APPENDIX J

EMPr

APPLICANT: ESKOM HOLDINGS SOC LTD.

PROPOSED SERE SOLAR PHOTOVOLTAIC PLANT PHASE 1A AND ASSOCIATED INFRASTRUCTURE, WESTERN CAPE

ENVIRONMENTAL MANAGEMENT PROGRAMME

DRAFT

July 2022

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Title and Approval Page

Project Name:	Proposed SERE Solar Photovoltaic Plant Phase 1A and Associated Infrastructure, Western Cape
Report Title:	Environmental Management Programme
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Applicant:	Eskom Holdings SOC Ltd

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Amendments Page

Date:	Nature of Amendment	Amendment Number:
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LIST OF ACRONYMS & ABBREVIATIONS

AC	Alternating Current
ACMP	Archaeological Conservation Management Plan
AIFA	AVIC - International Flight Training Academy
BPEO	best practicable environmental option
CBA	Critical Biodiversity Area
cEO	contractor Environmental Officer
DAFF	Department of Agriculture, Forestry and Fisheries
DEA&DP	Department of Environmental Affairs and Development Planning
DFFE	Department of Forestry, Fisheries and the Environment
dEO	developer Environmental Officer
DPM	Developer's Project Manager
DWS	Department of Water and Sanitation
DMRE	Department of Mineral Resources and Energy
DSS	Developer Site Supervisor
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ERAP	Emergency Response Action Plan
ESA	Ecological Support Area
GIS	Geographical Information System
GN	Government Notice
GRM	Grievance Redress Mechanism
HCS	Hazardous Chemical Substance
HWC	Heritage Western Cape
IAPs	Interested and Affected Parties
MPRDA	Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NFA	National Forests Act (No. 84 of 1998)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment

PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SANS	South African National Standard
SCC	Species of Conservation Concern
SDS	Material Safety Data Sheet
SAPS	South African Police Services
WCBSP	Western Cape Biodiversity Spatial Plan

DEFINITION OF KEY TERMS

Auditing	*A systematic and objective assessment of an organisation's activities and services conducted and documented on a periodic basis.*
Construction Area	*Immediate site influenced by specific construction activities, as approved by the Engineer.*
Construction Domain	*Entire footprint required for the construction of the overall project components.*
Environment	*The surroundings in which humans exist and which comprise:* • *The land, water and atmosphere of the earth.* • *Micro-organisms, plant and animal life.* • *Any part or combination of a) and b) and the interrelationships among and between them.* • *The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.*
Environmental Aspect	*Those components of the company's activities, products and services that are likely to interact with the environment.*
Environmental Feature	*Elements and attributes of the biophysical, economic and social environment.*
Environmental Impact	*The change to the environment resulting from an environmental aspect, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.*
Environmental Management Programme (EMPr)	*A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.*
Environmental Objective	*Overall environmental goal pertaining to the management of environmental features.*
Environmental Target	*Performance requirement that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.*
Monitoring	*A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.*
Project Area	*The greater area within which the project is executed. Extends beyond the construction domain.*
Sensitive environmental features	*Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA process as sensitive through specialists' findings and input received from Interested and Affected Parties.*
Watercourse	*A geomorphological feature characterized by the presence of a streamflow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water. According to the National Water Act (Act 36 of 1998), a watercourse constitutes a river or spring, a natural channel in which water flows regularly or intermittently, a wetland, lake or dam into which, or from which, water flows, and any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.*

1 PURPOSE OF THE DOCUMENT

Nemai Consulting (Pty) Ltd was appointed by Eskom Holdings SOC Ltd (the Applicant) as the independent Environmental Assessment Practitioner (EAP) to apply for Environmental Authorisation in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) for the Proposed SERE Solar Photovoltaic (PV) Plant Phase 1A Project in the Western Cape. The Basic Assessment Process is being undertaken in terms of Government Notice (GN) No. R. 982 of 4 December 2014 (as amended).

An **Environmental Management Programme (EMPr)** represents a detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

The content of an EMPr must either contain the information set out in Appendix 4 of GN No. R. 982 of 4 December 2014 (as amended), or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a Government Notice. Once the Minister has identified, through a Government Notice, that a generic EMPr is relevant to an application for Environmental Authorisation, that generic EMPr must be applied by all parties involved in the environmental assessment process, including, but not limited to, the Applicant and the Competent Authority.

In accordance with the above, following EMPr was developed for the Project:

- EMPr for the Solar PV Project.

This EMPr must be read in conjunction with the Basic Assessment Report.

The scope of the EMPr is as follows:

- Establish management objectives during the Solar PV Park's pre-construction, construction and operational phases in order to enhance benefits and manage (i.e. prevent, reduce, rehabilitate and/or compensate) adverse environmental impacts;
- Provide targets for management objectives, in terms of desired performance;
- Describe actions required to achieve management objectives;
- Outline institutional structures and roles required to implement the EMPr; and
- Provide the legislative framework.

2 DOCUMENT ROADMAP

As a minimum, the EMPr aims to satisfy the requirements stipulated in Appendix 4 of GN No. R 982 of 4 December 2014 (as amended). **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: Document Roadmap

Chapter	Title	Correlation with Appendix 4 of G.N. No. R982	
1	**Purpose of the Document**	N/A	
2	**Document Roadmap**	N/A	
3	**Project Overview**	N/A	
4	**Environmental Assessment Practitioner**	1(a)	Details of – (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including curriculum vitae.
5	**Legislation and Guidelines Considered**	N/A	
6	**Roles & Responsibilities**	1(i)	An indication of the persons who will be responsible for the implementation of the impact management actions.
7	**Monitoring**	1(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		1(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
8	**Environmental Training & Awareness Creation**	1(m)	An environmental awareness plan describing the manner in which - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.
9	**EMPr Review**	N/A	
10	**Environmental Activities, Aspects and Impacts**	1(b)	A detailed description of the aspects of the activity that are covered by the final environmental management plan.
11	**Sensitive Environmental Features**	1(c)	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.

Chapter	Title	Correlation with Appendix 4 of G.N. No. R982	
12	**Impact Management**	1(d)	A description of impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iv) rehabilitation of the environment after construction and where applicable post closure; and (v) where relevant, operation activities.
		1(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 - (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) comply with any prescribed environmental management standards or practices; (iii) comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		1(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.
		1(l)	A programme for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
N/A		1(n)	Any specific information that may be required by the competent authority
N/A		2	Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.

3 PROJECT OVERVIEW

3.1 Details of the Applicant

Name of applicant:	Eskom SOC Ltd
Tel No:	011 800 3501
Postal Address:	PO Box 1091, Johannesburg, 2000
Physical Address:	Megawatt Park, 1 Maxwell Dr, Sunninghill, Sandton, 2157

3.2 Project Description

The hybridisation of the existing Sere Wind Farm with the installation of PV capacity was identified as one of the Renewable initiatives in the Eskom Corporate Plan. Sere Wind Farm is a 105.8 MW wind facility located near Vredendal in the Western Cape, which entered into commercial operation on 31 March 2015. In order to address the urgent need for additional generating capacity, it has been proposed that PV technology be installed at the Sere Wind Farm site in phases. This project is applicable for the first phase (Phase 1A) of the Sere PV project. Phase 1A aims to address Eskom's urgent need for additional generating capacity.

The Project is located in the north-western part of the Western Cape and falls within the Matzikama Local Municipality (MLM) falling within the West Coast District Municipality (WCDM). The locality map is provided in **Figure 1** below.

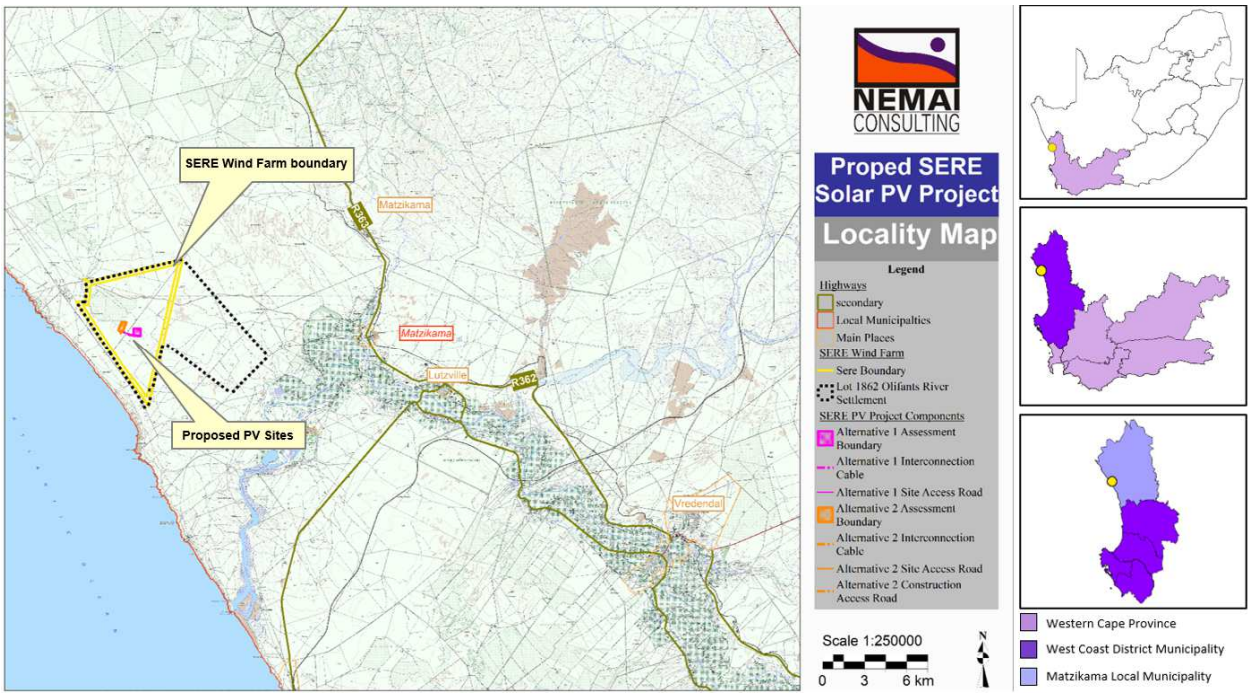

Figure 1: Locality map

The solar PV plant has a design life of a minimum of 25 years. The extension of the life of the plant will be considered when assessing the plant's economic viability to remain operational after its end of life.

The technical details of the proposed PV Plant are summarised in **Table 1** below.

Table 2: Technical details of the proposed PV Plant

No.	Component	Description / Dimensions
1.	Height of PV panels	Between 3 m to 6 m

No.	Component	Description / Dimensions
2.	Area of PV Array	Around 16 ha to 18 ha
3.	Number of inverters required	Up to 20 inverter stations between the PV modules.
4.	Area occupied by inverter / transformer stations / substations	▪ Area occupied by Inverter stations (20 Inverter stations 30m^2 each) = 0.003 x 20 = 0.09 ha (within the PV site) ▪ Area occupied by Control room/offices = 0.4 ha ▪ Area occupied by security house = 0.001 ha
5.	Capacity of existing substation	1 x 40 MVA, 22kV – 33kV/132 kV
6.	Area occupied by both permanent and construction areas	Less than 20 ha
7.	Length of roads	▪ Access road alternative 1 = 796m (tracking) / 880m (fixed) ▪ Access road alternative 2 = 30m (permanent) / 110m (construction) ▪ Internal roads to inverter stations = approximately 3.4km (alternative 1); 2km (alternative 2) ▪ Perimeter road = approximately 1.8km (both alternatives)
8.	Length of interconnection cable between PV site and substation	▪ Alternative 1 = 1044m (tracking) / 1150m (fixed) ▪ Alternative 2 = 244m (tracking/fixed)
9.	Width of roads	▪ Internal roads = 2.5 m to 5 m ▪ Access road = 8m (alternative 1) and 6m (alternative 2)
10.	Proximity to grid connection	Approximately 1km from existing Skaapvlei Substation (Alternative 1) Approximately 200m from existing Skaapvlei Substation (Alternative 2)
11.	Height and type of fencing	To be determined

Photovoltaic Panel Structures

The technology options considered for the PV array include the following:

- Fixed tilt structures with central inverters; or
- Single axis trackers with central inverters.

The decision between using the fixed or single axis tracking technology will only be made during the appointment of the Construction Contractor. For this reason, the technology options are not considered alternatives. The assessment site has been enlarged to accommodate both layouts for the fixed and tracking technologies, however each technology footprint itself will be less than 20 ha falling within the assessment site area. As confirmed with DFFE, the Department will provide a decision on the alternatives provided below within the assessment area for both fixed and single axis tracking technology, which will be chosen post-authorisation.

The alternatives considered are as follows:

- Alternative 1:
  Sere PV Fixed and Tracking Technology Layout options for site location to the east of the existing Skaapvlei Substation.
- Alternative 2:
  Sere PV Fixed and Tracking Technology Layout options for site location to the north of the existing Skaapvlei Substation.

The panel array (technology) layout options have different heights and spacing intervals; however, the total development footprint remains less than 20ha for each technology option. Approximate height differences between the alternatives are as follows:

- Fixed tilt structures and central inverters - 6m height;
- Single axis trackers, bifacial mono-crystalline modules and string inverters - 3.5m height.

Access Roads and Laydown Areas

The installation of the PV panels requires adequate access to the site by transport / delivery vehicles. A primary access road and internal secondary roads of gravel access is sufficient for the Project.

It is proposed to develop a new access point from the existing Wind Farm access road. From the Wind Farm access road, a main internal road will align to the PV Park facility from which the secondary internal roads branch off to align to the separate PV modules. The preferred option will have two site access roads, a temporary construction access road and a permanent road leading to the office buildings.

Each PV array requires its own access road next to it for construction, maintenance (and cleaning) and refurbishment. Although the existing on-site farm roads will be used as far as possible, the exact alignment and design of the required roads will be determined during detailed design phase.

Electrical Connection

The electricity generated by the PV site will be transferred to the national Eskom grid. The Project will connect to existing Skaapvlei Substation on the same property through a ±1.1km (Alternative 1) and 0.2 km (Alternative 2) single circuit underground line. The voltage of the energy generated by the Project will be transformed on site.

Office Buildings

The Solar PV plant is required to have a dedicated Operating and Maintenance building, and spares storage facilities. The Operating and Maintenance building to include the following rooms as a minimum:

- Control room (For employees to view status of plant equipment, air-conditioned)
- Server room (Air-conditioned room for sensitive electronic equipment)
- Ablution facilities (male and female)
- 2 x Offices
- Kitchen
- A security/access control building is to be positioned at the main gate of the PV Plant.
- Spares/Storeroom (for the storage of spare solar panels and electronic equipment)

The control room with regards to operator interface shall be designed to ergonomic principles and good Solar Power Plant practice.

The project-lifecycle as well as resources and services required for construction and operation are explained in the Basic Assessment Report.

4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

The details of the Environmental Assessment Practitioner (EAP) are as follows:

Name of EAP:	Jacqui Davis from Nemai Consulting
Tel No:	011 781 1730
Fax No:	011 781 1731
E-mail address:	jacquid@nemai.co.za

The core members of Nemai Consulting that were involved with compiling the EMPr are captured in **Table 3** below, and their respective Curricula Vitae are contained in in the Basic Assessment.

Table 3: EMPr Core Team Members

Name	Qualifications	Experience	Duties
Mr D. Henning	MSc (River Ecology)	20 years	• Project Manager - EIA Process
Mr. J. Davis	Hons (Environmental Science)	9 years	• Project Leader - EIA Process

5 LEGISLATION AND GUIDELINES CONSIDERED

5.1 Overview of Legislation

Activities during the pre-construction, construction and operational phases will be undertaken according to recognised best industry practices and will include measures prescribed within this EMPr. The EMPr shall form part of the contract documents and informs the Contractor about his duties in the fulfilment of the Project's objectives, with particular reference to the mitigation of environmental impacts that may potentially be caused by construction activities. The Contractor will note that obligations imposed by the EMPr are legally binding in terms of environmental legislation.

All Project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Some of the pertinent environmental legislation that has bearing on the proposed development is captured in **Table 4** below.

Table 4: Environmental legislative Framework

Legislation	Description and Relevance	
Constitution of the Republic of South Africa, (No. 108 of 1996)	▪ Chapter 2 – Bill of Rights. ▪ Section 24 – Environmental Rights.	
National Environmental Management Act (NEMA) (No. 107 of 1998)	▪ Key sections (amongst others): o Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). o Section 28 – Duty of care and remediation of environmental damage. ▪ Environmental management principles. ▪ Authorities – DFFE (national) and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) (provincial).	
GN No. R 982 of 4 December 2014 (as amended)	▪ Purpose - regulate the procedure and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to EIA, in order to avoid or mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.	
GN No. R. 983 of 4 December 2014 (as amended) (Listing Notice 1)	▪ Purpose - identify activities that would require environmental authorisations prior to commencement of that activity and to identify competent authorities in terms of sections 24(2) and 24D of NEMA. ▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014 (as amended). However, according to Regulation 15(3) of GN No. R 982 (as amended), S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. ▪ Activities under Listing Notice 1 and 3 that are relevant to this project follow.	
	GN No. R.983 – Activity 1 *The development of facilities or infrastructure for the generation of electricity from a renewable resource where—* *(i) the electricity output is more than 10 megawatts but less than 20 megawatts*	*Development of a solar PV plant consisting of approximately 20,000 – 65,000 solar PV modules and total installed power capacity of 14 – 19.9 MW.*
	GN No. R.983 – Activity 11(i): *The development of facilities or infrastructure for the transmission and distribution of electricity—* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* *excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —* *(a) temporarily required to allow for maintenance of existing infrastructure;* *(b) 2 kilometres or shorter in length;* *(c) within an existing transmission line servitude; and* *(d) will be removed within 18 months of the commencement of development.*	*Electrical interconnection line / cable, with capacity of 22kV or 33kV, for evacuation of power from the Solar PV facility to the 33/132 kV Skaapvlei substation*
	GN No. R.983 – Activity 27: *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	*Development of a solar PV plant and associated infrastructure (e.g. offices, maintenance buildings, guard house, inverters, construction laydown area and batching plant) with a footprint of more than 1 hectare but less than 20 hectares.*
	GN No. R.983 – Activity 28: *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:*	*The current Wind Farm site is zoned as Agriculture and has been used on an ad hoc basis for grazing of sheep.* *Therefore, this activity may be applicable as an area larger than 1 ha will be converted to a Solar PV*

Legislation	Description and Relevance	
	(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;	*Plant and no longer be available for ad hoc grazing.*
GN No. R. 985 of 4 December 2014 (as amended) (Listing Notice 3)	▪ Purpose - list activities and identify competent authorities under sections 24(2), 24(5) and 24D of NEMA, where environmental authorisation is required prior to commencement of that activity in specific identified geographical areas only. ▪ The investigation, assessment and communication of potential impact of activities must follow a Basic Assessment process, as prescribed in regulations 19 and 20 of GN No. R 982 of 4 December 2014 (as amended). However, according to Regulation 15(3) of GN No. R 982 (as amended), S&EIR must be applied to an application if the application is for two or more activities as part of the same development for which S&EIR must already be applied in respect of any of the activities. ▪ Activities under Listing Notice 3 that are relevant to this project follow.	
	GN No. R.985 – Activity 4(i) - (ii)(aa): *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *i. Western Cape* *ii. Areas outside urban areas;* *(aa) Areas containing indigenous vegetation;*	*A number of roads will be constructed as unsurfaced roads in association with the development across indigenous vegetation:* • *Access road alternative 1 = 796m (tracking) / 880m (fixed)* • *Access road alternative 2 = 30m (permanent) / 110m (construction)* • *Internal roads* to inverter stations = approximately 3.4km (alternative 1); 2km (alternative 2)* • *Perimeter road* = approximately 1.8km (both alternatives)* **To note is that the internal and perimeter roads fall under clearance of indigenous vegetation under Activity 27 above. Only the access roads will constitute a new footprint outside the PV site.*
	GN No. R.985 – Activity 10 (i) (ii): *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* *i. Western Cape* *ii. All areas outside urban areas;*	*Information on the actual amount of diesel that will be stored on site during construction by the contractor is unknow. There is a potential for the 30m^3 threshold to be exceeded, but not 80m^3.*
	GN No. R.985 – Activity 12(i) (ii): *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *i. Western Cape* *ii. Within critical biodiversity areas identified in bioregional plans;*	*More than 300m^3 of indigenous vegetation will be cleared within a CBA1 according to the Western Cape Biodiversity Spatial Plan 2017:* *Alternative 1 – the entire PV site, access road and interconnection cable falls within a CBA1.* *Alternative 2 – a small portion of the southern section of the PV site (458m^2) and the access road and interconnection cable fall within a CBA1.*
National Water Act (Act No. 36 of 1998)	▪ Sustainable and equitable management of water resources. ▪ Key sections (amongst others): o Chapter 3 – Protection of water resources. o Section 19 – Prevention and remedying effects of pollution. o Section 20 – Control of emergency incidents. o Chapter 4 – Water use. ▪ Authority – Department of Water and Sanitation (DWS).	

Legislation	Description and Relevance
National Environmental Management Air Quality Act (Act No. 39 of 2004)	▪ Air quality management ▪ Key sections (amongst others): o Section 32 – Dust control. o Section 34 – Noise control. ▪ Authorisation type – Atmospheric Emission License. *Note that this is not required for the Project.* ▪ Authority – DFFE, DEA&DP and municipalities.
National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	▪ Management and conservation of the country's biodiversity. ▪ Protection of species and ecosystems. ▪ Authorisation type – Permit. ▪ Authority – DFFE and CapeNature.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003)	▪ Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.
National Environmental Management: Waste Act (Act No. 59 of 2008)	▪ Management of waste. ▪ Chapter 5 – licensing requirements for listed waste activities - GN No. R. 921 of 29 November 2013 (as amended). ▪ Authorisation type – Waste Management Licence. *Note that this is not required for the Project.* ▪ Authority – DFFE and DEA&DP.
National Forests Act (No. 84 of 1998)	▪ Supports sustainable forest management and the restructuring of the forestry sector, as well as protection of indigenous trees in general. ▪ Section 15 – Authorisation required for impacts to protected trees. ▪ Authorisation type – Permit. ▪ Authority – Department of Agriculture, Forestry and Fisheries (DAFF).
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	▪ Equitable access to and sustainable development of the nation's mineral and petroleum resources and to provide for matters related thereto. ▪ Key sections (amongst others): o Section 22 – Application for mining right. o Section 27 – Application for, issuing and duration of mining permit. o Section 53 – Use of land surface rights contrary to objects of Act. ▪ Authorisation type – Mining Permit / Mining Right. *Note that this is not required for the Project.* ▪ Authority – DMRE.
Occupational Health & Safety Act (Act No. 85 of 1993)	▪ Provisions for Occupational Health & Safety. ▪ Authority – Department of Employment and Labour. ▪ Relevant regulations, such as Electrical Installation Regulations, Construction Regulations, etc.
National Heritage Resources Act (Act No. 25 of 1999)	▪ Key sections: o Section 34 – protection of structure older than 60 years. o Section 35 – protection of heritage resources. o Section 36 – protection of graves and burial grounds. o Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m^2 in extent, etc. ▪ Authorisation type – Permit. ▪ Authority – South African Heritage Resources Agency (SAHRA) and Heritage Western Cape (HWC).
Conservation of Agricultural Resources Act (Act No. 43 of 1983)	▪ Control measures for erosion. ▪ Control measures for alien and invasive plant species. ▪ Authority – Department of Agriculture.
Nature Conservation Ordinance of the Cape of Good Hope (Ordinance 19 of 1974) & Western Cape Nature Conservation Laws Amendment Act (Act 3 of 2000)	▪ Authority – DFFE and CapeNature.
Civil Aviation Act (Act 13 of 2009) & Civil Aviation Regulations of 2011	▪ Consents for obstacles ▪ Authority – Department of Transport & South African Civilian Aviation Authority (SACAA)

Refer to **Section 8** of the Basic Assessment EIA Report for an overview of the relationship between the proposed Project and certain key pieces of environmental legislation.

5.2 Method Statements

The Contractor shall provide detailed method statements on how the performance criteria in the EMPr will be met. These method statements are to be reviewed and approved by the Engineer to ensure that they are adequate.

The method statements must be project- and site specific and should explain in detail the following:

1. The manner in which the work is to be undertaken;
2. The estimated schedule for the works (timing);
3. The area where the works will be executed (location);
4. The materials and plant / equipment needed for the works;
5. The necessary mitigation measures that need to be implemented to adequately safeguard the environment, construction workers and the public (where applicable);
6. Training of employees;
7. Roles and responsibilities; and
8. Monitoring and reporting requirements.

The list of method statements required to assist in the implementation of this EMPr includes at least the following (where applicable):

- Method Statement for site clearing;
- Method Statement for establishing the construction camp;
- Method Statement with regard to waste and wastewater management;
- Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;
- Method Statement for dust control;
- Method Statement for the storage and handling of hazardous substances;
- Method Statement for management of concrete and batching plants;
- Method Statement for managing spoil material;
- Method Statement for controlling alien invasive species and noxious weeds;
- Method Statement for the decommissioning of the construction works area;
- Method Statement for rehabilitation of construction footprint; and
- Method Statement for the management of stormwater and erosion.

6 ROLES & RESPONSIBILITIES

The roles and responsibilities contained in the generic EMPr's, in accordance with GN No. 435 of 22 March 2019, were adopted for the PV Site EMPr. These roles and responsibilities and captured in **Table 5** below.

It is noted that if no specific person, for example, an Environmental Control Officer (ECO) is appointed, the holder of the Environmental Authorisation (EA) remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 5: Guide to roles and responsibilities for implementation of an EMPr

Responsible Person	Role and Responsibilities
Developer's Project Manager (DPM)	Role The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an Environmental Control Officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the Environmental Authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. Responsibilities - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	Role The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day-to-day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. Responsibilities - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; and - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	Role The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the ECO for non-compliance with the Performance Specifications as set out in the EA and EMPr.

Responsible Person	Role and Responsibilities
	The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; and - Communication of all modifications to the EMPr to the relevant stakeholders.

Responsible Person	Role and Responsibilities
developer Environmental Officer (dEO)	Role The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. Responsibilities - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; and - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor.
Contractor	Role The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion for overhead electricity transmission and distribution infrastructure activities. Responsibilities - Project delivery and quality control for the development services as per appointment; - Employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - Ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is Properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - Attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones;

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

7 MONITORING

Monitoring is required to ensure that the receiving environment is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the Project.

7.1 Baseline Monitoring

7.1.1 General

Baseline monitoring aims to determine the pre-construction state of the receiving environment and serves as a reference to measure the residual impacts of the Project by evaluating the deviation from the baseline conditions and the associated significance of the adverse effects.

7.1.2 Preconstruction (walk-down) Survey

A pre-construction survey needs to be conducted for all areas that are to be affected by construction activities. The survey needs to include the following:

- Site investigations by appropriate members of the project team and specialists (as relevant);
- Generate records from survey which include site details, photographs, explanatory notes, etc. (as required);
- Record the condition of existing structures and infrastructure on the site; and
- Identify site-specific mitigation measures.

The records from the pre-construction survey must be used to establish and inform the reinstatement and rehabilitation requirements for the affected areas.

The following walk-down surveys should be undertaken prior to construction commencement:

- Heritage; and
- Terrestrial Ecological (this walk-down can be combined with the implementation of the search and rescue plan for SCC and protected species).

7.1.3 Environmental Parameters

The following baseline studies were undertaken as part of the EIA process as shown in **Table 6** below.

Table 6: Baseline Monitoring Undertaken during the EIA Phase

Environmental Parameter	Monitoring Locations	Requirements
Fauna and Flora	Construction footprint and close vicinity.	A pre-construction survey in the flowering season (July-September) should be conducted

Environmental Parameter	Monitoring Locations	Requirements
		in order to ensure that a more comprehensive floral presence confirmation. For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work other conservation projects.
Avifauna	Construction footprint and close vicinity.	Complied with BirdLife SA Guidelines.

7.2 Environmental Monitoring

Environmental monitoring entails checking, at pre-determined frequencies, whether thresholds and baseline values for certain environmental parameters are being exceeded. The parameters and sampling localities used during the baseline monitoring will form the basis of the environmental monitoring programme.

The environmental parameters to be included as part of the environmental monitoring programme, which is to be undertaken by the Contractor or the Applicant during the construction phase, are listed in **Table 7** below.

The following requirements need to be incorporated into the programme:

- Monitoring during normal operations, abnormal situations and emergency situations;
- Measuring equipment must be accurately calibrated;
- Adequate quality control of the sampling must be ensured;
- Certified methods of testing must be employed;
- Where legal specifications exist for testing and sampling methods, these must be considered; and
- Establish a process for identifying and implementing corrective measures.

Table 7: Environmental Monitoring

Environmental Parameter	Monitoring Locations	Requirements
Operational Bird Monitoring	The PV site and surrounding boundary.	Monitoring to meet the requirements of the BirdLife SA Guidelines.

7.3 Compliance Monitoring and Auditing

Compliance monitoring will commence in the pre-construction phase, where those conditions in the EA that need to be adhered to prior to Project implementation will need to be checked and recorded, as well as to check compliance with the provisions in the EMPr. Compliance monitoring will be completed at the end of the defects liability period to check the performance of rehabilitation measures and whether the related objectives have been met.

It is recommended that the ECO undertake monthly monitoring and bi-annual full compliance auditing, including an audit at the end of construction and one at the end of the defects notification period. Furthermore, before site clearance, the ECO must be present to undertake a walk-through of the areas to be cleared to identify any nest sites, or plant Species of Conservation Concern (SCC) in order for the necessary actions to be undertaken prior to clearance.

Auditing of compliance with the EA and EMPr must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014) in terms of the following:

1. The holder of the EA must, for the period during which the EA and EMPr remain valid -
    a. Ensure that the compliance with the conditions of the EA and EMPr is audited; and
    b. Submit an environmental audit report to DFFE.
2. The environmental audit report must
    a. Be prepared by an independent person with the relevant environmental auditing expertise;
    b. Provide verifiable findings, in a structured and systematic manner, on-
        i. The level of performance against and compliance of an organization or project with the provisions of the requisite EA and EMPr; and
        ii. The ability of the measures contained in the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
    c. Contain the information set out in Appendix 7 of GN No. R. 982 of 4 December 2014 (as amended); and
    d. Be conducted and submitted to DFFE at intervals as indicated in the EA.
3. The environmental audit report must determine-
    a. The ability of the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
    b. The level of compliance with the provisions of the EA and EMPr.

A document handling system must be established to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr.

Supplementary EMPr documentation could include:

- Method Statements;

- Site instructions;
- Emergency preparedness and response procedures;
- Record of environmental incidents;
- Non-conformance register;
- Training records;
- Site inspection reports;
- Monitoring reports;
- Auditing reports;
- Public complaints register; and
- Grievance Mechanism/Process for public and contractor/employees.

8 ENVIRONMENTAL TRAINING & AWARENESS CREATION

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices.

The various means of creating environmental awareness during the pre-construction and construction phases of the project may include:

- Induction course for all workers before commencing work on site;
- Refresher courses (as and when required);
- Daily toolbox talks, focusing on particular environmental issues (task- and area specific);
- Courses must be provided by suitably qualified persons and in a language and medium understood by the workers;
- Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. grave sites, protected trees); and
- Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

The Contractor must compile a project-specific Environmental Training and Awareness Programme, taking into consideration the abovementioned factors, to be approved by the DPM/ECO.

9 EMPR REVIEW

Due to its dynamic nature, this EMPr will be reviewed and revised when necessary to ensure continued environmental improvement.

Following detailed design and planning, the EMPr may need to be revised to render the management actions more explicit and accurate to the final project specifications. Changes to the EMPr shall also be required where the existing system:

- Does not make adequate provision for protecting the environment against the pre-construction, construction and/or operational activities;
- Needs to be modified to meet conditions of statutory approval;
- It is not achieving acceptable environmental performance;
- Requires changes due to the outcome of a monitoring or auditing event or management review;
- Provides redundant, impracticable or ineffective management measures; and
- Based on provisions in Regulation 34 of GN No. R. 982 of 4 December 2014 (as amended), as amended.

The amendment of the EMPr will be undertaken in terms of Regulation 34 – 37 of GN No. R. 982 of 4 December 2014 (as amended), as applicable.

10 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

10.1 Environmental Activities

10.1.1 Pre-construction Phase

The main project activities and high-level environmental activities to be undertaken in the pre-construction phase are listed in **Table 8** below.

Table 8: Activities associated with Pre-Construction Phase

Project Phase: Pre-construction
Project Activities
❖ Detailed engineering design.
❖ Detailed geotechnical investigations.
❖ Survey and mark development.
❖ Survey and map topography for determination of post-construction landscape, rehabilitation and shaping (where necessary).
❖ Procurement process for Contractor.
❖ Review Contractor's method statements (as relevant).
❖ Establish new access roads and undertake selective improvements to existing access roads to facilitate the delivery of construction plant and materials.
❖ The building of a site office and ablution facilities.
❖ Confirmation of the location and condition of all structures and infrastructure.
❖ Determining and documenting the conditions of the roads to be used during construction.
❖ Fencing off PV site.
High Level Environmental Activities
❖ Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation
❖ Develop a Search and Rescue Plan for Protected Plants occurring within the Project footprint.
❖ Obtain permits for impacts to Species of Conservation Concern (SCC) and Protected Species, if avoidance is not possible
❖ Implement the plant Search and Rescue Plan
❖ Develop Environmental Monitoring Programme (e.g. avifauna)
❖ On-going consultation with I&APs
❖ Other activities as per EMPr

10.1.2 Construction Phase

The main project activities and high-level environmental activities to be undertaken in the construction phase are listed in **Table 9** below.

Table 9: Activities associated with Construction Phase

Project Phase: Construction
Project Activities
❖ Site establishment.
❖ Prepare access roads.
❖ Relocation of existing subterranean infrastructure, as relevant.
❖ Establish construction laydown area.
❖ Bulk fuel storage.
❖ Delivery of construction material.
❖ Transportation of equipment, materials and personnel.
❖ Storage and handling of material.
❖ Construction employment.
❖ Site clearing (as necessary).
❖ Construction of PV Plant infrastructure.
❖ Construction of site access road.
❖ Excavation and installation of the interconnection cable.
❖ Concrete Works, as required.
❖ Erection of steel structures, as required.
❖ Mechanical and Electrical Works.
❖ Electrical supply.
❖ Material delivery and offloading.
❖ Rehabilitation of construction laydown area.
❖ Stockpiling.
❖ Waste and wastewater management.
High Level Environmental Activities
❖ Diligent compliance monitoring of the EMPr, Environmental Authorisation and other relevant environmental legislation.
❖ Implement Environmental Monitoring Programme (e.g. avifauna).
❖ Reinstatement and rehabilitation of construction domain.
❖ On-going consultation with IAPs.
❖ Other activities as per EMPr.

10.1.3 Operation Phase

The main project activities and high-level environmental activities to be undertaken in the operational phase are listed in **Table 10** below.

Table 10: Activities associated with Operation Phase

Project Phase: Operation
Project Activities
❖ Testing and commissioning the Project's components.
❖ Cleaning of PV modules
❖ Servitude access arrangements and requirements.
❖ Routine maintenance inspections of interconnection cable.
❖ Controlling vegetation.

Project Phase: Operation
❖ Managing stormwater and waste.
❖ Conducting preventative and corrective maintenance.
❖ Monitoring of the PV facility's performance.
High Level Environmental Activities
❖ On-going consultation with I&APs.
❖ Other activities as per EMPr for Operational Phase.

10.2 Environmental Aspects

Environmental aspects are regarded as those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impact.

10.2.1 Pre-construction Phase

The environmental aspects listed in **Table 11** below have been identified for the proposed Project during the pre-construction phase, which are linked to the Project activities (note that only high level aspects are provided).

Table 11: Environmental aspects associated with Pre-Construction Phase

Project Phase: Pre-construction
Environmental Aspects
❖ Inadequate consultation with landowners, affected parties, stakeholders and authorities.
❖ Inadequate environmental and compliance monitoring.
❖ Poor construction site planning and layout.
❖ Site-specific environmental issues not fully understood.
❖ Land occupancy by temporary buildings, provisional on-site facilities and storage areas.
❖ Absence of relevant permits (e.g. for protected plants, heritage resources - if encountered).
❖ Poor waste management.
❖ Absence of, or poorly maintained, ablution facilities.

10.2.2 Construction Phase

The environmental aspects listed in **Table 12** below have been identified for the proposed Project during the construction phase, which are linked to the Project activities (note that only high level aspects are provided).

Table 12: Environmental aspects associated with Construction Phase

Project Phase: Construction
Environmental Aspects
❖ Inadequate environmental and compliance monitoring.
❖ Lack of environmental awareness creation.
❖ Indiscriminate site clearing.

Project Phase: Construction
❖ Poor site establishment.
❖ Poor management of access and use of access roads.
❖ Disruptions to traffic.
❖ Poor transportation practices.
❖ Poor fencing arrangements.
❖ Erosion.
❖ Disturbance of topsoil.
❖ Poor management of excavations.
❖ Inadequate storage and handling of material.
❖ Inadequate storage and handling of hazardous material.
❖ Poor maintenance of equipment and plant.
❖ Poor management of labour force.
❖ Pollution from ablution facilities.
❖ Inadequate management of construction camp.
❖ Poor waste management practices – hazardous and general solid, liquid.
❖ Wastage of water.
❖ Damage to significant flora (if encountered).
❖ Damage to significant fauna (if encountered).
❖ Inadequate stormwater management.
❖ Damage to surrounding environmentally sensitive areas.
❖ Damage to cultural heritage and palaeontological features (if encountered).
❖ Poor reinstatement and rehabilitation.

10.2.3 Operation Phase

The environmental aspects listed in **Table 13** below have been identified for the proposed Project during the operational phase, which are linked to the Project activities (note that only high level aspects are provided).

Table 13: Environmental aspects associated with Operational Phase

Project Phase: Operation
Environmental Aspects
❖ Inadequate environmental and compliance monitoring.
❖ Inadequate management of routine maintenance and maintenance works.
❖ Inadequate management of vegetation.
❖ Inadequate stormwater management.
❖ Pollution caused by cleaning of panels.
❖ Pollution caused by dangerous goods stored on site
❖ Inadequate management of light pollution.
❖ Failure to comply with health, safety and environmental specifications.

10.3 Potentially Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable.

Refer to **Table 14** below for the potentially significant impacts associated with the Project's activities and environmental aspects for the construction and operational phases.

Table 14: Potentially significant environmental impacts - Construction and Operational Phases

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Land Use	▪ Permanent change in land use at PV site and along power line route. ▪ Sterilisation of land.	▪ Sterilisation of land for other land use types up to the decommissioning of the Project (if applicable).
Geology	▪ Suitability of geological conditions to support the proposed infrastructure.	▪ Suitability of geological conditions to support the infrastructure.
Geohydrology	▪ Groundwater pollution due to spillages and poor construction practices.	▪ Groundwater pollution due to poor operation and maintenance practices.
Topography	▪ Visual impact. ▪ Erosion of areas cleared for construction purposes.	▪ Visual impact caused by proposed Project infrastructure and landscape transformation.
Soil	▪ Soil erosion due to clearance and inadequate stormwater management. ▪ Soil compaction. ▪ Soil contamination due to spillages and poor construction practices. ▪ Loss of topsoil.	▪ Soil erosion due to inadequate stormwater management. ▪ Soil contamination due to poor operation and maintenance practices.
Surface Water	▪ Alteration of drainage over site.	▪ Alteration of drainage over site.
Flora & Fauna	▪ Habitat loss / fragmentation. ▪ Potential loss, disturbance or displacement of fauna and flora species. ▪ Human - animal conflicts. ▪ Noise and vibration impacts to fauna. ▪ Nights lights may affect nocturnal faunal species. ▪ Illegal harvesting and poaching of faunal and floral species by construction workers. ▪ Pollution of the biophysical environment from poor construction practices. ▪ Proliferation of invasive alien species in disturbed areas.	▪ Habitat fragmentation (e.g. barriers to animal movement). ▪ Shading out of plants by solar panels. ▪ Reflection of sunlight from the solar panels could adversely affect birds. ▪ Risk to birds from collision with infrastructure. ▪ Chemical pollution associated with cleaning the PV panels. ▪ Proliferation of invasive alien species in disturbed areas. ▪ Pollution from use of herbicides.
Socio-economic Environment	▪ Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes). ▪ Safety and security. ▪ Use of local road network. ▪ Nuisance from dust and noise. ▪ Consideration of local labourers and suppliers in area – stimulation of local economy (positive impact). ▪ Transfer of skills (positive impact).	▪ Direct and indirect economic opportunities as a result of the Project (addition of MW to the national grid).
Air Quality	▪ Dust from the use of dirt roads by construction vehicles.	▪ The efficiency of the solar plant could be reduced if the modules are soiled (covered) by particulates/dust.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
	▪ Dust from bare areas that have been cleared for construction purposes. ▪ Emissions from construction equipment and machinery. ▪ Tailpipe emissions from construction vehicles.	▪ Impacts to air quality caused by the operation and maintenance of the facility include dust from the use of dirt roads and tailpipe emissions from vehicles.
Noise	▪ Localised increases in noise may be caused by construction activities.	N/A
Agriculture	▪ Soil erosion. ▪ Loss of topsoil. ▪ Risk of harm to livestock (associated with informal grazing) from construction activities.	▪ Soil erosion due to inadequate stormwater management.
Historical and Cultural Features	▪ Potential direct impacts on below-ground archaeological deposits and fossils as a result of ground disturbance.	▪ Possible impacts to the cultural landscape as a result of the introduction of incompatible structures and infrastructure to the rural landscape
Existing Structures & Infrastructure	▪ Setbacks / conditions associated with surrounding land and infrastructure.	▪ Setbacks / conditions associated with surrounding land and infrastructure.
Transportation	▪ Increase in traffic on the local road network. ▪ Transportation of materials and construction personnel to site. ▪ Impacts to road conditions. ▪ Speeding and reckless driving by construction personnel. ▪ Use of oversized vehicles / abnormal loads, as required. ▪ Risks to other road users.	▪ Transportation of maintenance materials, as well as operational and maintenance personnel, to site.
Civil Aviation	▪ Impact on Air Traffic Navigation and Communication. ▪ Sun glare off PV panels blinding aircraft pilots.	
Aesthetics	▪ Landscape transformation. ▪ Visual impacts associated with construction activities.	▪ Landscape transformation. ▪ Inadequate reinstatement and rehabilitation of construction footprint. ▪ Light pollution. ▪ Glint and glare from PV facility.
Health	▪ Hazards related to construction work. ▪ Increased levels of dust and particulate matter. ▪ Increased levels of noise. ▪ Poor water and sanitation. ▪ Communicable diseases. ▪ Safety and security.	▪ Hazards related to operation and maintenance work.

11 SENSITIVE ENVIRONMENTAL FEATURES

Some of the sensitive and significant environmental features and aspects that are associated with the Project's receiving environment are highlighted, for which mitigation measures are included in the Basic Assessment Report and EMPr (as relevant):

- The proposed Solar PV Site Alternative 1 overlaps with a NPAES focus area, while Site Alternative 2 falls just outside the NPAES area.

- In terms of the WCBSP, the PV Site Alternative 1 falls entirely within a CBA1, while Site Alternative 2 overlaps with a small section of CBA1 (approx. 400m^2), and an ESA1, ESA2 and ONA area.
- Provincially projected fauna and flora species where identified to occur in the Project area during the field assessment survey.
- Faunal and floral SCC have the potential to occur in the Project area.
- The entire Project falls within a SKEP area of a near endemic habitat for mammals.
- Archaeological occurrences were identified in the vicinity of the site but none within the Project footprints of either alternative.
- One sensitive receptor from a visual impact perspective showed a VER larger than zero. This was the SERE Wind Farm Facility with a VER of 1.45 out of 10, which was considered insignificant.
- The site is underlain by the West Coast Group, a geology that is considered to have a very high palaeontological sensitivity. However, data from sampling undertaken in the proposed Project footprints showed an extensive aeolian sand depth above the West Coast Group of 20m on average. It was deemed unlikely that palaeontological resources would be impacted on by the Project.
- The Site Ecological Importance (SEI) determined by the specialist was deemed high for the Namaqua Shrubland habitat in Alternative Site 1 and medium for Alternative Site 2.
- The closest farm/smallholding dwelling is located more than 6km east of Alternative site 1.
- A district road runs east-west to the north of the proposed Project, which forms the access road to the SERE Wind Facility property. This road joins with the R363 a number of kilometers to the east.
- The nearest town is Koekenaap, located 16km to the east (direct distance).

The sensitivity maps are provided in **Figure 2** and **Figure 3** below.

The sensitivity maps need to be made available to the implementation team (including the DPM, ECO and Contractor) in GIS format to allow for further consideration and adequate interpretation at an appropriate scale.

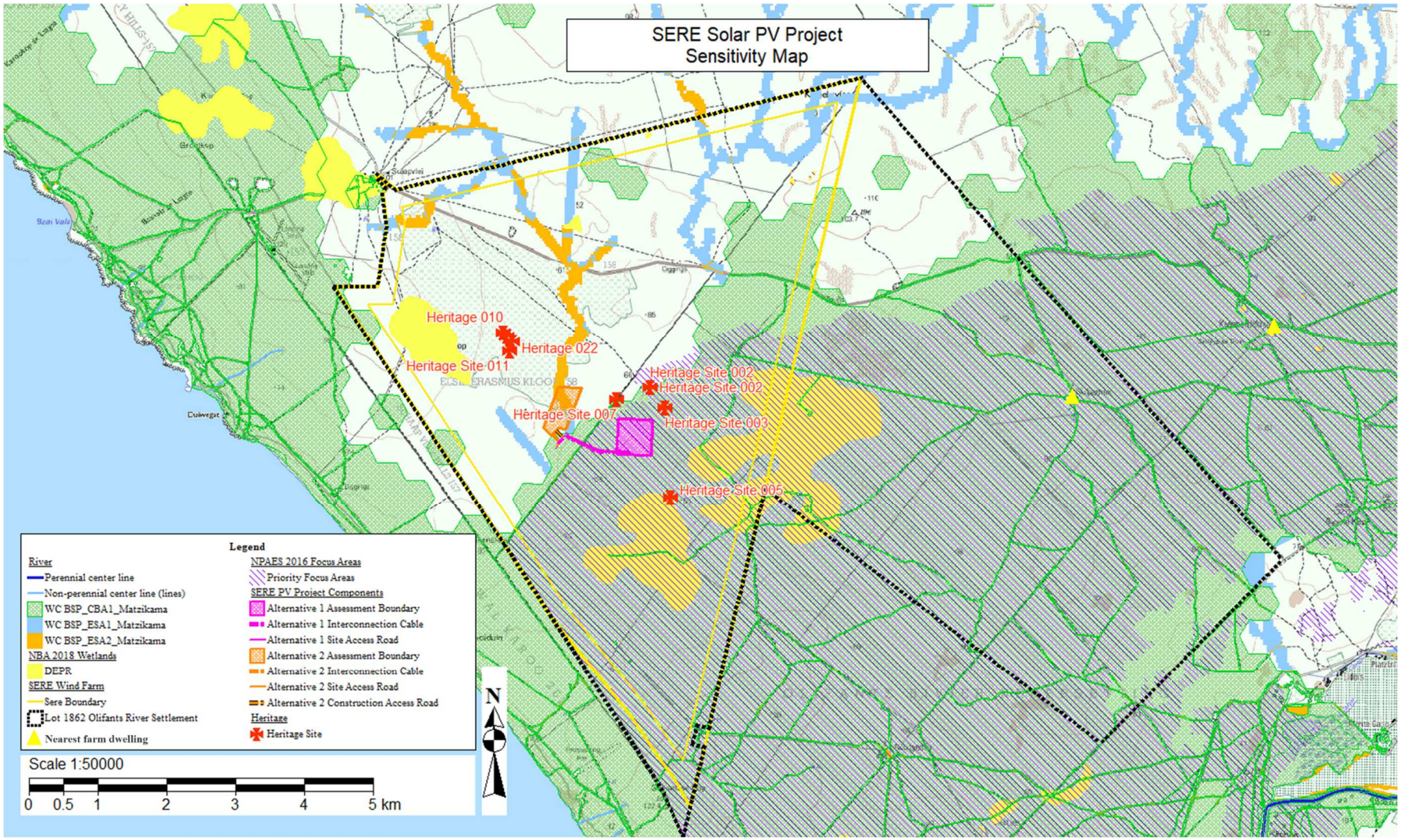

Figure 2: Sensitivity map for PV Site Alternatives

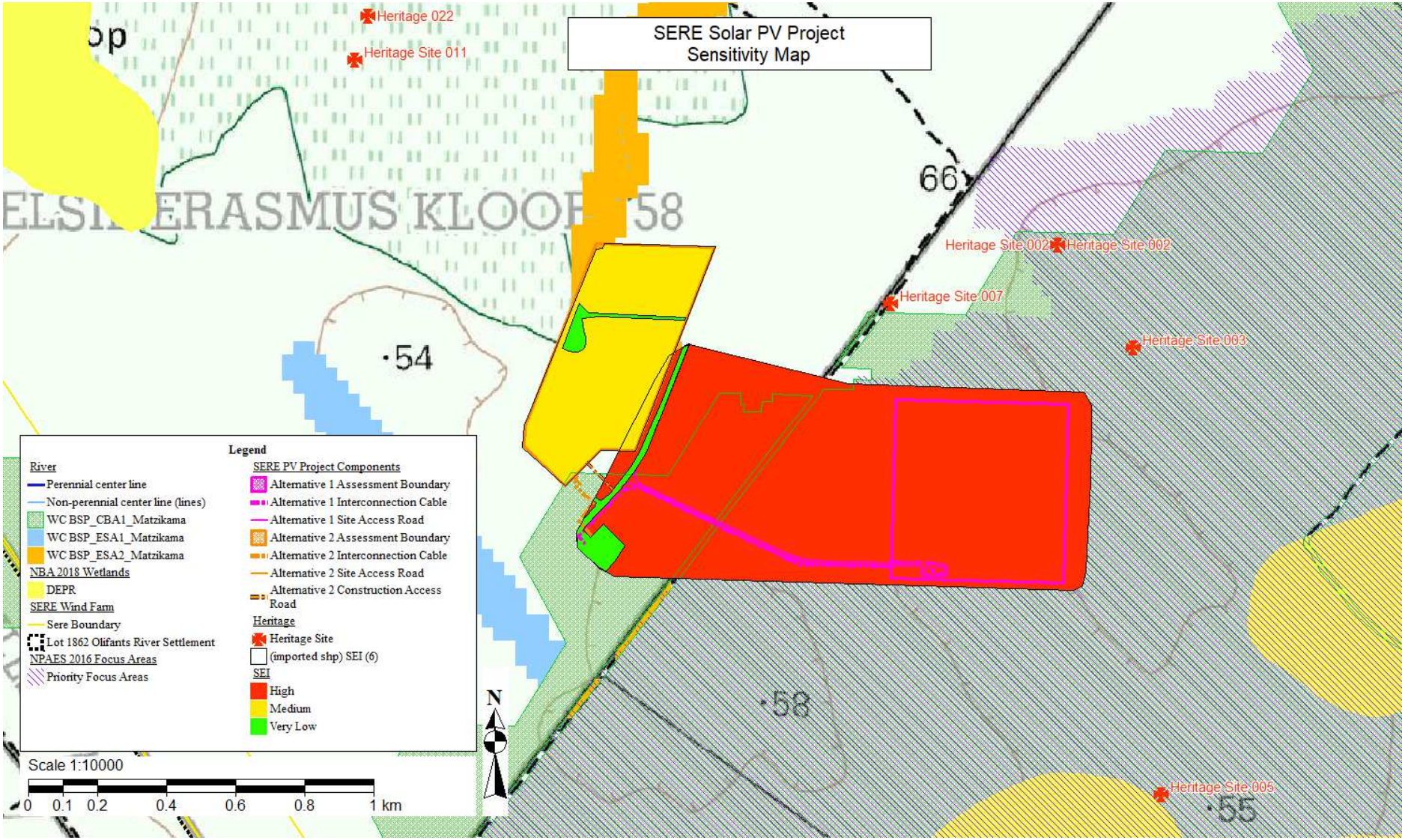

Figure 3: Sensitivity map2 for PV Site Alternatives

12 IMPACT MANAGEMENT

12.1 Introduction

The framework for the subsequent management measures consists of the following:

- **Management objectives** – i.e. desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources);
- **Targets** – i.e. level of performance to accomplish management objectives;
- **Management actions** – i.e. practical actions aimed at achieving management objectives and targets;
- **Responsibilities**; and
- **Monitoring requirements**.

12.2 Pre-Construction and Construction Phases

12.2.1 Specialist Environmental Investigations

Management Objective:

Identify and manage impacts to sensitive and protected environmental features.

Target:

1. All sensitive and protected environmental features to be identified in the construction domain.
2. All relevant approvals to be obtained prior to relocation of red data, protected and endangered flora and fauna species, medicinal plants, heritage resources and graves (where avoidance is not possible).

Management Actions:

- As far as possible, avoid disturbance to fauna and flora SCC.
- Permits from CapeNature, as relevant, are required before construction commences in order to disturb, destroy or remove protected plants.
- A pre-construction survey must be undertaken by a suitably qualified Ecologist to identify fauna and flora SCC within the approved site footprint.
- Where avoidance of fauna and flora SCC is not possible, the suitably qualified Ecologist must oversee the rescue and relocation of these species.
- For the relocation of flora SCC, the following factors need to be considered amongst others) as part of this process:
  - Detailed plan of action (including timeframes, methodology and costs);

- Site investigations;
- Consultation with authorities and stakeholders;
- Marking of species to be relocated;
- Applying for permits;
- Identification of suitable areas for relocation; and
- Aftercare.

- In order to protect fauna SCC on or around the site, prior to construction, these species must be removed and relocated to natural areas in the vicinity.
- Undertake a heritage walk-down of the approved construction footprint by a qualified independent specialist. Results from the walk-down must be taken into consideration and the recommendations followed, with any permits being received (if needed) prior to construction.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
DPM	Appoint Specialists	Pre-construction phase (prior to site clearing)
Specialists	• Execute relevant management actions • Compile reports capturing findings of pre-construction survey	
Contractor & cEO	• Barricading of sensitive features and displaying of signage (no-go areas) • Relocation of SCC, under Specialist supervision	

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• All necessary environmental consents to be in place with due consideration to the Project programme. • Pre-construction survey report • Inspection of barricading (photographic records) • Visible signage (photographic records)

12.2.2 Administrative Requirements

Management Objective:

Ensure that all administrative measures and arrangements associated with the compliance with the EA and EMPr are in place.

Target:

- Administrative measures and arrangements are confirmed, checked and maintained.
- Document control procedure is in place.

Management Actions:

- Adequate financial provision is made for the implementation of the conditions of the EA and the mitigation measures contained in the EMPr. Differentiate between those requirements that relate to the Proponent, Contractor, environmental team and other responsible parties.
- Document control procedure shall be provided and adhered to.
- Filing system shall be provided and maintained.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
DPM	Administrative provisions for compliance	Pre-construction & construction phases
Contractor & cEO		

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Document control procedure. • Filing systems. • Financial provisions (e.g. bill of quantities, budgets, etc.).

12.2.3 Construction Site Planning and Layout

Management Objective:

Proper planning and layout of the construction domain to ensure protection of sensitive environmental features. Refer to sensitive features highlighted in **Section 11** above, findings from pre-construction survey, further environmental studies, etc.

Target:

1. No negative impacts to sensitive environmental features as a result of poor construction site planning and layout.
2. The entire construction domain shall be included in the pre-construction survey.

Management Actions:

- See requirements in EMPr for *Specialist Environmental Investigations*.
- Conduct a pre-construction survey of the area to be affected by construction activities. This shall include site investigations with photographic records.
- The Contractor shall produce a site plan for the approval of the DPM (Developer's Project Manager) prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features. The plan shall show the following (as relevant):
  - Buildings and structures;

- Contractors' camp and lay down areas;
- Site offices;
- Site laboratories;
- Batching plants;
- Access routes;
- Gates and fences;
- Essential services (permanent and temporary water, electricity and sewage);
- Solid waste storage and disposal sites;
- Site toilets and ablutions;
- Hazardous waste storage and disposal sites;
- Firebreaks;
- Excavations and trenches;
- Cut and fill areas;
- Topsoil stockpiles;
- Spoil areas;
- Construction material stores;
- Vehicle and equipment stores;
- Workshops;
- Wash bays;
- Fuel stores;
- Hazardous substance stores;
- Sensitive environmental features (including riparian areas, 1:100 year floodlines and archaeological occurrences); and
- Any other activities, facilities and structures deemed relevant.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Establishment Method Statement • Site Plan	Pre-construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Evidence of site establishment in accordance with method statement (photographic records) • Pre-construction survey report • Approved site plan

12.2.4 Environmental Awareness Creation

Management Objective:

Ensure that the Contractor, construction workers and site personnel are aware of the relevant provisions of the EA and EMPr.

Target:

1. All construction workers and employees are to have completed appropriate environmental training before being allowed on the construction site.
2. A record of environmental training undertaken shall be kept on site.

Management Actions:

- Environmental Training and Awareness Programme shall be developed, which is to be approved by the Engineer/ECO.
- The Contractor shall arrange that all of his employees and those of his sub-contractors go through the project specific environmental awareness training courses before the commencement of construction and as and when new staff or sub-contractors are brought on site.
- The environmental training is compulsory for all employees and structured in accordance with their relevant rank, level and responsibility, as they apply to the works and site.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Environmental Training and Awareness Programme • Induction course • Refresher courses • Daily toolbox talks • Courses to be provided by suitably qualified persons and in a language and medium understood by the workers • Erect signage and place posters	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Records of training and awareness creation (e.g. training material, training programme, completed attendance registers, etc.)

12.2.5 On-going Consultation with Community and Affected Parties

Management Objective:

- Establish and maintain a record of all complaints and claims against the Project and ensure that these are timeously and effectively verified and responded to.

Target:

1. All complaints and claims shall be acknowledged within 5 working days and shall be responded to within 10 working days of receipt, unless additional information and / or clarification are required.
2. No deviations from agreements made with individual landowners and community members.

Management Actions:

- Develop Grievance Redress Mechanism (GRM).
- Establish lines of communications with surrounding community members.
- Existing communication channels shall be duly respected and adhered to when engaging with communities.
- Establish processes and procedures to effectively verify and address complaints and claims received.
- Complaints or liaison with community members with regard to environmental aspects, shall be recorded, reported to the correct person and a record of the response shall be entered in the complaints register.
- Provide the relevant contact details to community members for queries / raising of issues or complaints.
- Provide all information, especially technical findings, in a language that is understandable to the general public.
- Promptly deal with any raised expectations amongst communities regarding perceived benefits associated with the project, through a process of communication and consultation.
- Where necessary always provide prompt and clear feedback to communities.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	Develop and implement GRM	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Documented and functional GRM • Proof of communication • Related entries into Public Complaints Register

12.2.6 Management of Security

Management Objective:

The safety and security of the public is of paramount importance and shall not be compromised by the activities associated with the construction phase.

Target:

- No security related incidents associated with the labour force and construction activities.

Management Actions:

- Involve the local Community Policing Forum or other security associations (as relevant).
- Ensure suitable management of the labour force to prevent security-related issues or disturbance to surrounding community members.
- A security policy shall be developed which amongst others includes provisions controlling trespassing by contractor staff.
- Only security staff shall be allowed to reside at the construction camp.
- The camp site for the project shall be fenced for the duration of construction.
- The Contractor shall establish crime awareness programmes at the site camp.
- See requirements in EMPr for *Management of Labour Force* and *Management of Health and Safety* and *Management of Access* and *Fencing Arrangements*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Security Policy • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Records of training and awareness creation • Proof of communication • Related entries into Public Complaints Register • Visual inspections (photographic records) (e.g. fencing)

12.2.7 Site Clearing

Management Objective:

- Manage environmental impacts associated with site clearing.
- Ensure that only areas that are specifically required for the construction purposes are cleared.

Target:

No damage shall be caused to sensitive environmental features outside of the demarcated construction domain, including heritage resources, protected plants, and existing infrastructure.

Management Actions:

- A Method Statement shall be developed, which will provide the details of how site clearing will be executed.
- ECO to undertaken site walk prior to site clearance to identify any nests or sensitive fauna to be relocated from the site. This should occur after the search and rescue and relocation of plant SCC and protected plants. Should any Species of Conservation Concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.
- Schedule activities and operations during least sensitive periods, to avoid migration, nesting and breeding seasons.
- Restrict site clearing activities to the construction domain.
- Maintain barricading around sensitive environmental features until the cessation of construction works.
- Undertake site clearance incrementally so as to not have large open areas devoid of vegetation and to reduce wind erosion and fugitive dust levels.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Method Statement for site clearing • Barricading and signage	Pre-construction & construction phases
ECO	• Pre-site clearance site walk-down	construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Related entries into Public Complaints Register • Visual inspections (photographic records) of cleared areas, barricading and signage

12.2.8 Site Establishment

Management Objective:

Minimise negative environmental impacts associated with site establishment.

Target:

1. No damage to sensitive environmental features outside demarcated construction areas during site establishment.
2. Site layout approved by Engineer.

3. No access or encroachment into designated no-go areas, or areas outside the approved construction footprint (i.e. the approved boundary of the PV site).
4. No justifiable complaints regarding general disturbance and nuisance caused by site establishment.

Management Actions:

- See requirements in EMPr for *Construction Site Planning and Layout* and *Management of Flora.*
- Topsoil should be striped (minimum of 150mm) and kept around the boundary of the construction camp (within the approved site footprint) to be used for rehabilitation.
- Locate construction camp in area where sensitive environmental features will not be impacted on.
- Positioning of the storage and lay-down areas shall aim to minimise visual impacts.
- Maintain barricading around sensitive environmental features until the cessation of construction works.
- Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.
- Ensure noise levels of construction activities and equipment are within their lawfully acceptable limits as per SANS 10103.
- Minimise disturbance from lighting of the construction camp and site. For example, proper design of the placing (zones), height, type, direction (inward rather than outward) and intensity of floodlights, without compromising safety. As far as possible, orange light bulbs should be used for site lighting as research shows they attract the least number of invertebrates.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Plan • Barricading and signage	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Related entries into Public Complaints Register • Visual inspections (photographic records)

12.2.9 Management of Existing Services and Infrastructure

Management Objective:

- Prevent impacts to existing services and infrastructure.
- Adhere to agreements made with owners/custodians of the services and infrastructure.

Target:

1. No unwarranted complaints regarding adverse impacts to existing services and infrastructure.
2. No adverse impacts to existing services and infrastructure.
3. All relevant approvals shall be obtained prior to working within existing servitudes on site.

Management Actions:

- Identify and record all existing services.
- Conform to requirements of relevant service providers. Agreements to be in place prior to construction in affected areas.
- Ensure access to infrastructure is available to service providers at all times.
- Immediately notify service providers of disturbance to services. Rectify disturbance to services, in consultation with service providers. Maintain a record of all disturbances and remedial actions on site.
- Notify landowner of any disruptions to essential services.
- Adequate reinstatement and rehabilitation of affected environment.
- See requirements in EMPr for *Management of Waste*, and *Management of Access and Traffic*

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Plan • Wayleaves (as applicable) • Record of disturbances and remedial actions • Method statement for rehabilitation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Related entries into Public Complaints Register • Visual inspections (photographic records)

12.2.10 Management of Access and Traffic

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to the construction site.
- Ensure proper access control.
- Prevent unlawful access to the construction domain.
- Adhere to agreement made with Eskom regarding access.
- Ensure the safety of all road users by implementing proper signage and traffic control measures.

Target:

1. No reports of construction vehicles using other unauthorised routes.
2. No complaints regarding blocking of access to properties.

3. No transporting of unsafe loads. Permits are to be obtained for abnormal loads.
4. No speeding.
5. No accidents.

Management Actions:

- Confirm access arrangements with Eskom.
- Temporary access road constructed (Alternative 2) shall be suitably rehabilitated.
- Strict adherence to speed limits by construction vehicles on the public and private access roads. Appropriate speed limits shall be posted on all access roads according to the geometric design and limitations of heavy vehicles.
- Abnormal load permits shall be acquired, as relevant.
- Traffic shall be accommodated according to the South-African Road Traffic Signs Manual standards where any construction affects an existing road.
- Access roads shall be maintained in a suitable condition (in consultation with Eskom).
- Clearly demarcate all construction access roads.
- Clearly mark pedestrian-safe access routes within the construction areas.
- Suitable erosion protective measures shall be implemented for access roads during the construction phase.
- Traffic safety measures (e.g. traffic warning signs, flagmen) shall be implemented where applicable.
- Proper access control shall be maintained to prevent livestock from accessing construction domain.
- Right of way must be given to wildlife (mammals, birds, reptiles, etc.) crossing roads used by construction vehicles.
- Delivery routes shall be defined and adhered to during the construction phase.
- When construction vehicles are required to cross national, provincial and district roads (as relevant) appropriate safety and traffic calming measures need to be in place. This will include flag men, speed reductions and warning signage.
- See requirements in EMPr for *Fencing Arrangements* and *Construction Site Planning and Layout*

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Plan • Condition survey of roads • Notification of DPRT and SANRAL, if relevant • Traffic and access related signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.11 Fencing Arrangements

Management Objective:

- Protect and maintain existing fences.
- Fencing arrangements to adequately protect livestock and wild animals from construction activities.
- Adhere to agreement made with Eskom regarding fencing of the PV Site.

Target:

1. No deviations from agreements made regarding fencing.
2. No direct harm to public / livestock / wild animals due to inadequate fencing arrangements.
3. Disturbed or damaged fencing to be reinstated / replaced to meet pre-existing conditions.

Management Actions:

- Any damaged fencing shall be replaced to meet pre-existing conditions.
- All fences erected for construction purposes (e.g. fences around camp sites, etc.) shall be inspected on a daily basis to detect whether any damage has occurred or wildlife has been impacted by the fences. Damaged fences / barricading shall be repaired immediately. Trapped wildlife must be reported, and a suitably qualified specialist must free the trapped animal. Causes for wildlife entrapment must be addressed to prevent further incidences.
- The following mitigations were provided through the Fauna and Flora study to be implemented:
  - Top 2 strands must be smooth wire
  - Routinely retention loose wires
  - Place markers on fences
- Monitor fences for slack wires.
- Erect fences according to appropriate specifications.
- Fence failures during the construction phase shall be fixed immediately.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Plan • Fence inspections • Training and awareness creation	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Fencing register • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.12 Management of Labour Force

Management Objective:

- Ensure suitable management of the labour force to prevent security-related issues or disturbance to surrounding landowners / community members.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

1. No complaints from surrounding landowners / community members regarding trespassing or misconduct by construction workers.
2. All unskilled labour to be sourced from local area.

Management Actions:

- See requirements in EMPr for *Management of Security.*
- Develop a Code of Conduct in terms of behaviour of construction staff.
- Prohibit trespassing of construction workers on private property.
- Workers shall be provided with identity cards and must wear identifiable clothing.
- Creating nuisances and disturbances in or near communities shall be prohibited.
- Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.
- Ensure that operators and drivers are properly trained and make them aware, through regular toolbox talks, of any risk they may pose to the community. Place specific emphasis on the vulnerable sector of the population such as children and the elderly.
- Designated smoking areas shall be provided, with special bins for discarding of cigarette butts.
- Establish a 'labour and employment desk' in consultation with local authorities, which shall not to be situated at the site.
- Promote equal job opportunities for women and men during the construction and operational processes.
- Develop a grievance procedure, which also needs to address gender matters.
- Local SMMEs shall be given an opportunity to participate in the construction of the project through the supply of services, material or equipment.

- A procurement policy promoting the use of local business where possible shall be put in place and applied throughout the construction and operational phases of the project.
- The main contractor must employ non-core labour from the sub-places as far as possible during the construction phase.
- Prioritise and articulate gender inclusivity and equity in the project documents by including specific strategies and guidelines for implementation.
- Where possible use labour-intensive methods of construction.
- Implement applicable training of labour to benefit individuals beyond the completion of the project.
- Liaise with the South African Police Services (SAPS) and Community Policing Forums to ensure that construction sites are monitored.
- Prevent loitering within the vicinity of the construction camp as well as surrounding properties.
- Communicate the limitation of opportunities created by the project through the Ward Councillor.
- Draw up a recruitment policy in conjunction with the Ward Councillor of the area and ensure compliance with this policy.
- Include a section in the induction programme for incoming construction workers that cover local traditions and practices.
- Ensure the infrastructure and social facilities within the host communities will not be compromised with the arrival of additional people into the area.
- All employment of locally sourced labour shall be controlled on a contractual basis. If possible, and if the relevant Ward Councillor deems it necessary, the employment process must include the affected Ward Councillor.
- No staff accommodation must be allowed on site (except for security personnel).

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Code of Conduct • GRM • Security Policy • Recruitment Policy • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Documented GRM • Proof of communication • Related entries into Public Complaints Register • Proof of training

12.2.13 Management of Construction Camps

Management Objective:

Minimise environmental impacts associated with construction camp and eating areas.

Target:

1. No environmental contamination associated with construction camp and eating areas.
2. Minimise visual impact associated with construction camp and eating areas.
3. Prevent socio-economic impacts associated with the construction camp.

Management Actions:

- Erect suitable fencing around the construction camp. See requirements in EMPr for *Fencing Arrangements*.
- Provide essential services (including appropriate sanitation and drinking water facilities) at the construction camp. Maintain essential services in a functional state.
- Provide safe potable water for food preparation and drinking.
- Provide adequate parking for site staff and visitors.
- Open uncontrolled fires will be forbidden at the site camp. Rather, 'contained' cooking mechanisms shall be used (e.g. gas stoves or an enclosed braai facility).
- The cooking area shall be positioned such that no vegetation is in close proximity thereto. An area around the cooking area shall be cleared such that any escaping embers will not start an uncontrolled fire.
- Eating areas shall be designated and demarcated.
- The feeding, or leaving of food for animals, is strictly prohibited.
- Allow areas for social interaction.
- Sufficient vermin / weatherproof bins shall be present in this area for all waste material and must be serviced regularly – waste to be disposed at a registered waste facility and proof of waste disposal to be kept on site in the environmental file.
- Dish washing facilities shall be provided, if required.
- Ensure that wastewater is appropriately disposed of and not released into the environment.
- Locate all storage areas and material laydown sites within predetermined zones as per the approved site plan.
- Keep the camp and all its storage and laydown areas secure and neat at all times.
- Employ appropriate access control and security measures.
- Manage stormwater from construction camp to avoid environmental contamination and erosion.
- Failure to comply with the general code of conduct, or the rules and procedures implemented at the construction camp will result in disciplinary actions.
- Prohibit the harvesting of plants.
- No trapping, killing, or poisoning of any wildlife is to be allowed
- Provide medical and first aid facilities at the camp area.
- Prepare de-establishment plan for construction camp for approval by the DPM.
- Provide firefighting equipment at the camp area to the approval of Eskom.
- See requirements in EMPr for *Management of Waste, Management of Water, Management of Labour Force, Management of Ablution Facilities, Management of Storage and Handling of*

Non-Hazardous Material, Management of Workshop and Equipment, Management of Flora, and Management of Fauna etc.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site Plan • Fence inspections • Training and awareness creation • De-establishment plan for construction camp	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Fencing register • Waste disposal records • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.14 Management of Ablution Facilities

Management Objective:

Minimise environmental impacts associated with ablution facilities.

Target:

1. No environmental contamination associated with ablution facilities.
2. Minimise visual impact associated with ablution facilities.

Management Actions:

- Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the construction camp and within the construction domain, which shall conform to all relevant health and safety standards and codes.
- No pit latrines, french drain systems or soak away systems shall be allowed. Install and maintain conservancy tanks for any site offices, which must comply with any relevant local by-laws and must be serviced by a suitable contractor, as appropriate. The location of conservancy tanks shall be approved by the DPM.
- A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100m from any working area.
- Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.
- There must be separate toilets for men and women.

- All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Ensure the proper utilisation, maintenance and management of toilet, wash and waste facilities.
- The entrances to the toilets shall be adequately screened from public view.
- Ablution facilities shall be maintained in a hygienic state and serviced regularly.
- Toilet paper and hand washing facilities shall be provided. Hand washing facilities should not cause environmental contamination. Used, soapy water must be collected in a container and disposed of through sewer network. Alternatively biodegradable soap can be used.
- The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed waste disposal facility (proof of disposal to be provided).
- Should shower facilities be provided for use by staff on site, the following controls shall be imposed:
  - Proper positioning of the shower, and specifically its discharge point, shall be carried out to ensure that erosion and build-up of detergents does not occur;
  - All discharge from the shower and other washing facilities shall be managed to prevent environmental contamination; and
  - Use of the shower facilities shall be limited to staff or authorised persons only.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Schedule for cleaning toilets • Service agreements with sanitation service providers • Training and awareness creation	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Maintenance register for ablution facilities • Waste disposal records • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.15 Management of Visual Aspects

Management Objective:

- Minimise impacts to the aesthetics / visual quality.
- Ensure that the visual appearance of the construction site is not an eyesore the adjacent areas.

Target:

No verified complaints regarding impacts to visual quality.

Management Actions:

- Advertising and lighting shall be in accordance with relevant standards.
- Lighting shall not constitute an eyesore / hazard to users of the road.
- Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights or orange tinted light bulbs should be used wherever possible.
- Try incorporating motion detection lights as much as possible to reduce the duration of illumination. Heights of light columns to be minimised to reduce light spill. Baffles, hoods or louvres to also be used to reduce light spill.
- Lighting shall be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.
- All structures walls should be painted a suitable natural colour so as to blend with the surrounding environmental landscape colours.
- The site will be shielded /screened to minimise the visual impact, where practicable.
- Undertake on-going housekeeping to maintain a tidy construction area.
- After the construction phase, the areas disturbed that are not earmarked for operational purposes (e.g. construction camp and laydown areas) shall be suitably rehabilitated.
- See requirements in EMPr for *Management of Reinstatement and Rehabilitation*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Method statement for rehabilitation • Training	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.16 Management of Water

During the construction stage, water will be required for various purposes, such as concrete batching, washing of plant and equipment in dedicated areas, dust suppression, potable use by construction workers, etc.

Management Objective:

- Minimise environmental impacts associated with stormwater as well as water services for construction workers.

Target:

1. No visual evidence of erosion caused by wastewater or stormwater practices.
2. No environmental contamination associated with wastewater or stormwater practices.
3. No water wastage (water conservation).

Management Actions:

- The necessary negotiations will be undertaken with the MLM or Eskom to obtain water from approved sources.
- Any water to be sourced directly from natural watercourses or groundwater will require the necessary authorisation in terms of Section 21 of the NWA, as relevant.
- Prevent leakages from pipes or taps. Report and repair leaks timeously.
- Establish a dedicated vehicle maintenance area and/or wash-bay, where suitable stormwater management measures are in place to prevent pollution. The following must be adhered to as a minimum in order for the construction site to operate a vehicle/machine maintenance area or wash-bay:
  - The facility/area must have as solid, impermeable floor.
  - The facility/area must have a rain-proof covering / roof.
  - No water from the wash-bay / maintenance area may wash or otherwise be released into the environment.
  - Wash-bay / maintenance area water and/or oil/hydrocarbons must drain to a sump that is water-tight to prevent seepage, the content of which is regularly removed and disposed of as hazardous waste. Proof of waste disposal must be obtained and kept on site for record purposes.
- In the event that the contractor cannot adhere to the minimum requirements for maintenance and wash-bay facilities, maintenance and wash-bay activities must be conducted at an established facility for those purposes off-site.
- Manage stormwater from construction site to avoid environmental contamination and erosion.
- Stormwater runoff from workshops, vehicle maintenance area, wash-bay and other potential pollution sources shall be collected and removed for disposal as hazardous waste.
- Any wastewater discharges that might occur, must comply with legal requirements associated with the NWA.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Monitoring of water abstraction volumes • Monitoring of treated wastewater discharges • Inspection of water abstraction point • Training and awareness creation	Construction phase

	• Method statement for managing storm water	

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Proof of registration from DWS, if relevant • Monitoring records of water use • Visual inspections (photographic records) • Approved method statement • Proof of training

12.2.17 Management of Topsoil

Management Objective:

Ensure suitable removal, storage and transportation of topsoil for re-use during rehabilitation.

Target:

1. At least 95% of recovered topsoil from disturbed areas is to be stored for future use.
2. No visual evidence of erosion from topsoil stockpiles.
3. No visual evidence of erosion from areas where topsoil has been reinstated.
4. No alien or invasive plant species growth on topsoil stockpiles or in areas where topsoil has been reinstated.

Management Actions:

- A minimum of 150mm topsoil to be removed prior to excavations and during site clearance.
- Topsoil from the construction activities shall be stored for post-construction rehabilitation work.
- Identify suitable areas to store topsoil within the project footprint.
- Remove topsoil from areas to be affected by construction activities.
- Establish and demarcate topsoil stockpiling areas, in order to prevent the mixing of topsoil with subsoil and spoil material.
- Topsoil shall be adequately protected from contamination from construction activities and material.
- Protect stored topsoil from compaction.
- Topsoil shall be stored in such a way that does not compromise its plant-support capacity.
- Wind and water erosion-control measures shall be implemented to prevent loss of topsoil.
- Following the construction phase, the topsoil shall be placed as the final soil layer.
- An ecologically-sound stormwater management plan shall be implemented during construction and appropriate water diversion systems shall be put in place.
- During interconnection line/cable excavations, topsoil must be stripped and stockpiled on one site of the excavation, sub soil must be stockpiled on the opposite site, or in separate parallel windrows. Sub soil must be returned first, followed by topsoil.

- See requirements in EMPr for *Management of Flora,* and *Management of Reinstatement and Rehabilitation*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation

Contractor & cEO	• Site plan
	• Inspection of topsoil stockpile areas
	• Method statements for:
	  o Managing topsoil
	  o Rehabilitation
	• Training and awareness creation
		Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Visual inspections (photographic records) • Proof of training

12.2.18 Management of Excavations

Management Objective:

Minimise environmental impacts associated with excavations.

Target:

1. No damage to sensitive environmental features outside construction area during excavations.
2. No harm to people or animals as a result of excavations.

Management Actions:

- Construction activities shall remain within the designated construction area.
- Suitable barricading shall be erected around open excavations, as per the Construction Regulations (2014) or the prevailing legislation.
- Provide signage as a warning of open excavations.
- Divert runoff away from excavations, where necessary.
- During interconnection line/cable excavations, topsoil must be stripped and stockpiled on one site of the excavation, sub soil must be stockpiled on the opposite site, or in separate parallel windrows. Sub soil must be returned first, followed by topsoil.
- Inspect excavations at least daily to ensure that animals have not become trapped. Such animals will be safely removed and released, and not killed. Special equipment for handling of venomous snakes shall be available on site to ensure safe removal. Alternatively a qualified snake handler must be contracted to remove the snake.
- Make adequate provision for subsidence.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation

Contractor & cEO	• Excavation Register
	• Method statements for:
	  o Managing excavations
	  o Managing spoil material
	  o Rehabilitation
	• Barricading and signage
	• Training and awareness creation
		Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Updated Excavation Register • Visual inspections (photographic records) • Proof of training

12.2.19 Management of Storage and Handling of Non-Hazardous Material

Management Objective:

Effective and safe management of materials on site, in order to minimise the impact of non-hazardous materials on the environment.

Target:

1. No pollution due to handling, use and storage of non-hazardous material.

Management Actions:

- Materials shall be suitably stored to prevent environmental contamination and visual impacts. Storage requirements to be determined based on chemical qualities of material and Safety Data Sheet (SDSs).
- Where required, stored material shall be protected from rain and run-off to avoid environmental contamination.
- Materials shall be appropriately transported to avoid environmental contamination.
- Loose loads (e.g. sand, stone chip, refuse, paper and cement) shall be covered when vehicles travel on public roads.
- Suitable remedial measures, depending on the nature of the contaminant and the receiving environment, shall be instituted for spillages.
- Materials shall be suitably used to prevent environmental contamination.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site plan • Inspection of storage areas • MSDS register • Barricading and signage • Training and awareness creation	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Records (e.g. copies of MSDSs) • Visual inspections (photographic records) • Proof of training

12.2.20 Management of Storage and Handling of Hazardous Material

Management Objective:

Ensure the protection of the natural environment and the safety of personnel on site, as well as the community, by the correct management and handling of hazardous substances.

Target:

1. No pollution due to handling, use and storage of hazardous material.
2. In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills to be cleaned within 24 hours or sooner (depending on the nature of the spill).

Management Actions:

- An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date.
- Hazardous substances shall be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations and applicable SANS and international standards.
- Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination and will adhere to the requirements stipulated on the SDSs.
- Appropriate signage shall be displayed at storage areas for hazardous substances.
- Where flammable liquids are being used, applied or stored the workplace will be effectively ventilated.
- No person shall smoke in any place in which flammable liquid is used or stored.
- Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.
- Where flammable liquids are decanted, the metal containers shall be bonded or earthed.

- No flammable material (e.g. paper, cleaning rags or similar material) shall be stored together with flammable liquids.
- Staff that will be handling hazardous materials will be trained to do so.
- Any hazardous materials (apart from fuel) shall be stored within a lockable store with a sealed floor. Suitable ventilation shall be provided.
- All storage tanks containing hazardous materials shall be placed in bunded containment areas with impermeable surfaces. These bunded areas must be able to contain 110% of the total volume of the stored hazardous material. There should not be an open pipe draining the bund.
- SDSs, which contain the necessary information pertaining to a specific hazardous substance, shall be present for all hazardous materials stored on the site.
- Suitably stocked spill kits will be available for the cleanup of hazardous material spillages (such as hydrocarbons (e.g. oil and fuel).
- Provide secondary containment where a risk of spillage exists.
- Drip trays shall be placed under parked heavy vehicles, equipment and other receptacles of hazardous material to prevent spillages.
- In the event of spillages of hazardous substances the appropriate clean up and disposal measures shall be implemented. Any major incidents to be reported to the DFFE as per the requirements of Section 30 of NEMA.
- Spill reporting procedures shall be displayed at all locations where hazardous substances are being stored.
- Hazardous materials will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling. Proof of adequate disposal shall be provided.
- Proper and timeous notification will be undertaken of any pollution incidents associated with hazardous materials.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site plan • Method statement for managing hazardous substances • HCS Control Sheet & registers for SDS • Personal Protective Equipment (PPE) register • Signage • Fire-fighting equipment • Training and awareness creation • Inspection of storage areas	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Records (e.g. HCS Control Sheet, copies of SDS, PPE register, spills) • Visual inspection of storage areas, signage, spill kits, etc. (photographic records)

		• Disposal records • Proof of training

12.2.21 Management of Waste

Management Objective:

- Minimise negative environmental impacts associated with waste.
- Apply waste management principles to prevent, minimise, recycle or re-use material, with disposal as a last option.

Target:

1. No littering on construction site.
2. Maintain a clean and tidy construction site.
3. A 100% record of all waste generated and disposed of at registered waste disposal facilities.
4. Valid disposal certificates for all waste disposed.
5. Provision of adequate waste containers that are easily accessible and maintained.
6. Waste bins to be removed and cleaned weekly.

Management Actions:

- Waste management activities shall comply with the NEM:WA.
- The storage of general or hazardous waste in a waste storage facility shall comply with the norms and standards in GN No. R. 926 of 29 November 2013.
- Vermin / weatherproof bins shall be provided in sufficient numbers and capacity to store domestic waste. These bins shall be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste shall be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and separate for hazardous wastes).
- Establish and monitor recycling targets.
- Provide waste skips at the construction areas. These skips shall be sufficient in number, the skip storage area shall be kept clean, and skips shall be emptied and replaced before overflowing or spillage occurs.
- Ensure suitable housekeeping.
- The Contractor shall ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that waste is transported so as to avoid waste spills *en-route*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Method statement for waste management	Construction phase

	• Service agreements with waste service providers • Training and awareness creation	

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Waste management and disposal records • Visual inspections of waste management facilities (photographic records) • Related entries into Public Complaints Register • Proof of training

12.2.22 Management of Blasting (if applicable)

Management Objective:

Minimise environmental impacts associated with blasting.

Target:

1. Compliance with blasting-related legislation and standards.
2. No blasting-related impacts to existing structures and infrastructure, private property, livestock, fauna or human health.
3. Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.

Management Actions:

- Prior to commencing with blasting activities, the blasting Contractor shall submit a Method Statement which shall comply with the Explosives Regulations (2003) and all relevant SANS standards and health and safety standards for mitigating blasting.
- The Contractor shall employ industry standard methods to control the impact of blasting and limit the risk of damage to buildings and structures by reducing blast vibrations induced in the rock mass, eliminating fly rock and limiting air-blast and noise to acceptable levels.
- Blast mats shall be used wherever there is a risk that fly-rock may result in damage to any infrastructure or where it could result in death or injury of animals, livestock, game, or where damage could be caused to sensitive environmental features.
- All explosives shall be transported, stored and handled in accordance with applicable laws and good design engineering and constructions practices.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation

Contractor & cEO	• Compliance with blasting-related legislation and standards • Method statement for blasting • Notifications • Noise and vibration levels • Training and awareness creation	Prior to blasting up to safe completion of blasting

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Proof of notification of landowners • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.2.23 Management of Workshop and Equipment

Management Objective:

Minimise environmental impacts associated with workshops and equipment use.

Target:

1. No environmental contamination associated with workshops and equipment use.

Management Actions:

- See EMPr Management Actions under *Management of Water* above.
- Maintenance of equipment and vehicles will be performed in such a manner so as to avoid any environmental contamination (e.g. use of drip trays).
- No washing of plant may occur on the construction site. Plant to be washed in dedicated areas (See EMPr Management Actions under *Management of Water* above).
- Drip trays will be provided for the stationary plant and for the "parked" plant.
- All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site.
- Suitable storage and disposal of hydraulic fluids and other vehicle oils (see requirements in the EMPr for *Management of Storage and Handling of H*azardous *Material*).
- Wastewater from workshop shall be disposed in accordance with the requirements in the EMPr for *Management of Water*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Vehicle & Equipment maintenance programme • Training and awareness creation	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Updated maintenance schedule • Visual inspection of workshop, storage areas, signage, spill kits, plant, etc. (photographic records) • Disposal records • Proof of training

12.2.24 Management of Pollution Generation Potential

Management Objective:

Ensure that all possible causes of pollution are mitigated as far as possible to minimise impacts to the surrounding environment.

Target:

1. No verified complaints regarding pollution.
2. No measurable signs of pollution.
3. Dust -
    a. Comply with ASTM D1739; *SANS 1929, SANS 69,* as required.
2. Noise -
    a. Comply with SANS 10103:2008.
3. Blasting operations (if applicable) to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.

Management Actions:

- **Noise** -
    - The provisions of SANS 10103:2008 will apply to all areas at the perimeter of the site, within audible distance of residents.
    - Construction work shall take place during working hours, which need to be agreed upon with the DPM. Should overtime work be required that will generate noise, consultation with the affected community/Eskom shall take place.
    - No amplified music will be allowed on the site. The use of radios, tape recorders, compact disc players, television sets etc. will not be permitted on site.
    - The Contractor will implement preventative measures (e.g. screening, muffling, timing, pre-notification of affected parties) to minimise complaints regarding noise and vibration nuisances from sources such as power tools.
    - Proper design and maintenance of silencers on diesel-powered equipment, systematic maintenance of all forms of equipment, training of personnel to adhere to operational procedures that reduce the occurrence and magnitude of individual noisy events.
- **Dust** -

- Appropriate dust suppression measures or temporary stabilising mechanisms to be used when dust generation is unavoidable, particularly during prolonged periods of dry, windy weather. Dust suppression to be undertaken for all bare areas, including construction area and access roads.
- Dust suppression shall be undertaken for all bare areas, including construction area, access roads, site yard, etc.
- Note that all dust suppression requirements shall be based on the results from the dust monitoring and the proximity of construction activities to sensitive receptors.
- Incremental site clearance to prevent significant wind erosion of large bare surfaces.
- Placement of wind breaks and dust suppression to prevent wind erosion of bare surfaces.
- Reinstate and rehabilitate disturbed areas within development footprint to uncompact soil and prevent excessive wind erosion.
- Speed limits to be strictly adhered to.
- All vehicles and machinery used at the site are to be in good working condition and fitted with appropriate emission controls
- Plant to be operated efficiently and turned off when not in use.

- **Lights** -
  - Prior to construction the position and type of lighting will be planned to ensure that unnecessary light pollution will be eliminated.
  - All lighting installed on site must not lead to unacceptable light pollution to the surrounding community and natural environment (e.g. use of down-lighters).
  - Orange coloured bulbs should be used as far as possible as research shows they have the least impact on invertebrate species.
- **Erosion** -
  - Protect areas of the construction site that are susceptible to erosion through suitable measures (e.g. watering, planting, retaining structures, commercial anti-erosion compounds, etc.).
  - Any erosion channels caused by construction activities shall be suitably stabilised and rehabilitated.
  - Reasonable efforts must be made to prohibit ponding on surface and to ensure stormwater runoff is channelled from the site. The method used will be appropriate to the expected stormwater flows and the topography and geology of the site.
- **Cement and Concrete Batching** -
  - Cement mixing shall take place on an impervious surface (e.g. cement mixing pit).
  - Batching operations shall take place in a designated area, which will be kept clean at all times.
  - The location of batching plant will be approved by the DPM, with due consideration of the relevant management measures contained in the EMPr (see requirements in the EMPr for *Site Clearing*, *Site Establishment*, *Management of Water*, *Management of Waste*, etc.).
  - Ensure separation of clean and dirty water from batching plant.
  - Wastewater from batching operations must either reused in the batching process or allowed to evaporate (although birds and other wildlife must be protected by not ingesting the

wastewater and wastewater should not be drowning hazard). Contaminated water will not be discharged to the environment. Prevent overflow from contaminated wastewater storage area. Cement contaminated water is hazardous to the environment and wildlife.

- Waste concrete and cement sludge shall be removed on a regular basis (to prevent overflowing) and shall be disposed of at a suitable facility.
- Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent leakage of cement.
- Used cement bags will be stored so as to prevent windblown dust and potential water contamination. Used bags will be disposed of adequately at a licenced waste disposal facility.
- Concrete or cement transportation will not result in spillage.
- Cleaning of equipment and flushing of mixers will not result in pollution, with all contaminated wash water entering the wastewater collection system. Cement contaminated water is hazardous to the environment and wildlife.
- To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site. This should not be done on the ground surface.
- Cement spillages must be cleaned up and contaminated soil removed.
- Suitable screening and containment will be in place to prevent windblown contamination from cement storage, mixing, loading and batching operations.
- All visible remains of excess concrete will be physically removed on completion of the plastering or concrete pouring and disposed of in an acceptable manner.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Noise and dust monitoring • Dust suppression schedule • Code of Conduct • Method statement for managing batching plants • Inspection of batching areas and cement storage areas • Training and awareness creation	Construction phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Results from noise and dust monitoring • Updated dust suppression schedule • Approved method statement • Related entries into Public Complaints Register • Visual inspections (photographic records) • Disposal records • Proof of training

12.2.25 Management of Flora

Management Objective:

- Manage impacts to red data and protected flora species within the construction domain.
- Preserve red data and protected flora species outside of the construction domain.
- Control alien invasive plants and noxious weeds.

Target:

1. No unpermitted disturbance to red data and protected flora species.
2. Ongoing eradication of alien invasive plants and noxious weeds. 100% alien invasive plants controlled within areas affected by construction activities.

Management Actions:

- Include mitigation measures identified as part of environmental pre-construction survey.
- Comply with the requirements of the Nature Conservation Ordinance of the Cape of Good Hope (Ordinance 19 of 1974), Western Cape Nature Conservation Laws Amendment Act (Act 3 of 2000), NEMA, NEM:BA, NFA and National Veld and Forest Fire Act (No. 101 of 1998).
- Areas of indigenous vegetation, even secondary communities outside of the construction domain, must under no circumstances be fragmented or disturbed further. Clearing of vegetation must be minimized and avoided where possible.
- Where possible, existing access routes and walking paths must be made use of.
- All laydown, chemical toilets etc. must be restricted to low sensitivity areas.
- It is an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic must be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.
- Any protected plants that were observed need a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Preferably, the trees/plants can be relocated within the property without a permit or otherwise left unharmed. High visibility flags must be placed near any protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness programme.
- A fire management plan needs to be complied and implemented (refer to the requirements in the EMPr for *Management of Fire*).
- Areas that are denuded during construction need to be re-vegetated with locally indigenous vegetation to prevent erosion wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. A species list must be obtained from a qualified ecologist.
- Alien invasive vegetation must be removed according to a plan and disposed of at a recognised waste disposal facility.
- With the disturbance of soils, weed growth is expected and should be controlled before seed formation. Manual removal is preferrable to the use of herbicides. The root system must be removed during manual removal to prevent regrowth/coppicing.

- Ensure that the control of exotic or invasive plants is undertaken by suitable contractors using appropriate methods such hoeing, hand pulling, and digging. Pesticides or herbicides may not be used unless they are environmentally friendly and will not cause any soil contamination. A certified person must deploy herbicide following legal requirements.
- See requirements in EMPr for additional control measures for the protection of flora –
  - *Specialist Environmental Investigations*;
  - *Construction Site Planning and Layout*;
  - *Environmental Awareness Creation*;
  - *Site Clearing*;
  - *Site Establishment*;
  - *Management of Topsoil*;
  - *Management of Water*;
  - *Management of Storage and Handling of Hazardous Material;*
  - *Management of Pollution Generation Potential;*
  - *Management of Fauna*; and
  - *Management of Reinstatement and Rehabilitation*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Compile reports capturing findings of pre-construction survey • Method Statement for managing SCC • Method Statement for managing alien invasive species • Applications for permits • Daily register of herbicide usage • Barricading and signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Pre-construction survey report • Permits on record • Records of herbicide usage • Visual inspections (photographic records), including relocated species and presence of alien invasive species • Approved method statement • Proof of training

12.2.26 Management of Fauna

Management Objective:

- Ensure the protection of fauna.

Target:

1. No direct / indirect harm to fauna from construction activities.

Management Actions:

- Include mitigation measures identified as part of environmental pre-construction survey.
- Comply with the requirements of the Nature Conservation Ordinance of the Cape of Good Hope (Ordinance 19 of 1974), Western Cape Nature Conservation Laws Amendment Act (Act 3 of 2000), NEM:BA and the Animal Protection Act (No. 71 of 1962).
- No animals must be intentionally killed.
- Right of way must be given to wildlife (mammals, birds, reptiles, etc.) crossing roads used by construction vehicles.
- Any animals found within excavations or other construction areas must not be harmed, and a suitably qualified person must be called to assist in safely removing the animal.
- As far as possible, the existing road network must be utilised to access the construction sites.
- Revegetation of disturbed areas must be carried out in order to restore habitat availability and minimise soil erosion and surface water runoff whilst re-instating faunal habitat.
- Should any smaller animals which are less mobile be observed in the construction domain during clearing and construction activities, they are to be carefully and safely moved to an area of similar habitat outside of the disturbance footprint. Construction personnel are to be educated about these species and the need for their conservation.
- No hunting/trapping or collecting of faunal species is allowed.
- Any person found deliberately disturbing any animal in any way must face disciplinary measures, following the possible dismissal from the site.
- Control light pollution to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas.
- No dogs or other domestic pets are allowed on site.
- Prepare an emergency response procedure for dealing with snake bites, as venomous species may occur in the area.
- Photographs of protected and sensitive fauna species must be displayed in the construction camp to heighten awareness.
- Educate personnel about venomous snakes, scorpions and spiders and that these species are not to be harmed. Should any such species be encountered they are to be safely moved outside of the construction domain by a suitably qualified person.
- Ensure that cables and connections are insulated successfully to reduce electrocution risk.
- Use environmentally friendly cleaning and dust suppressant products.
- Fencing mitigations:
  - Top 2 strands must be smooth wire
  - Routinely retention loose wires
  - Place markers on fences
- See requirements in EMPr for additional control measures for the protection of fauna –
  - *Specialist Environmental Investigations*;

- *Construction Site Planning and Layout*;
- *Environmental Awareness Creation*;
- *Site Clearing*;
- *Site Establishment*;
- *Management of Access and Traffic*;
- *Management of Storage and Handling of Hazardous Material;*
- *Management of Pollution Generation Potential;*
- *Management of Flora*; and
- *Management of Reinstatement and Rehabilitation*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Compile reports capturing findings of pre-construction survey • Method Statement for managing SCC • Applications for permits • Barricading and signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Pre-construction survey report • Permits on record • Records of herbicide usage • Visual inspections (photographic records), including relocated species and presence of alien invasive species • Approved method statement • Proof of training

12.2.27 Management of Heritage & Palaeontological Features

Management Objective:

Comply with legislative requirements with regards to heritage and palaeontological features.

Target:

1. No heritage and palaeontological features to be damaged during construction, including the archaeological occurrences identified in the project area.

Management Actions:

- Include mitigation measures identified as part of heritage pre-construction walk-down.
- Avoid all archaeological occurrences within the Wind Farm property (which occur outside the proposed development footprint).

- In the event that vegetation clearing and earthmoving activities expose archaeological materials, such activities must stop and HWC must be notified immediately.
- Although unlikely, should any human remains be encountered at any stage during the works associated with the project, work must in the vicinity must cease immediately, the remains must be left *in situ* but made secure and the project archaeologist and HWC must be notified immediately.
- Fossil Chance Find Protocol: The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence:
  - If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.
  - The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ESO or site manager. The ESO or site manager must report the find to the relevant Heritage Agency (South African Heritage Research Agency, SAHRA). (Contact details: SAHRA, 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel: 021 462 4502. Fax: +27 (0)21 462 4509. Web: www.sahra.org.za). The information to the Heritage Agency must include photographs of the find, from various angles, as well as the GPS co-ordinates.
  - A preliminary report must be submitted to the Heritage Agency within 24 hours of the find and must include the following: 1) date of the find; 2) a description of the discovery and a 3) description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.
  - Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.
  - Upon receipt of the preliminary report, the Heritage Agency will inform the ESO (or site manager) whether a rescue excavation or rescue collection by a palaeontologist is necessary.
  - The site must be secured to protect it from any further damage. No attempt should be made to remove material from their environment. The exposed finds must be stabilized and covered by a plastic sheet or sand bags. The Heritage agency will also be able to advise on the most suitable method of protection of the find.
  - In the event that the fossil cannot be stabilized the fossil may be collected with extreme care by the ESO (site manager). Fossils finds must be stored in tissue paper and in an appropriate box while due care must be taken to remove all fossil material from the rescue site.
  - Once Heritage Agency has issued the written authorization, the developer may continue with the development on the affected area.
- See requirements in EMPr for additional measures to manage impacts to cultural heritage and palaeontological features, including -
  - *Specialist Environmental Investigations;*
  - *Construction Site Planning and Layout; and*
  - *Environmental Awareness Creation*.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Compile reports capturing findings of pre-construction survey • Implement Chance Finds procedure • Applications for permits • Barricading and signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Pre-construction survey report • Permits on record • Inspection of barricading and visible signage (photographic records) • Visual inspections (photographic records) • Records of chance finds • Proof of training

12.2.28 Management of Emergency Procedures

Management Objective:

Minimise environmental impacts associated with emergency procedures.

Target:

1. Approved emergency response procedures.
2. No site fires to be caused by construction activities and workers.

Management Actions:

- Compile an Emergency Response Action Plan (ERAP) prior to the commencement of construction for approval by the DPM and ECO. This plan must deal with accidents, potential spillages and fires in line with relevant legislation.
- All staff must be made aware of emergency procedures as part of environmental training and awareness creation.
- Prepare and display a list of emergency contact numbers.
- **Fire** -
  - Comply with the National Veld and Forest Fire Act (No. 101 of 1998) and National Veld and Forest Fire Bill (B122B of 1998).
  - Work closely with the local Fire Protection Association. Determine requirements and add to list of emergency telephone numbers.
  - Keep a fire danger index displayed on site and comply with requirements.
  - Proper emergency response procedure shall be in place for dealing with fires.

- Identify ignition risks and prevent risk of fires from these sources.
- Manage construction domain to prevent the build-up of combustible material.
- Burning of waste is not permitted.
- Suitable precautions will be taken (e.g. suitable fire extinguishers, water bowsers, welding curtains) when working with welding or grinding equipment.
- Provide adequate fire control mechanisms (fire-fighting equipment).
- All fire control mechanisms (fire-fighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and shall be approved by local fire services.
- All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire. The contact details of the emergency services must be displayed and easily accessible on site.
- No fires are allowed on site.
- Dedicated smoking areas to be provided.

- **Accidental Leaks and Spillages** -
  - Proper emergency response procedure shall be in place for dealing with spills and leaks.
  - Ensure that the necessary materials and equipment for dealing with spills and leaks are available on site, where practicable.
  - Remediation of the spill areas will be undertaken to the satisfaction of the Engineer.
  - In the event of a hydrocarbon spill, the source of the spillage will be isolated and contained. The area will be cordoned off and secured. The Contractor will ensure that there is always a supply of an appropriate absorbent material readily available to absorb, breakdown and where possible, encapsulate a minor hydrocarbon spillage.
  - All staff on site will be made aware of actions to be taken in case of a spillage.
  - Provide contact details of person and emergency services to be notified in a case of spillages – signage to be displayed at strategic points within the construction domain (e.g. workshop, fuel storage area, hazardous material containers).
  - All major incidents (i.e. uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property) to be reported to DFFE and/or other relevant authorities.

- **Loss of vegetation due to fuel and chemical spills**
  - Appropriate measures must be implemented in order to prevent potential soil pollution through fuel, oil leaks and spills.
  - Ensure construction vehicles are maintained and serviced to prevent oil and fuel leaks.
  - An emergency response contingency plan will be implemented to address clean-up measures should a spill and/or a leak occur.
  - All plant and machinery must be inspected every day, serviced and maintained regularly, and any leaking plant/machinery must be removed from site for repair.
  - Implement measures to avoid leakages and spillages on to bare ground.
  - Emergency on-site maintenance must be done over appropriate drip trays and all oil or fuel must be disposed of according to regulatory requirements. Safe disposal certificates must

always be obtained from the registered waste disposal site, and proof of disposal kept on site.
  - Drip-trays must be placed under vehicles and equipment when not in use.
  - Washing and cleaning of equipment must be done within bunded areas, in order to trap any cement and prevent excessive soil erosion. These sites must be re-vegetated after construction has been completed.
  - Spill prevention and emergency spill response plan, as well as dust suppression, and fire prevention plans will be implemented during the construction phase.
  - Spill kits will be made available on site for clean-up of spills and leaks of contaminants.
  - The site must have a suitable area for the safe cleaning of cement contaminated tools and equipment. Cleaning such tools/equipment results in water contaminated with cement, which is hazardous to the environment. Cement contaminated water must not be released or otherwise disposed of into the environment, including stormwater drains. The contaminated water must be contained and allowed to evaporate. The remaining residue can be disposed of as building rubble once dry.
  - Plant and machinery must be issued with a drip tray on site. The drip tray must be placed underneath the plant/machinery when it has shutdown. Drip trays must be in good working order and must be able to hold liquid adequately if/when needed.
  - The contents of drip trays, including rainwater, must not be disposed of into the environment, but decanted into suitable, sealable, containers. These containers must be labelled and the contents disposed of as hazardous waste. Proof of disposal at a licenced waste disposal site must be obtained.
- See requirements in EMPr for additional control measures related to potential emergency event:
  - *Management of Construction Camp*;
  - *Management of Labour Force*;
  - *Environmental Awareness Creation*;
  - *Management of Storage and Handling of Hazardous Material;*
  - *Management of Workshop and Equipment;*
  - *Management of Pollution Generation Potential; and*
  - *Management of Fire.*

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• ERAP • Emergency contact list • Document all fire control mechanisms with an inspection and maintenance schedule • Signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible	Frequency	Evidence of compliance

person		
dEO & ECO	Monthly	• Compliance with approved ERAP • Emergency contact list displayed • Updated maintenance schedule for fire-fighting equipment • Visual inspections (photographic records) • Records of incidents and corrective measures taken • Proof of training

12.2.29 Management of Health and Safety

Management Objective:

Provide a safe working environment to construction workers and the public.

Target:

1. Approved Health and Safety Plan.
2. No incidents.
3. Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993), Construction Regulations (2014) and other relevant regulations.

Management Actions:

- Contractor to submit a Health and Safety Plan, prepared in accordance with the Health and Safety Specification, for approval prior to the commencement of work. These requirements are aligned with the Construction Regulations (2014).
- The site should have a COVID-19 risk assessment, policy and plan. The COVID protocols recommended by this process, and those stipulated as the legal minimum should be enforced on site (as applicable in line with any Covid-19 Regulations in effect at the time of construction).
- Gender sensitive workplace practises should be planned for and adopted on site. Employment practises should be demonstrated free of coercion or harassment.
- Fencing and barriers will be in place in accordance with the Occupational Health and Safety Act (Act No. 85 of 1993).
- Applicable notice boards and hazard warning notices will be put in place and secured.
- Night hazards will be suitably indicated (e.g. reflectors, lighting and traffic signage).
- Emergency contact details will be prominently displayed.
- Two-Way Radio Systems shall be used where cell phone coverage is poor.
- All construction personnel shall be clearly identifiable. All employees will also be issued with employee cards for identification purposes.
- All workers will be supplied with the required Personal Protective Equipment as per the Occupational Health and Safety Act (Act No. 85 of 1993).
- Maintain access control to prevent access of the public to the construction domain, as far as practicable.
- Use approved communication channels to inform the community of Occupational Health and Safety measures to prevent incidents involving community members.
- Contractors shall establish HIV/AIDs awareness programmes at their site camps.

- Put in place a monitoring system to monitor health risks throughout the life of the project.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Occupational Health and Safety system • Risk Assessment • Health and Safety Plan • Signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Visual inspections (photographic records) • Records of incidents and corrective measures taken • Proof of training

12.2.30 Management of Reinstatement and Rehabilitation

Management Objective:

- Adequate reinstatement and rehabilitation of construction domain.
- Conduct concurrent or progressive rehabilitation of areas affected by construction activities.

Target:

1. Complete site clean-up.
2. Reinstate and rehabilitate areas disturbed by construction activities.

Management Actions:

- Rehabilitation Method Statement to be developed, which will include additional measures identified during construction to supplement the reinstatement and rehabilitation provisions included in the EMPr. Targets to be specified for re-growth.
- Ensure that rehabilitation is in line with the surrounding natural environment and pre-construction state of the affected area.
- Cordon off areas that are under rehabilitation as no-go areas.
- **Removal of structures and infrastructure** -
  - Clear and completely remove from site all construction plant, equipment, storage containers, temporary fencing, temporary services, fixtures, construction material, stockpiles, residue, spillages, etc.
  - Ensure that all temporary access roads utilised during construction and which are not earmarked for use during the operational phase, are returned to a state no worse than prior to construction.

- **Inert waste and rubble** -
  - Clear the site of all inert waste and rubble, including surplus rock, foundations and batching plant aggregates. After the material has been removed, the site shall be re-instated and rehabilitated.
  - All remaining combustible biomass from bush clearing operations must be removed from the area, unless it is to be used in rehabilitation measures.
- **Domestic waste** -
  - Remove from site all domestic waste and dispose of in the approved manner at a registered waste disposal site.
- **Hazardous waste and pollution control** -
  - Remove from site all pollution containment structures.
  - Remove from site all temporary sanitary infrastructure and waste water disposal systems. Take care to avoid leaks, overflows and spills and dispose of any waste in the approved manner.
  - Comply with relevant provisions under the following EMPr sections –
    - *Management of Storage and Handling of* H*azardous Material*;
    - *Management of Water*;
    - *Management of Waste*; and
    - *Management of Pollution Generation Potential.*
- **Topsoil replacement and soil amelioration** -
  - Execute top soiling activity prior to the rainy season or any expected wet weather conditions.
  - Execute topsoil placement only after all construction work has ceased.
  - Replace and redistribute stockpiled topsoil together with herbaceous vegetation, overlying grass and other fine organic matter in all disturbed areas of the construction site, including temporary access routes. Replace topsoil to the original depth.
  - Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. The soil brought in must not come from areas infested by alien and invasive plant species. The suitability of substitute material must be determined.
  - Do not use topsoil suspected to be contaminated with the seed of alien vegetation. Alternatively, the soil is to be appropriately treated.
  - Ensure that stormwater run-off is not channelled alongside the gentle mounding, but that it is taken diagonally across it.
  - Shape remaining stockpiled topsoil not utilised elsewhere in an acceptable manner so as to blend in with the local surrounding area.
  - After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area.
- **Ripping and scarifying** -

- Rip and/or scarify all areas following the application of topsoil to facilitate mixing of the upper most layers. Whether ripping and/or scarifying is necessary it will be based on the site conditions immediately before these works commence.
- Rip and/or scarify all disturbed (and other specified) areas of the construction site, including temporary access routes and roads, compacted during the execution of the works.
- Do not rip and/or scarify areas under wet conditions, as the soil will not break up.

- **Planting** -
  - All plant species to be used for rehabilitation must be approved by a suitably qualified specialists prior to use on site.
  - Revegetation must match the vegetation type which previously existed, provided by a suitably qualified flora specialist.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Rehabilitation Method Statement • Pre-construction survey – established baseline • Signage • Training	Throughout construction period, as relevant to the concurrent or progressive reinstatement and rehabilitation of affected areas. Up to end of defects liability period.

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Pre-construction survey report • Visible signage • Related entries into Public Complaints Register • Visual inspections (photographic records) • Proof of training

12.3 Operational Phase

Where relevant, all management actions are to be carried forward from the construction phase to the operational phase. Specific management measures for the operational phase follow:

12.3.1 Management of Access, Routine Maintenance Inspections and Maintenance Works

Management Objective:

- Manage environment impacts associated with operation and maintenance activities.
- Restrict operation and maintenance activities to the development footprint.
- Safeguarding of sensitive environmental features and existing services.

- Ensure proper access control.
- Adhere to agreement made with BWLM regarding access.

Target:

1. No damage to be caused to sensitive environmental features (including heritage resources, protected flora and fauna, existing structures and infrastructure, etc.) outside of the development footprint.
2. No reports of operation and maintenance vehicles using unauthorised access points and routes.
3. No verified complaints regarding poor practices during operation and maintenance.

Management Actions:

- Restrict operation and maintenance activities to the development footprint.
- During maintenance related activities, damage to access roads as well as existing structures and infrastructure, will be restored to its original condition.
- Maintain access control to the PV Plant.
- Strict adherence to speed limits by operation and maintenance vehicles.
- All roads used for maintenance inspections and maintenance works shall be maintained and repaired where necessary.
- Protect all areas susceptible to erosion resultant from operation and maintenance activities.
- Maintenance work shall be undertaken as per the provisions of the EMPr for the pre-construction and construction phases, as relevant.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Compliance with relevant management actions • Training	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Evidence of erosion • Verified damage to existing structures and infrastructure • Concern or complaint raised as part of GRM • Visual inspections (photographic records) • Proof of training

12.3.2 Management of Wastewater & Stormwater

Management Objective:

- Manage site drainage.
- Minimise environmental impacts associated with stormwater.

Target:

1. No visual evidence of erosion caused by stormwater practices.
2. No environmental contamination associated with wastewater or stormwater practices.

Management Actions:

- Manage stormwater from Solar PV Plant to avoid environmental contamination and erosion.
- Separate clean and dirty water, as necessary.
- Stormwater runoff from operation and maintenance building as well as other potential pollution sources shall be collected and treated before being discharged in to drains and/or waterways.
- All wastewater discharges shall comply with legal requirements associated with the NWA.
- Wastewater discharges to be monitored.
- Prevent erosion on access roads.
- No harmful, toxic, or hazardous chemicals can be used when cleaning solar panels.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Monitoring of treated wastewater discharges • Training and awareness creation • Inspect stormwater system	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Visual inspections (photographic records) • Proof of training

12.3.3 Management of Storage and Handling of Hazardous Material

Management Objective:

Ensure the protection of the natural environment and the safety of operational staff, as well as the community, by the correct management and handling of hazardous substances.

Target:

1. No pollution due to handling, use and storage of hazardous material.
2. In the event of a spill, appropriate containment, clean up and disposal of contaminated material. Spills to be cleaned within 24 hours or sooner (depending on the nature of the spill).

Management Actions:

- Hazardous substances shall be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations and applicable SANS and international standards.
- Storage and use of hazardous materials will be strictly controlled to prevent environmental contamination and will adhere to the requirements stipulated on the MSDSs.
- Appropriate signage shall be displayed at storage areas for hazardous substances.
- Where flammable liquids are being used, applied or stored the workplace will be effectively ventilated.
- No person shall smoke in any place in which flammable liquid is used or stored.
- Install an adequate number of fire-fighting equipment in suitable locations around the flammable liquids store.
- No flammable material (e.g. paper, cleaning rags or similar material) shall be stored together with flammable liquids.
- Operational staff that will be handling hazardous materials will be trained to do so.
- All storage tanks containing hazardous materials shall be placed in bunded containment areas with impermeable surfaces. These bunded areas must be able to contain 110% of the total volume of the stored hazardous material.
- SDSs, which contain the necessary information pertaining to a specific hazardous substance, shall be present for all hazardous materials stored on the site.
- Spill kits will be available for the cleanup of hazardous material spillages.
- Provide secondary containment where a risk of spillage exists.
- In the event of spillages of hazardous substances the appropriate clean up and disposal measures shall be implemented. Any major incidents to be reported to the DFFE as per the requirements of Section 30 of NEMA.
- Spill reporting procedures shall be displayed at all locations where hazardous substances are being stored.
- Hazardous materials will be disposed of at registered sites or handed to registered hazardous waste disposal facilities for disposal / recycling. Proof of adequate disposal shall be provided.
- Proper and timeous notification will be undertaken of any pollution incidents associated with hazardous materials.
- Use environmentally friendly cleaning products for PV panels and other facilities at the Solar PV plant.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Compliance with relevant management actions • Designated person • ERAP • Inspection of storage areas for hazardous material • SDS register • PPE register	Operational Phase

	• Signage • Training and awareness creation • BESS specifications	

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Updated inspection register • Records (e.g. copies of MSDS, PPE register, spills) • Visual inspection of storage areas, signage, etc. (photographic records) • Disposal records • Records of incidents and corrective measures taken • Proof of training

12.3.4 Management of Waste

Management Objective:

- Minimise negative environmental impacts associated with waste.
- Apply waste management principles to prevent, minimise, recycle or re-use material, with disposal as a last option.

Target:

1. No littering at the Solar PV plant.
2. Maintain a clean and tidy facility.
3. Provision of adequate waste receptacles that are easily accessible and maintained.

Management Actions:

- Waste management activities shall comply with the NEM:WA.
- The storage of general or hazardous waste in a waste storage facility shall comply with the norms and standards in GN No. R. 926 of 29 November 2013.
- Where possible, waste shall be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Establish and monitor recycling targets.
- Provide waste receptacles at the facility.
- Ensure suitable housekeeping.
- No burying, dumping or burning of waste materials, vegetation, litter or refuse will be permitted.
- All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that waste is transported so as to avoid waste spills *en-route*.
- Waste generated during maintenance or replacement of panels and inverters will be sent to suitable disposal sites.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Service agreements with waste service providers • Training and awareness creation	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Waste management and disposal records • Visual inspections of waste management facilities (photographic records) • Related entries into Public Complaints Register • Proof of training

12.3.5 Management of Emergency Procedures

Management Objective:

Minimise environmental impacts associated with emergency procedures during operational phase.

Target:

1. Approved emergency response procedure for operational phase.
2. No fires caused by the Solar PV Plant.
3. No loss of sensitive environmental features as a result of environmental incidents.

Management Actions:

- Compile an ERAP for the operational phase. This plan must deal with *inter alia* accidents, potential spillages and fires in line with relevant legislation.
- All operational staff must be made aware of emergency procedures as part of environmental training and awareness creation.
- Prepare and display a list of emergency contact numbers at the facility.
- Develop and communicate an appropriate emergency evacuation procedure.
- Establish suitable communication system for emergencies.
- **Fire** -
  - The Solar PV Plant will operate under the general principle of fire avoidance.
  - The ERAP must include a standard operating procedure for dealing with fires at the Solar PV Plant.
  - Designated person to be appointed to monitor conditions at and surrounding the facility related to fire management. This person needs to be given site specific training to carry out the monitoring role.

- Comply with the National Veld and Forest Fire Act (No. 101 of 1998), National Veld and Forest Fire Bill (B122B of 1998) and OHS Act.
- Ensure compliance with requirements of the local fire service authority.
- Obtain a hot work permit for welding, cutting and grinding activities that are undertaken on site, as relevant.
- Work closely with the local Fire Protection Association. Determine requirements and add to list of emergency telephone numbers.
- Maintain a fire break around the Solar PV Plant as relevant. Fire breaks will be used to prevent naturally occurring fires from damaging buildings and infrastructure.
- Proper emergency response procedure shall be in place for dealing with fires.
- Identify ignition risks and prevent risk of fires from these sources.
- Manage Solar PV Plant to prevent the build-up of combustible material. Ensure proper housekeeping to reduce waste and dry vegetation.
- Burning of waste is not permitted.
- Provide adequate fire control mechanisms (fire-fighting equipment).
- Portable fire extinguishers must be located in easily identifiable locations throughout the facility. Ensure that their locations and suitability for use take into consideration the various types of fires that may be encountered ((e.g. electrical, flammable liquids, ordinary combustibles).
- All fire control mechanisms (fire-fighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and shall be approved by local fire services.
- All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire. The contact details of the emergency services must be displayed and easily accessible on site.
- No fires are allowed on site.
- Dedicated smoking areas to be provided.
- Undertake fire drills at regular intervals, in accordance with legal requirements and best practices.
- Regularly inspect operational vehicles.

- **Accidental Leaks and Spillages** -
  - The ERAP must include a standard operating procedure for dealing with spills and leaks (e.g. transformer oils) at the Solar PV Plant.
  - Ensure that the necessary materials and equipment for dealing with spills and leaks are available at the Solar PV Plant, where practicable.
  - Remediation of the spill areas will be undertaken.
  - All staff on site will be made aware of actions to be taken in case of a spillage.
  - All major incidents (i.e. uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property) to be reported to DFFE and/or other relevant authorities.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Compliance with relevant management actions • Designated person • ERAP • Emergency contact list • Document all fire control mechanisms with an inspection and maintenance schedule • Inspection of ignition sources • Signage • Training and awareness creation • BESS specifications	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Compliance with ERAP • Emergency contact list displayed • Updated maintenance schedule for fire-fighting equipment • Visual inspections (photographic records) • Records of incidents and corrective measures taken • Proof of training

12.3.6 Management of Flora and Fauna

Management Objective:

- Control alien invasive plant species within the Solar PV plant.
- Ensure the protection of animals.

Target:

1. No direct / indirect harm to animals from operation and maintenance activities.
2. Ongoing eradication of alien invasive plants and noxious weeds. 100% alien invasive plants controlled within areas affected by construction activities.

Management Actions:

- Implement eradication programme for alien invasive plants and noxious weeds at the facility.
- Prevent contamination of natural vegetation by any maintenance activities.
- As much vegetation growth as possible must be promoted post construction within the permanent development footprint. This will serve to reduce the percentage of the surface area which is left as bare ground. Only locally indigenous species already occurring in the habitat is to be used for this purpose.
- The areas affected by operation and maintenance activities must be reinstated and rehabilitated.

- No hunting/trapping/snaring or collecting of faunal species is allowed.
- Vehicles to use the facility's access roads as far as possible.
- Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed downwards, and the use of orange tinted lighting is preferred.
- Prevent disturbance of natural areas during operation and maintenance activities.
- The fences must be inspected regularly to detect whether any damage has occurred or wildlife has been impacted by the fences. Damaged fences / barricading shall be repaired immediately. Trapped wildlife must be reported, and a suitably qualified specialist must free the trapped animal. Causes for wildlife entrapment must be addressed to prevent further incidences.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Eradication programme for alien invasive plants and noxious weeds • Training and awareness creation	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Compliance with Eradication programme • Visual inspections (photographic records) • Records of incidents related to flora and fauna • Proof of training

12.3.7 Management of Socio-Economic Environment & Visual Impacts

Management Objective:

- Minimise impacts to the socio-economic environment
- Establish and maintain a record of all complaints against the project and ensure that these are timeously and effectively verified and responded to.

Target:

1. No justifiable complaints.
2. No direct harm to public / livestock / fauna due to inadequate fencing arrangements.
3. Disturbed or damaged perimeter fencing to be reinstated / replaced.

Management Actions:

- Establish lines of communications with the surrounding landowners.
- Implement GRM in operational phase.
- Prevent unauthorised access to the facility.
- Prevent livestock from entering the facility.
- Maintain the facility's perimeter fencing.

- Maintain a clean and tidy PV facility.
- To retain the rural sense of pace, lights at night need to be controlled. Lighting should be kept to an efficient minimum while still keeping within the safety norms.
- Rehabilitation of previously modified areas should be continually undertaken.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Compliance with relevant management actions • Develop and implement GRM • Inspection of fencing • Training and awareness creation	Operational Phase

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Documented and functional GRM • Proof of communication • Visual inspections (photographic records) • Records of incidents to members of the public / livestock • Proof of training

12.3.8 Management of Glint and Glare for Civil Aviation (if tracking technology used)

Management Objective:

- Prevent project-related risks (associated with glint and glare) to civil aviation activities.

Target:

1. No risks to civil aviation as a result of the PV site.
2. No justifiable complaints.

Management Actions:

- It was noted that some yellow glare may be a result of the PV panels reverting back to the resting angle of 0° before the sun has fully set. It is therefore recommended that the tracking panels remain at the full 60° tilt to the west for 15 minutes after the sun has set in order to mitigate the yellow glare that could impact the receptors.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Operator	• Compliance with relevant management actions • Develop and implement GRM	Operational Phase

	• Operation of tracking panels according to the recommendation from the Glint and Glare Impact Assessment • Training and awareness creation	

Monitoring:

Responsible person	Frequency	Evidence of compliance
Operator's designated person	Varies from daily to *ad hoc*	• Operational records for tracking panels • Documented and functional GRM • Proof of communication • Visual inspections (photographic records) • Records of incidents • Proof of training

-End of document-