Do not harm, catch or kill birds or animals by any means, including poisoning, trapping, shooting or setting of snares.	• Contractor	• Throughout operations	• Check for evidence of faunal mortalities	• Number of faunal mortalities
	67.	Avoid fauna when driving on site (especially tortoises and sungazers ( <i>S. giganteus</i> )).				
Dust management	68.	Submit and Implement a Dust Method Statement.	• Contractors	• Throughout operation	• Visual assessment of dust plumes  • Visual assessment of dust control measures	• Visibility of dust coming off construction site  • Dust mitigation measures in place  • Number of days that dust plumes are visible  • Number of registered complaints  • Size of disturbed areas
	69.	Avoid clearing of vegetation until absolutely necessary (i.e., just before excavations).				
	70.	Regularly evaluate the effectiveness of all dust management measures. Amend how or which measures are used if necessary.				
	71.	Stabilise exposed surfaces as soon as is practically possible.				
	72.	Avoid excavation, handling and transport of materials which may generate dust under high wind conditions or when a visible dust plume is present.				
	73.	Minimise dust generated off stockpiles: <ul style="list-style-type: none"> <li>• Locate piles in sheltered areas where possible;</li> <li>• Place the stockpile lengthwise into the wind;</li> <li>• Minimise the slope of the stockpile (maximum slope of 2:1);</li> <li>• Limit stockpile sizes;</li> <li>• Install barriers on three sides of the stockpile (maximum 50% material porosity) if required;</li> <li>• Limit activity to the downwind side of the pile;</li> <li>• Use the last in – first out system of stockpile management; and</li> <li>• Cover stockpiles when not in active use for some time and / or use an environmentally friendly chemical spray to bind soil.</li> </ul>				
	74.	Limit vehicle speeds to 20 km/h on unconsolidated and non-vegetated areas.				
	75.	Cover trucks transporting loose material to or from site with tarpaulins, plastic or canvas.				
	76.	Ensure that any material spilled from trucks during transport to or from the site is cleaned up immediately.				
	77.	Use bedliners to minimise seepage and spillage of material from bottom-dumping trucks.				

Operational Phase Measures						
Aspect	ID	Mitigation measure / Procedure	Responsible	Implementation	Monitoring Methods <sup>4</sup>	Performance Indicators
	78.	Check weather reports daily and closely observe weather patterns to enable action to be taken immediately if conditions change.				
	79.	Limit the number of vehicles allowed on-site and restrict the movement of these vehicles over unsurfaced or unvegetated areas once they are on site to reduce dust problems.				
	80.	Sweep roads leading from the site if wheel washing facilities do not effectively prevent mud being deposited on access roads.				
	81.	Reduce airborne dust at construction sites through: <ul style="list-style-type: none"> <li>• Dampening dust-generating areas with non-potable water if available (and necessary);</li> <li>• Use of cloth or brush-barrier fences; and</li> <li>• Covering dumps or stockpiles of loose material with plastic sheeting or netting, especially during windy conditions.</li> </ul>				
<b>Visual Management</b>	82.	Avoid shiny materials in structures. Where possible shiny metal structures should be darkened or screened to prevent glare	• Contractors	• Throughout operation	• Visual assessment of structures	• Number of complaints
	83.	Mitigation to minimise lighting impacts include the following: <ul style="list-style-type: none"> <li>• Shielding the sources of light by physical barriers (walls, vegetation or structures itself);</li> <li>• Limit mounting heights of lighting fixtures, or alternatively using footlights or bollard level lights);</li> <li>• Make use of downward directional lighting fixtures;</li> <li>• Make use of minimum lumen or wattage in lights;</li> <li>• Any navigation lights must be shielded to prevent disturbance to adjacent landowners; and,</li> <li>• Use motion sensors to activate lighting ensuring light is available when needed.</li> </ul>	• Contractors	• Throughout operation	• Visual assessment of structures	• Number of complaints
	84.	Wirth regards to visual management - mitigation measures will be negotiated with neighbours within high impact zone	• Contractors	• Throughout operation	Visual assessment	• Number of complaints
	85.	If the parameter fence consists of palisade fencing, the palisading must be painted either a red-brownish or light brown- colour	• Contractors	• Throughout operation	Visual assessment	• Number of complaints
<b>Avifauna Management</b>	86.	To avoid the impacts associated with PV panel collisions, during day-time panels should be vertically oriented/angled (as needed for optimal operation), whereas at night-time panels should be horizontally-oriented.	• Contractors	• Throughout operation	Visual assessment	• Number of injured birds



## 9 MEASURES APPLICABLE AT DECOMMISSIONING

The solar infrastructure which will be utilised for the Khauta Cluster Solar PV Energy Facilities are expected to have a lifespan of 25 to 30 years (with maintenance). Equipment associated with this solar facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the solar facility would comprise the dismantling and replacement of the solar panels with more appropriate technology/infrastructure available at that time. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMP to be revisited and amended.

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

### 9.1 Site Preparation

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

### 9.2 Dismantle and Remove Infrastructure

The solar infrastructure (solar panels and mounting structures) of the solar facility will be dismantled once it reaches the end of its economic lifespan. Once dismantled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements (NEMA / NEM:WA). All parts of the solar panels would be considered reusable or recyclable.

### 9.3 Decommissioning Objectives

In decommissioning the Khauta Cluster Solar Energy Facilities, the Applicant must ensure that:

- All structures not required for the post-decommissioning use of the site (may include the solar panels and mounting structures, substation, inverters and transformers, BESS, laydown areas) are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
- Rehabilitate access/service roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
- All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- Monitor rehabilitated areas quarterly for at least a year following decommissioning and implement remedial action as and when required.
- Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
- All vehicles to adhere to low-speed limits (i.e. 30km/h max) on the site, to reduce risk of faunal collisions as well as reduce dust.
- Retrenchments should comply with South African Labour legislation of the day.

The general recommendations in Sections 7 and 8 are also relevant to the decommissioning of the solar facilities and must be adhered to.

**Appendix A: Layout Maps and Sensitivity Maps**

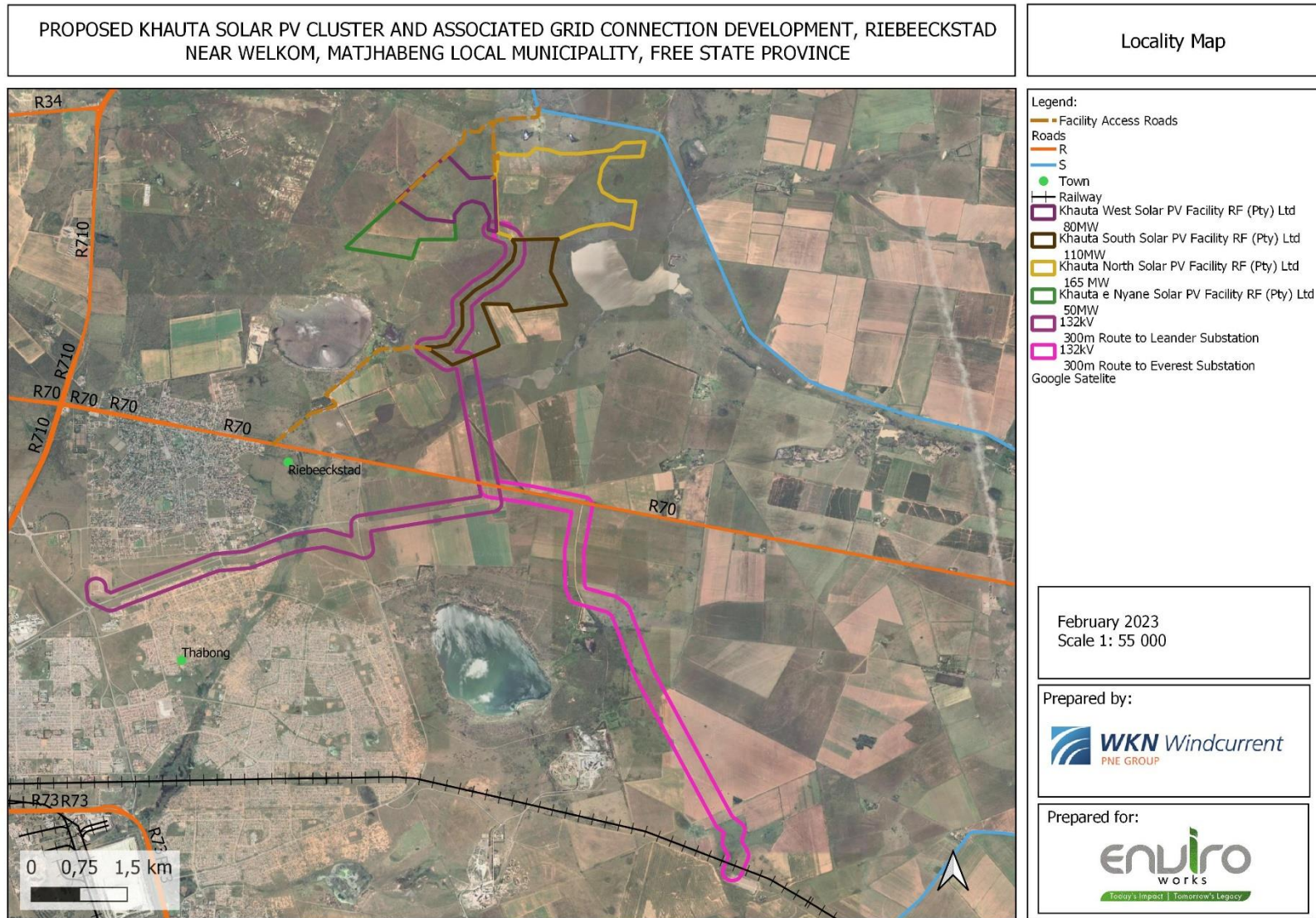


Figure 3: Locality Map

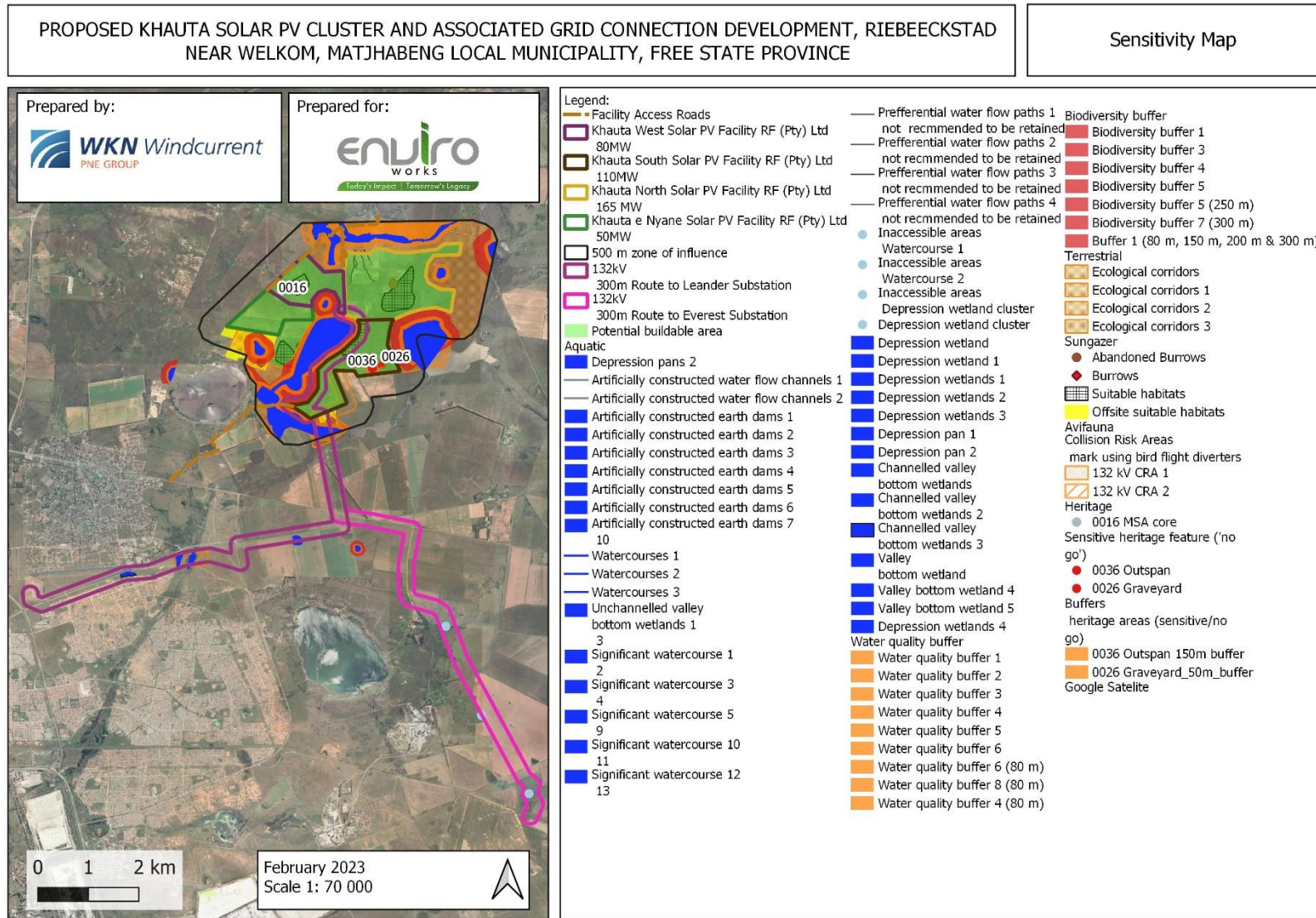
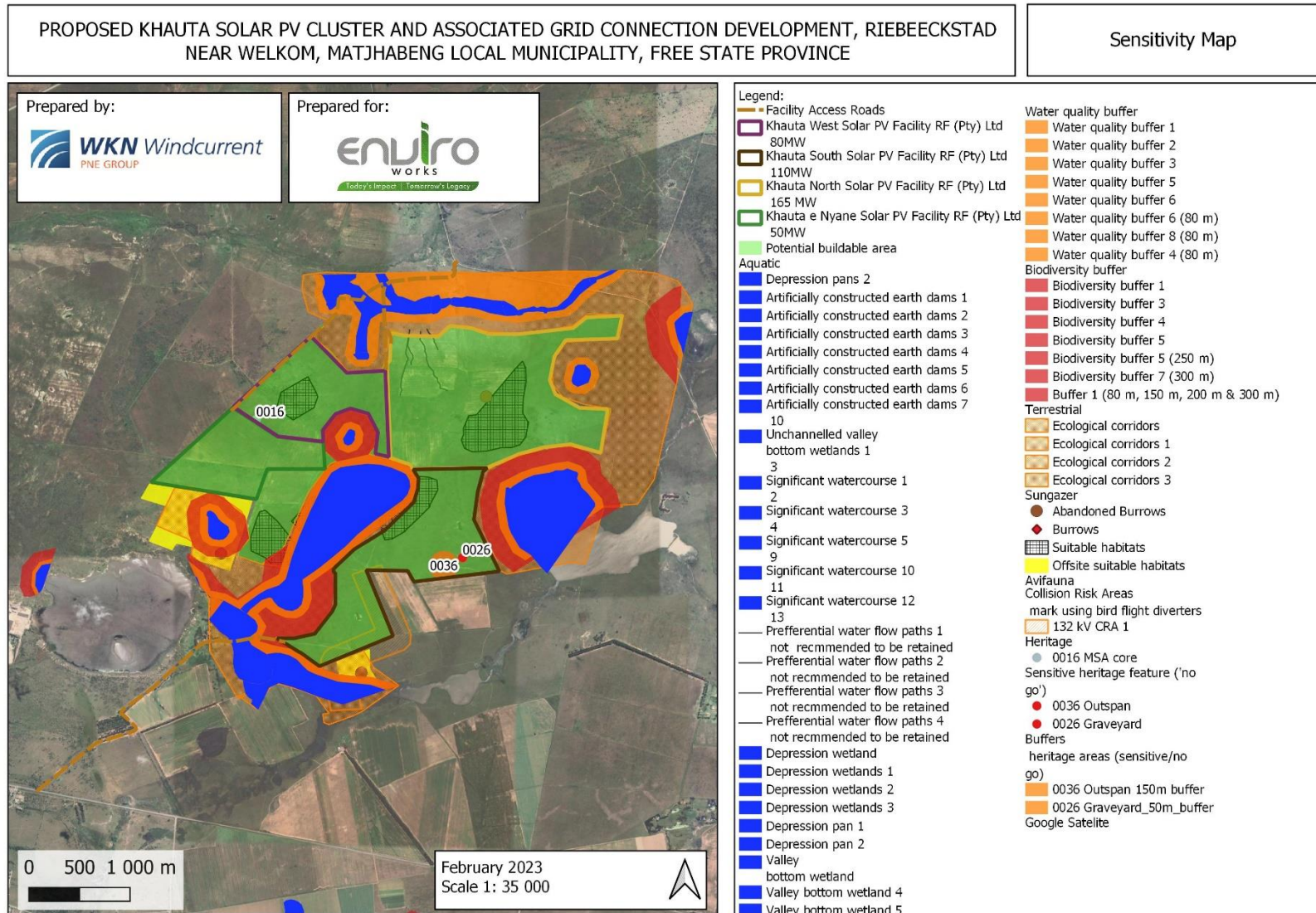


Figure 4: Combined Sensitivity Map



0 500 1 000 m



February 2023  
Scale 1: 35 000



**Figure 5: Recommended No-Go areas (demarcated in red and orange) within the solar PV farm development footprints.**