APPENDIX H

EMPR

APPENDIX H1: EMPr for the Solar PV Facility

APPLICANT: ONDERSTEPOORT SOLAR 1 (PTY) LTD

PROPOSED UP TO 240MW ONDERSTEPOORT SOLAR 1 PHOTOVOLTAIC PROJECT NORTH WEST OF RUSTENBURG, NORTH WEST PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

JUNE 2023

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Title and Approval Page

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Amendments Page

Date:	Nature of Amendment	Amendment Number:
June 2023	Draft for Review by Authorities and the Public	0

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LIST OF ACRONYMS & ABBREVIATIONS

AC	Alternating Current
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)
MSDS	Material Safety Data Sheet
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
SAPS	South African Police Services

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 was appointed by Onderstepoort Solar 1 (Pty) Ltd (the "Applicant") to conduct the Environmental Impact Assessment (EIA) for the proposed up to 240MW Onderstepoort Solar1 Photovoltaic Project north west of Rustenburg, North West Province (the "Project").

The EIA is being undertaken according to the process prescribed in the EIA Regulations of 2014, published under Government Notice (GN) No. 982 in Gazette No. 38282 of 4 December 2014 and amended by GN 326 of 7 April 2017 published in Gazette No. 40772 (the "EIA Regulations"). The EIA Regulations were promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA).

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, the following EMPr's were developed for the Project:

- Generic EMPr for the development and expansion for overhead electricity transmission and distribution infrastructure (contained in **Appendix H 2** of the EIA Report);
- Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity (contained in **Appendix H 3** of the EIA Report); and
- **Normal EMPr for the PV and BESS Project** (topic if this document).

This EMPr must be read in conjunction with the EIA Report. The scope of the EMPr is as follows:

- Establish management objectives during the Project'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:	Onderstepoort Solar 1 (Pty) Ltd
Tel No:	084 401 9015
Email Address:	david@atlanticep.com
Postal Address:	PO Box 51060, Cape Town, 8002

3.2 Project Description

The Project Area is located approximately 10km west of Rasimone and 30km north-west of Rustenburg's central business district (CBD) and, falls within Ward 1 of the Rustenburg Local Municipality, in the North West Province. The site can be accessed via Lindleyspoort Road (off the R565) which runs along the southern boundary of the site. The project footprint covers a combined area of approximately 400 hectares (ha) (**Figure 1**).

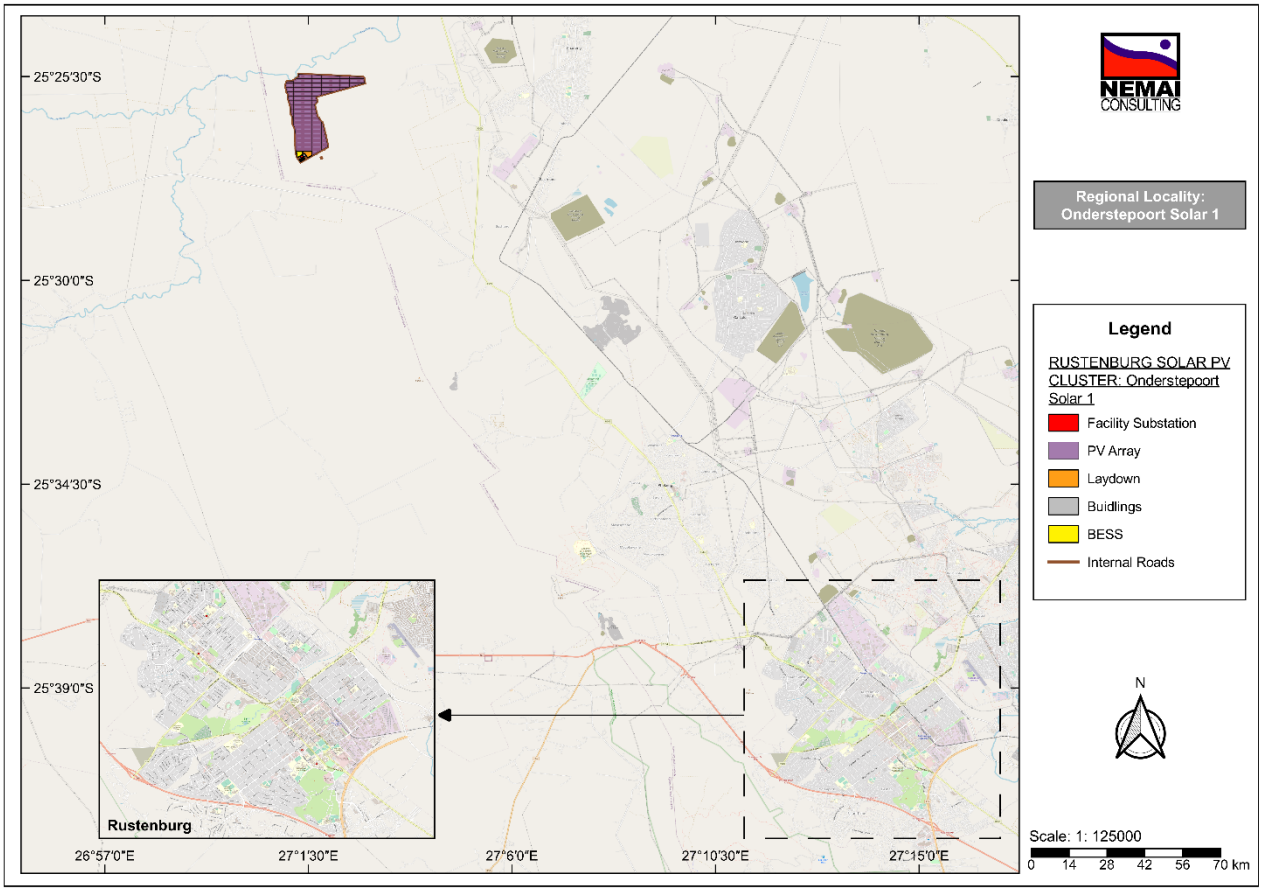

Figure 1: Locality map of overall Project Area

The technical details of the proposed PV Plant are captured in **Table 2** below.

Table 2: Technical details of the proposed PV Plant

No	Component	Description / Dimensions	
		Alternative 1	Alternative 2
1	Height of PV panels	Up to 5.5 m	Up to 5.5 m
2	Area of PV Array	Up to approximately 469.5 ha	Monofacial or Bifacial PV panels, mounted on either fixed-tilt, single-axis tracking, and/or double-axis tracking systems. Up to 390 ha
3	Area occupied by substations	Up to 1 ha	Up to 1 ha
4	Capacity of on-site substation	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33kV) to high voltage (132 kV).	The facility substation will collect the power from the facility and transform it from medium voltage (up to 33kV) to high voltage (132 kV).
5	BESS	Area up to ± 5 ha	Area up to ± 5ha
6	Area occupied by both permanent and construction laydown areas	Temporary: Up to 7 ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)	Temporary: Up to 7ha Permanent: Up to 1 ha (located within the area demarcated for temporary construction laydown)
7	Area occupied by buildings	Up to 1.5 ha	Up to 1.5 ha
8	Length of internal roads	Up to 33 km	Up to 33 km
9	Width of internal roads	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.	The internal roads will be up to 6 m wide. The access roads will be up to 8 m wide.
10	Proximity to grid connection	±5-6 km	Approximately 5 - 6 km
11	Height of fencing	Up to 3.5 m	Up to 3.5m
12	Type of fencing	Type will vary around the site, welded mesh, palisade and electric fencing	Type will vary around the site, welded mesh, palisade and electric fencing

The electricity generated by the proposed PV facility will be transferred to the existing Eskom 132 kV distribution system.

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

4 ENVIRONMENTAL ASSESSMENT PRACTITIONER

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

Name of EAP: Donavan Henning from Nemai Consulting
Tel No: 011 781 1730
Fax No: 011 781 1731
E-mail address: donavanh@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
Mrs D. Naidoo	BSc Eng (Chem)	20 years	• Project Manager - EIA Process
Mr D. Henning	MSc (River Ecology)	20 years	• Project Leader - EIA Process
Ms. U Naicker	BSc (Hons) Geography	13 years	• Project Assistant – 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	▪ Key sections (amongst others):

Legislation	Description and Relevance
(NEMA) (No. 107 of 1998)	○ Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment). ○ Section 28 – Duty of care and remediation of environmental damage. ▪ Environmental management principles. ▪ Authorities – Department of Forestry, Fisheries and the Environment (DFFE) (national) and the Department of Economic Development, Environment, Conservation and Tourism (DEDECT) (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.
GN No. R. 984 of 4 December 2014 (as amended) (Listing Notice 2)	▪ 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 Scoping and EIA process, as prescribed in regulations 21 - 24 of GN No. R 982 of 4 December 2014 (as amended).
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.
National Water Act (Act No. 36 of 1998)	▪ Sustainable and equitable management of water resources. ▪ Key sections (amongst others): ○ Chapter 3 – Protection of water resources. ○ Section 19 – Prevention and remedying effects of pollution. ○ Section 20 – Control of emergency incidents. ○ Chapter 4 – Water use. ▪ Authority – Department of Water and Sanitation (DWS).
National Environmental Management Air Quality Act (Act No. 39 of 2004)	▪ Air quality management ▪ Key sections (amongst others): ○ Section 32 – Dust control. ○ Section 34 – Noise control. ▪ Authorisation type – Atmospheric Emission License. *Note that this is not required for the Project.* ▪ Authority – DFFE, DEDECT 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
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.*

Legislation	Description and Relevance
	▪ Authority – DFFE and DEDECT.
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 – Department of Mineral Resources and Energy (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 North West Heritage
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.
North West Province Nature Conservation Ordinance 8 of 1969	▪ Provides for the listing of certain protected plant species.
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 5** of the 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(s);
- 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 this Project 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.

7.1.3 Environmental Parameters

The environmental parameters to be included in the baseline monitoring are shown in **Table 6** below. No baseline monitoring has been recommended.

Table 6: Baseline Monitoring

Environmental Parameter	Monitoring Locations	Requirements
None		

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 Applicant during the operational 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
Avifauna Monitoring	Post-construction monitoring should be undertaken in accordance with the BirdLife South Africa best practice guidelines for solar energy facilities (BirdLife South Africa, 2017). If monitoring results indicate that excessive bird fatalities are occurring, then adaptive mitigations should be implemented. These should be discussed with avifaunal specialist and ECO prior to implementation and could include the retrofitting/incorporation of additional visual cues/diverters to existing PV panels/infrastructure.	Based on findings with specialist

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 compliance auditing, including an audit at the end of construction and one at the end of the defects notification period.

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
❖ Negotiations and agreements with the affected landowner, stakeholders and authorities
❖ Lease Agreement
❖ Registration of power line servitude
❖ Detailed engineering design
❖ Detailed geotechnical investigations, including geophysical investigations
❖ Survey and mark development
❖ 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
❖ Arrangements for accommodation of construction workers (off site)
❖ The building of a site office and ablution facilities
❖ Confirmation of the location and condition of all structures and infrastructure on the PV Site
❖ 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
❖ Pre-construction environmental survey
❖ Develop Environmental Monitoring Programme (e.g. air quality, water quality, noise, traffic, social)
❖ Barricading of sensitive environmental features (e.g. watercourses)
❖ Obtain permits for impacts to Species of Conservation Concern (SCC), if avoidance is not possible
❖ 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 structures and infrastructure, as relevant.
❖ Establish construction laydown areas.
❖ 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 substation components.
❖ Construction of associated infrastructure.
❖ Concrete Works.
❖ Erection of steel structures.
❖ Mechanical and Electrical Works.
❖ Electrical supply.
❖ Material delivery and offloading.
❖ Stringing of transmission lines.
❖ 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
❖ 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 power lines and servitudes.
❖ Controlling vegetation.

Project Phase: Operation
❖ Managing stormwater and waste.
❖ Conducting preventative and corrective maintenance.
❖ Monitoring of the PV facility's performance.
❖ On-going consultation with directly affected parties.
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.
❖ Inaccurate pre-construction environmental survey.
❖ Absence of relevant permits (if required).
❖ Lack of barricading of sensitive environmental features.
❖ Poor waste management.
❖ Absence of 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

Project Phase: Construction
❖ Inadequate consultation with landowners.
❖ Inadequate environmental and compliance monitoring.
❖ Lack of environmental awareness creation.
❖ Indiscriminate site clearing.
❖ Poor site establishment.
❖ Poor management of access and use of access roads.
❖ Disruptions to traffic.
❖ Poor transportation practices.
❖ Poor fencing arrangements.
❖ Erosion.
❖ Disruptions to existing services.
❖ 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.
❖ Disturbance to land use along power line route.
❖ Poor management of pollution generation potential.
❖ Damage to significant flora (if encountered).
❖ Damage to significant fauna (if encountered).
❖ Environmental damage where watercourses are crossed.
❖ Inadequate stormwater management.
❖ Damage to 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.

Project Phase: Operation
❖ Pollution caused by cleaning of panels.
❖ Pollution caused by dangerous good (e.g. transformer oils) associated with the onsite substation.
❖ 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	▪ Sterilisation of land for other land use types. ▪ Setbacks / conditions associated with surrounding land and infrastructure.	▪ Sterilisation of land for other land use types up to the decommissioning of the Project (if applicable). ▪ Servitude restrictions associated with proposed power line (grid connection).
Geology	▪ Suitability of geological conditions to support the Solar PV Plant.	▪ Suitability of geological conditions to support the Solar PV Plant.
Geohydrology	▪ Groundwater pollution due to spillages and poor construction practices. ▪ Utilisation of boreholes, if required.	▪ Groundwater pollution due to poor operation and maintenance practices. ▪ Utilisation of boreholes, if required.
Topography	▪ Visual impacts. ▪ Erosion of areas cleared for construction purposes. ▪ Crossing topographic features (watercourses).	▪ Crossing topographic features (watercourses). ▪ Visual impact caused by proposed Project infrastructure and landscape transformation. ▪ Glint and glare from solar panels.
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 the PV Site. ▪ Surface water pollution due to spillages and poor construction practices. ▪ Encroachment of construction activities into watercourses and their buffer zones. ▪ Impacts where access roads and ancillary infrastructure cross / are in close proximity to watercourses (e.g., sedimentation, loss of vegetation, destabilisation of watercourse structure).	▪ Sedimentation through silt-laden runoff, caused by inadequate stormwater management. ▪ Water resources could be contaminated through inadequate storage and handling of hazardous materials, leaks from the BESS and poor management of waste and wastewater. ▪ Water use requirements of the Project need to be satisfied.
Flora & Fauna	▪ Habitat loss / fragmentation. ▪ Potential loss, disturbance or displacement of protected fauna and flora species. ▪ Human - animal conflicts. ▪ Noise and vibration impacts to fauna.	▪ 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.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
	▪ 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.	▪ Risk to birds from collision with infrastructure and from electrocution. ▪ Electrical faulting from birds. ▪ Chemical pollution associated with cleaning the PV panels. ▪ Proliferation of invasive alien species in disturbed areas.
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. ▪ Threats to human and animal health from electromagnetic field (power line and on-site substation).
Air Quality	▪ Dust from the use of dirt roads by construction vehicles. ▪ Dust from bare areas that have been cleared for construction purposes. ▪ Emissions from construction equipment and machinery. ▪ Tailpipe emissions from construction vehicles.	▪ The efficiency of the solar plant could be reduced if the modules are soiled (covered) by particulates/dust. ▪ 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	▪ Loss of fertile soil through land clearance. ▪ Soil erosion. ▪ Loss of topsoil. ▪ Risk of harm to livestock from construction activities.	▪ Loss of possible future agricultural land use due to direct occupation by the development footprint. ▪ Soil erosion due to inadequate stormwater management.
Historical and Cultural Features	▪ Possible 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. ▪ Crossing of existing infrastructure by power line.	▪ Setbacks / conditions associated with surrounding land and infrastructure. ▪ Disturbances to infrastructure traversed by power line during maintenance activities.
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. ▪ Construction vehicles accessing and leaving the sites via N6 national road. ▪ 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. ▪ Safe access, taking into consideration the high speed environment along the N6. ▪ Sun glare off PV panels.
Aesthetics	▪ Landscape transformation. ▪ Visual impacts associated with construction activities.	▪ Landscape transformation. ▪ Inadequate reinstatement and rehabilitation of construction footprint. ▪ Light pollution. ▪ High visibility of power lines to visual receptors.

Environmental Factor	Construction Phase Potential Issues / Impacts	Operational Phase Potential Issues / Impacts
Health	▪ Hazards related to construction work. ▪ Increased levels of dust and particulate matter. ▪ Increased levels of noise. ▪ Water (surface and ground) contamination. ▪ Poor water and sanitation. ▪ Communicable diseases. ▪ Psychosocial disorder (e.g. social disruptions). ▪ Safety and security. ▪ Lack of suitable health services.	▪ Hazards related to operation and maintenance work. ▪ Fire and explosion risks during BESS operation.

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 EIA Report and EMPr (as relevant):

- The initial Aquatic and Wetland Assessment advocated that the proposed development avoid the non-perennial drainage lines, as well as their associated buffers. In response, PV Layout Alternative 1 was revised to avoid encroachment into the drainage lines. PV Layout Alternative 2 does take into account both riparian zones as well as its 32 m buffer zones and is therefore outside any freshwater sensitive features.
- In terms of the North West Conservation Plan, the project area overlaps with an ESA1, and ESA 2 areas.
- The project area lies 5 km south from Pilanesberg National Park and is thus on the edge of the 5 km Protected Area Buffer Zone of this Nature reserve.
- Based on field surveys, one SCC were recorded during the survey period, namely Sagittarius serpentarius (Secretarybird). Sixteen and seventeen priority species respectively were recorded in the first and second survey. These species are at risk of either habitat loss, collisions or electrocutions.
- Visual impacts are likely to be largely localised and within 5 km of the proposed project boundary, while significant visual impacts with regards to the proposed activities are expected at the sensitive receptors located within 2km of the proposed project boundary.
- No fossiliferous outcrop was detected in the proposed development.

The sensitivity maps are provided in the EIA Report and below. Key environmental features that contributed toward the sensitive areas included watercourses, and sensitivities as determined by the relevant specialist studies. 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.

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

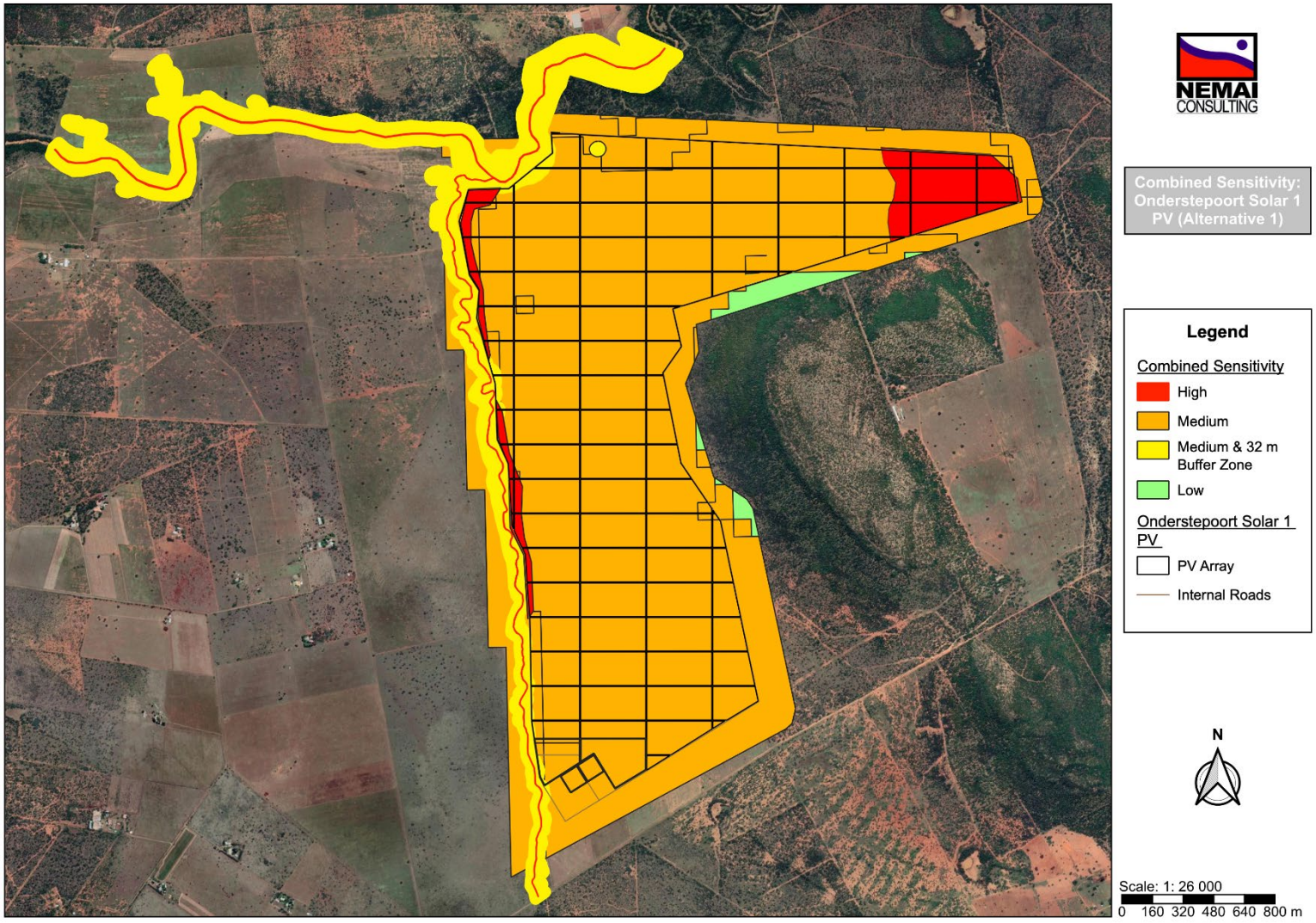

Figure 2: Specialist Verified Sensitivity map for Alternative 1

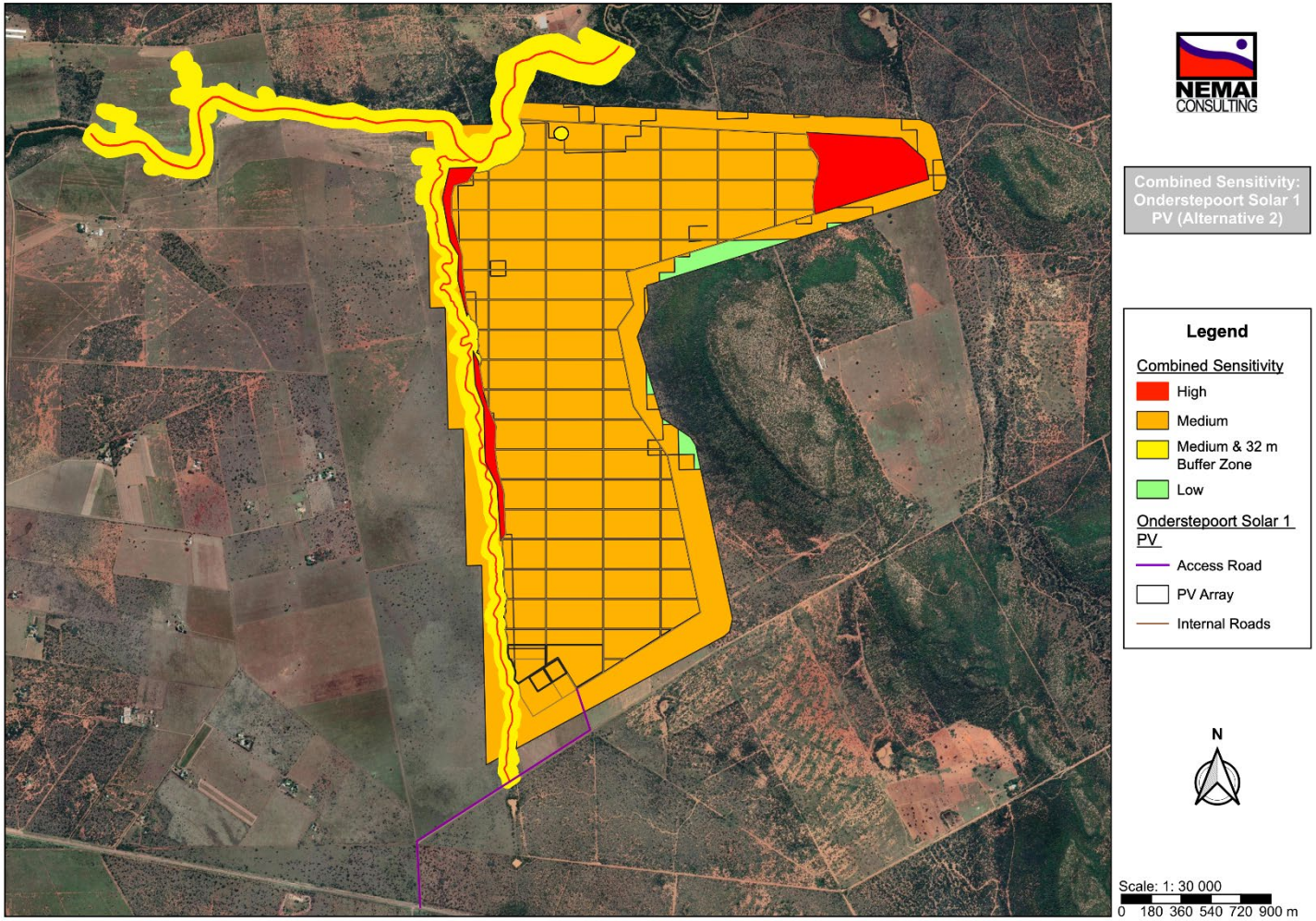

Figure 3: Specialist Verified Sensitivity map for Alternative 2

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.
- In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.
- Where avoidance of fauna and flora SCC is not possible, the suitably qualified Ecologist must oversee the rescue and relocation of these species.
- A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities,

preferably during the wet season. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.

- 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.
- Avoid all areas of High avifaunal sensitivity.
- An appropriately qualified heritage consultant should be identified to be called upon if any possible heritage resources or artefacts are identified.
- Use the watercourse shapefiles to clearly demarcate (on the ground) the edge of the buffer on the watercourses. Regard these as strict no-go areas and sign post as environmentally sensitive.

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 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;
- Crusher 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.

- Adhere to agreements made with the Landowner and community members regarding communication.

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 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 community members.
- A security policy shall be developed which amongst others requires that permission be obtained prior to entering any property and 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 marked and barricaded heritage resources, protected species, watercourses, structures and 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.
- Avoid any disturbance to demarcated sensitive environmental features (including surrounding watercourse areas and 1:100 year floodlines).
- Clearing of vegetation should be minimized and avoided where possible.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events.
- Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Hi visibility flags must be placed near any threatened/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 program. Infrastructure, development areas and routes where protected plants cannot be avoided, these plants mainly being succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Method Statement for site clearing • Barricading and signage	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) of cleared areas, barricading and signage

12.2.8 Site Establishment

Management Objective:

Minimise negative environmental impacts associated with site establishment.

Target:

1. No deviations from agreement made with landowner.
2. No damage to sensitive environmental features outside demarcated construction areas during site establishment.
3. Site layout approved by Engineer.
4. No access or encroachment into no-go areas (including surrounding watercourse areas and 1:100 year floodlines).
5. 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.*
- All laydown, chemical toilets etc. should be restricted to medium/low sensitivity areas.
- Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded.
- No permanent construction phase structures should be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials.
- No storage of vehicles or equipment will be allowed outside of the designated project areas.
- 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.
- The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments. Signs must be put up to enforce this.
- 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 public 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.

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 (including roads, railway line, power lines, telephone lines, etc.).

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 landowners 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 • 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 construction sites.
- Ensure proper access control.
- Prevent unlawful access to the construction domain.
- Adhere to agreement made with Landowner 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:

- Selective upgrade of the relevant access roads shall ensure that they are capable of accommodating the type of vehicles and/or mechanical plant using these roads.
- Obtain the necessary approvals from Authorities for access roads.
- Any temporary access roads constructed shall be suitably rehabilitated.
- Ensure temporary accommodation of traffic where any public or private roads are to be affected by construction activities.
- 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.
- The payloads delivered by heavy vehicles shall be recorded and audited to prevent overloading 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.
- Time restrictions for delivery vehicles through built-up and socially sensitive areas.
- Access roads shall be maintained in a suitable condition.
- 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.
- A continuous condition survey of the local roads to be used during the construction phase must be made.
- Delivery routes shall be defined and adhered to during the construction phase.
- Maintenance of local roads shall take place during the construction phase, ensuring that the local roads used by the contractor are left in the same or better condition than they were prior to the start of construction.
- 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.
- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads located within the site boundary, including the main access road to the site and the site access roads, during the construction phase, if required.
- Regular maintenance of gravel roads located within the site boundary, including the access roads to the site, by the Contractor during the construction phase and by the Owner/Facility Manager during the operational phase, if required.
- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network, if available and feasible.
- Staff and general trips should occur outside of peak traffic periods as far as possible.
- The Contractor should ensure that all drivers, entering the site, adhere to the traffic laws.
- Vehicular movements within the site boundary are the responsibility of the respective Contractor and the Contractor must ensure that all construction road traffic signs and road markings (where applicable) are in place. It should be noted that traffic violations on public roads are the responsibility of Law Enforcement, and the public should report all transgressions to Law Enforcement and the Contractor.
- If required, low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved (to be arranged by the haulage company and communicated beforehand with the service provider of the OHL) to accommodate the abnormal load vehicles. The Contractor and the Developer are to ensure that the haulage company is aware of this requirement.
- The haulage company is to provide evidence to the Contractor and the Developer that any affected overhead lines have been moved or raised.
- The preferred route should be surveyed by the developer to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, which may require modification). After the road modifications have been

implemented, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. The “dry-run” should be undertaken within the same month that components are expected to arrive. The haulage company is to provide evidence that the route has been surveyed and deemed acceptable for the transportation of the abnormal load.

- The Contractor needs to ensure that the gravel sections of the haulage routes (i.e., the site access road and the main access road to the site) remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a camber of between 3% and 4% (to facilitate drainage) and regular maintenance blading will also be required. The geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.
- 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 the landowner regarding fencing of the Project 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, fencing around trenches, etc.) shall be inspected on a daily basis to detect whether any damage has occurred. Damaged fences / barricading shall be repaired immediately.
- Erect fences according to appropriate specifications.
- Fence failures during the construction phase shall be fixed immediately.
- Proper access control is to be maintained to prevent livestock from accessing construction areas, as well as for any other unauthorised access.
- The fence must have holes of 30*30cm to allow for free movement of wildlife.

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 landowners and community members.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

1. No complaints from landowners and 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.
- All contractors' staff should be easily identifiable through their respective uniforms.
- 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.
- A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards crime, trespassing, and not gathering outside the site could be conducted.
- Only security staff should be allowed to reside at contractor camps and no other employees.
- 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 construction sites.
- 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).
- Spaza shops may open next to the site as a consequence of construction. These must be controlled by the contractor to limit their footprint and to ensure that the Moqhaka LM Informal Trading By-Laws, are complied with.

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.
- The construction camp shall not be situated within the delineated buffer areas of any watercourses or within the 1:100 year flood line.
- Provide essential services (including showers, appropriate sanitation and drinking water facilities) at the construction camp. Maintain essential services in a functional state.
- Provide safe potable water for food preparation, drinking and bathing.
- 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, including overhanging trees. 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.
- Dish washing facilities shall be provided.
- Ensure that wastewater is appropriately disposed of.
- 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 measures.
- Suitable security shall be provided at the construction camp at all times.
- Manage storm water 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 felling of trees for firewood.
- 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.
- 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.
- Toilets shall not be situated within 50m of any water body.
- 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 shall be provided.
- 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. Orange coloured lights should be used as far as possible for lighting.
- Lighting shall not constitute an eyesore / hazard to users of the road and the surrounding community.
- Lighting shall be sufficient to ensure security but will not constitute 'light pollution' to the surrounding areas.
- Large fences should go around the defined Project area and not along the N1 on the outer property perimeter as this can be visually intrusive.
- All structures walls should be painted a grey-brown colour so as to blend with the surrounding colours.
- The site will be shielded /screened to minimise the visual impact, where practicable.
- Only the necessary vegetation should be cleared.
- Revegetate the surface below the solar PV modules.
- Paint any supporting structures the same dark colours as the solar PV modules to reduce the contrast as far as possible.
- Undertake on-going housekeeping to maintain a tidy construction area.

- After the construction phase, the areas disturbed that are not earmarked for operational purposes (part of infrastructure footprint) 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 landowner or municipality to obtain water from approved sources. All water use from the boreholes must be in accordance with the registered volume that can be abstracted and must comply with the provisions of the NWA.
- 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.
- Establish a dedicated vehicle maintenance area and wash-bay, where suitable storm water management measures are in place to prevent pollution.

- 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 treated in hydrocarbon separation pits/tanks before being discharged in to drains and/or waterways.
- Develop a sound stormwater management plan that is engineered to promote rainfall infiltration, maintain diffuse subsurface flows in seep areas, minimise the development of preferential flow paths. The stormwater plan would also benefit from Lidar based topography maps and / or site-specific contours that allow for the identification of flow paths.
- All wastewater discharges shall comply with legal requirements associated with the NWA.
- Wastewater discharges to be monitored.
- Prevent erosion on access roads due to construction traffic.
- The Stormwater Management Plan is to be developed during detailed design, inclusive of stormwater management designs based on the detailed design of the facility.
- All buildings will be provided with down pipes to control runoff from the roofs. In addition, all buildings will be constructed with a 1 m wide concrete pavement structure around the building to minimise and prevent any runoff related erosion taking place around the buildings.
- Points of stormwater discharge to be stabilised.
- Porous paving surfaces to be used wherever possible.
- The harvesting of stormwater for appropriate uses where possible (such as cistern water or for irrigation) will be incorporated into the design where possible.
- Rainwater runoff from roofs and panels will be directed into natural areas where possible.
- Waste traps will be included in the stormwater design to catch any litter.
- All roads and parking areas to have stable surfaces and channels lined.
- All activities that affect surface drainage will be designed so as to ensure that stormwater runoff does not lead to excessive surface erosion problems on the site.
- Run-off from roads will be managed to avoid erosion and pollution problems.
- Mitigation steps will be in place to control the flow of excess water so that it does not impact on surface vegetation.
- Only vegetation essential for construction will be removed and steps will be made so that no disturbance will occur to the adjoining natural vegetation.
- The drainage of the surface will be done in such a way that stormwater will be dissipated quickly and efficiently thereby preventing any erosion taking place.
- Prevent stormwater or contaminated water directly entering any watercourse.
- Install waste traps to catch litter conveyed by surface runoff.
- Implement topsoil and stormwater runoff control management measures to prevent the loss of topsoil.
- Dissipate concentrated stormwater flows through energy dissipaters or vegetated areas.
- Repair all erosion damage as soon as possible.
- Implement topsoil and stormwater runoff control management measures to prevent the loss of topsoil
- Dissipate concentrated stormwater flows through energy dissipaters or vegetated areas
- Repair all erosion damage as soon as possible

- Dissipate concentrated stormwater flows through energy dissipaters or vegetated areas.
- All waste traps within the stormwater system will be cleaned regularly to ensure efficient functioning.

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 • Method statement for managing storm water	Construction phase

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.

Management Actions:

- Avoid the need to strip topsoil by employing construction methods with minimal impact to vegetation and soil. If this is not possible, topsoil in areas to be impacted on by construction should be stripped.
- Determine the average depth of the topsoil prior to excavations.
- Topsoil from the construction activities shall be stored for post-construction rehabilitation work.
- Identify suitable areas to store topsoil.
- 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 prior to seeding.
- An ecologically-sound stormwater management plan shall be implemented during construction and appropriate water diversion systems shall be put in place.
- Topsoil stripped must be stored in such a way that it can be replaced at the same location to limit the mixing of plant species between habitats.
- 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.
- Inspect excavations at least daily to ensure that animals have not become trapped. Such animals will be safely removed and released, where possible. Special equipment for handling of venomous snakes shall be available on site to ensure safe removal.
- Make adequate provision for subsidence.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation

Contractor & cEO	• Excavation Register
	• Method statements for:
	  ○ Managing excavations
	  ○ Managing spoil material
	  ○ 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 Material Safety Data Sheet (MSDSs).
- 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 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.
- 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.
- MSDSs, 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.
- 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.
- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.

Implementation:

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

	• Inspection of storage areas	

Monitoring:

Responsible person	Frequency	Evidence of compliance
dEO & ECO	Monthly	• Approved method statement • Records (e.g. HCS Control Sheet, copies of MSDS, 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 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 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*.
- Waste management must be a priority and all waste must be collected and stored effectively
- Litter, spills, fuels, chemicals and human waste in and around the project area
- A minimum of one toilet must be provided per 15 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area. Chemical toilets must be serviced regularly to avoid spill over and eutrophication of the soil by urea and or nitrates.
- The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility
- Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site.
- Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Method statement for waste management • Service agreements with waste service providers • Training and awareness creation	Construction phase

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

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:

- 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.
- 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 fallout -
    a. Fence line sites = Industrial Band (600 to 1200 mg/m^2/day);
    b. Community sites = Residential Band (< 600 mg/m^2/day);
    c. Comply with ASTM D1739; *SANS 1929, SANS 69.*
2. Noise -

a. L_{Aeq} (equivalent continuous sound level) during daytime hours (06:00 to 22:00) = 45 dBA;
b. L_{Aeq} during night-time hours (22:00 to 06:00) = 35 dBA;
c. Comply with SANS 10103:2008.

3. Blasting operations to be controlled to ensure sound pressure levels are kept below the generally accepted 'no damage' level of 140 decibels.
4. Water quality – construction activities may not cause an adverse impact that results in more than a 10% change in baseline values.
5. All water discharges to comply with legal requirements associated with the NWA, including GN No. 399.

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. Noise shall be monitored at the nearest sensitive receptor and where the noise is generated.
  - Construction work should take place during working hours – defined as 07h00 to 17h00 on weekdays and 07h00 to 14h00 on Saturdays. Should overtime work be required, that will generate noise, consultation with the affected community or landowner should 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 unless at a level that does not serve as an intrusion to adjacent community.
  - 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.
  - Environmental noise monitoring shall be carried out regularly to detect deviations from pre-construction noise levels and to enable corrective measures to be taken, where warranted.

- **Dust** -
  - Appropriate dust suppression measures or temporary stabilising mechanisms shall be used when dust generation is unavoidable (e.g. dampening with water, chemical soil binders, straw, brush packs, chipping, etc.), particularly during prolonged periods of dry weather.
  - 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.
  - Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces.
    - No non environmentally friendly suppressants may be used as this could result in pollution of water sources.

- **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).
- **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.
  - Take every measure to ensure that the bulk of the site clearing and earth moving activities take place in winter when rainfall is lowest (and the grass sward is thinnest) to minimize environmental damage, erosion, sedimentation and contamination.
  - All low points, flow paths or clean water drains should be engineered to minimize erosion through the installation of small drop downs and flow attenuation structures especially out outlets into the floodplain.
  - Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events.
- **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 shall be disposed in accordance with the EMPr section on *Management of Water*. Contaminated water will not be discharged to the environment. Prevent overflow from contaminated wastewater storage area.
  - 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 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.
- To prevent spillage onto roads, ready mix trucks will rinse off the delivery shoot into a suitable sump prior to leaving the site.
- 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 North West Province Nature Conservation Ordinance 8 of 1969, NEMA, NEM:BA, NFA and National Veld and Forest Fire Act (No. 101 of 1998).
- Areas rated as High sensitivity in proximity to the construction domain (including delineated riparian zones) must be declared as 'no-go' areas during the construction phase and operational phase, and all efforts must be made to prevent access to this area from construction workers, machinery. This excludes High sensitivity areas which are authorised for development.
- 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 individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. Hi visibility flags must be placed near any threatened/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 program. Infrastructure, development areas and routes where protected plants cannot be avoided, these plants should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.
- 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 indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species.
- Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion.
- Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility.
- Rocks removed in the construction phased may not be dumped, but can be used in areas where erosion control needs to be performed.
- With the disturbance of soils, weed growth is expected and should be controlled before seed formation.
- Ensure that the control of exotic or invasive plants is undertaken by suitable contractors using appropriate methods such hoeing, hand pulling, digging or mowing. Pesticides or herbicides may not be used, unless they are environmentally friendly and will not cause any soil contamination.

Vegetation and habitats

The following mitigation measures are recommended to address known potential impacts:

- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted within the low/medium sensitivity areas. No further loss of high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon.
- If high sensitivity cannot be avoided, the necessary permits must be obtained to destroy, rescue, or relocate plants. For each protected plant destroyed, another individual must be propagated and replanted is a suitable area to mitigate the loss.
- For each protected plant destroyed, another individual must be propagated and replanted in a suitable area to mitigate the loss.
- The large mature protected trees (Shepard's tree) should be marked and a buffer of 5m from the furthest extent of the canopy should be used so as not to damage these specimens, or the necessary destruction permits must be obtained and an individual for each destroyed plant must be propagated and replanted in a suitable habitat to mitigate loss.
- Existing access routes, especially roads must be made use of
- All laydown, chemical toilets etc. should be restricted to medium/low sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No storage of vehicles or equipment will be allowed outside of the designated project areas.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently revegetated.
- A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area.
- It should be made 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 should be brought

into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.

- Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. High visibility flags must be placed near any threatened/protected plants in order to avoid any damage or destruction of these specimens.
- Infrastructure, development areas and routes where protected plants cannot be avoided, these plants mainly being succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again.
- A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.
- Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals.
- Restrict impact to development footprint only and limit disturbance in surrounding areas.
- Prior to commencement of construction, compile a Rehabilitation Plan including monitoring specifications, to be included into the EMPr during final approval.
- Prior to commencement of construction, compile an Alien Plant Management Plan, to be included into the EMPr during final approval.
- Prior to commencement of construction, compile and implement an alien management plan, which highlights control priorities and areas and provides a programme for long-term control, including monitoring specifications.
- Undertake regular monitoring to detect alien invasions early so that they can be controlled.
- Prior to commencement of construction, compile and implement a stormwater management plan including monitoring specifications.
- Monitor surfaces for erosion, repair and/or upgrade, where necessary.
- Prior to decommissioning commencing, compile a Rehabilitation Plan in compliance with the regulatory requirements at the time of decommissioning.

Fauna

The following mitigation measures are recommended to address known potential impacts:

- A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.

- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights 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.
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits (30km/h) must still be enforced to ensure that road killings and erosion is limited.
- The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments,
    - Signs must be put up to enforce this.
- No trapping, killing, or poisoning of any wildlife is to be allowed
    - Signs must be put up to enforce this;
- Outside lighting should be designed and limited to minimize impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (green/red) lights should be used wherever possible.
- All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits (30km/h) must still be enforced to ensure that road killings and erosion is limited.
- All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. 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
- Any holes/deep excavations must be dug and planted in a progressive manner and shouldn't be left open overnight;
    - Should the holes be left open overnight they must be covered temporarily to ensure no small fauna species fall in.
- Ensure that cables and connections are insulated successfully to reduce electrocution risk
- Any exposed parts must be covered (insulated) to reduce electrocution risk.
- Heat generated from the substations must be monitored to ensure it does not negatively affect the local fauna
- Use environmentally friendly cleaning and dust suppressant products
- Fencing mitigations:
    - Wildlife-permeable fencing with holes large enough for mongoose and other smaller mammals should be installed every 50 m along the fence (with a size of 30 x 20 cm), the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.

Alien Species

- Compilation of and implementation of an alien vegetation management plan.
- The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths.
- Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.
- A pest control plan must be put in place and implemented; it is imperative that poisons not be used.

Erosion

- Speed limits must be put in place to reduce erosion.
    - Reducing the dust generated by the listed activities above, especially the earth moving machinery, through wetting the soil surface and putting up signs to enforce speed limit as well as speed bumps built to force slow speeds;
    - Signs must be put up to enforce this.
- Where possible, existing access routes and walking paths must be made use of.
- Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events and strong winds.
- A stormwater management plan must be compiled and implemented.

Specific monitoring recommendations should be provided in the Alien Invasive Management Plan, and the Rehabilitation Plan. The following are broad recommendations:

Alien Invasive Species:

- Monitor for early detection, to find species when they first appear on site. This should be as per the frequency specified in the management plan and should be conducted by an experienced botanist. Early detection should provide a list of species and locations where they have been detected. Summer (vegetation maximum
- growth period) is usually the most appropriate time, but monitoring can be adaptable, depending on local conditions – this must be specified in the management plan.
- Monitor for the effect of management actions on target species, which provides information on the effectiveness of management actions. Such monitoring depends on the management actions taking place. It should take place after each management action.
- Monitor for the effect of management actions on non-target species and habitats.

Rehabilitated areas:

- Rehabilitation Plan must be compiled by an approved ecologist prior to achieving COD and prior to the start of decommissioning.

- All management actions associated with rehabilitation must be recorded after each management action has taken place.
- All rehabilitated areas should be monitored to assess vegetation recovery. This should be for a minimum of three years after post-construction rehabilitation, but depends on the assessed trajectory of rehabilitation (whether it is following a favourable progression of vegetation establishment or not – this depends on the total vegetation cover present, and the proportion that consists of perennial growth of desired species). For each monitoring site, an equivalent comparative site in adjacent undisturbed vegetation should be similarly monitored. Monitoring data collection should include the following:
    - total vegetation cover and height, as well as for each major growth form;
    - species composition, including relative dominance;
    - soil stability and/or development of erosion features;
    - representative photographs should be taken at each monitoring period.
- Monitoring of rehabilitated areas should take place at the frequency and for the duration determined in the rehabilitation plan, or until vegetation stability has been achieved.

- 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.
- North West Province Nature Conservation Ordinance 8 of 1969, NEM:BA and the Animal Protection Act (No. 71 of 1962).
- No animals must be intentionally killed.
- A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species.
- 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.
- Small holes (30 cm by 30 cm) must be placed in the fence along the riparian areas to allow animals to move between the areas, the holes must not be placed in the fence where it is next to a major road as this will increase road killings in the area.
- Use environmentally friendly cleaning and dust suppressant products.
- Fencing mitigations:
  - The fence must have holes of 30*30cm to allow for free movement of wildlife
- 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 Watercourses

Management Objective:

- Ensure that the watercourses (rivers and their tributaries, natural channels, drainage lines, wetlands) are protected and incur minimal negative impact to their resource quality (flow, water quality, habitat and aquatic biota).
- Structure and functions of watercourses affected by construction activities to be returned to pre-construction state as part of reinstatement and rehabilitation.

Target:

1. No encroachment of panel arrays into delineated riparian area and 1:100 year floodline.
2. Unaltered downstream flow regime for watercourses affected by construction activities.
3. No visible evidence of erosion caused by wastewater or stormwater practices.
4. No dewatering of sediment-laden or cement laden water into natural water resources.

Management Actions:

- Structures associated with the PV facility are to be developed outside of the 1:100 year floodline and delineated buffer areas of delineated watercourse.
- The development footprint should remain outside the delineated rivers, riparian and buffer zones;
- Design and implement a suitable stormwater drainage system on the PV Site.
- Erosion and sedimentation into the drainage lines must be minimised through the effective stabilisation and the re-vegetation of any disturbed areas.
- The construction camp shall not be situated within 100m or within the 1:100 year flood line of any watercourse.
- Stabilisation of watercourses at crossings (access roads and ancillary infrastructure).
- Carry out earthworks in phases across the PV Site to reduce the total area of disturbed ground at any one time.
- Signpost the edge of the riparian zones. Place the sign 50 m from the edge (buffer zone) as no-go areas.
- Educate staff on the location and importance of the identified riparian zones.
- Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.
- Do not store any construction materials or equipment within any of the identified riparian zones or their 50m buffers.

- See requirements in EMPr for additional measures to manage impacts to watercourses, including -
  - *Specialist Environmental Investigations;*
  - *Construction Site Planning and Layout;*
  - *Management of Water;*
  - *Management of Pollution Generation Potential; and*
  - *Management of Reinstatement and Rehabilitation.*

Implementation:

Responsible person	Method of implementation	Timeframe for implementation
Contractor & cEO	• Site plan • Method Statement for managing stormwater • Inspections of watercourse crossings • Rehabilitation Method Statement to include watercourses affected by the development • Barricading and signage • Training and awareness creation	Pre-construction & construction phases

Monitoring:

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

12.2.28 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:

- No heritage resources were identified within or adjacent to the proposed Onderstepoort Solar 1 PV project footprint area during the site survey. Should any unidentified heritage resources are uncovered during site clearance or construction activities, the general management guidelines in Section 12 would apply.
- Include mitigation measures identified as part of environmental pre-construction survey.

- 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.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted.
- The qualified archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- Fossil Chance Find Protocol: The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence:
  - When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.
  - Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (see examples in Palaeontological Impact Assessment contained in the Basic Assessment Report). This information will be built into the training and awareness programme.
  - Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
  - If there is any possible fossil material found then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material.
  - Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
  - If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
  - If no fossils are found and the excavations have finished then no further monitoring is required.
- 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

12.2.29 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.
  - Fire breaks will be agreed with neighbours and the local Fire Protection Association.
  - 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.
- Firebreaks shall be made for construction areas, as required.
- 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.
  - A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.
  - The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site.
  - Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary.
  - 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 person	Frequency	Evidence of compliance
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

12.2.30 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
- 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

12.2.31 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 and fixtures.
  - Ensure that all temporary access roads utilised during construction and which are not earmarked for use during the operational phase, are returned to a usable state and/or 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.
  - Load and haul excess spoil and inert rubble to fill in borrow pits/dongas or to dump sites indicated/approved by the DPM.
  - 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, unless otherwise indicated by a suitably qualified specialist.
  - Although the use of indigenous vegetation is promoted, where there is a risk of soil erosion a suitable specialist must be consulted to determine the most appropriate stabilisation measures.
- **Grassing** -
  - Suitably trained personnel must undertake grassing by making use of the appropriate equipment and indigenous grass species, as specified by a suitably qualified specialist.
  - Sodding may be done at any time of the year, but seeding must be done by sowing appropriate seed mixtures at the most suitable time under the guidance of a suitably qualified 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 Landowners regarding access.

Target:

1. No damage to be caused to sensitive environmental features (including heritage resources, protected flora and fauna, watercourses, 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. Where this is not possible, the landowners need to be notified and adequate arrangements made in advance.
- 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.
- Monitoring to be conducted to detect erosion and remediate.
- 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.

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.
- MSDSs, 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 • MSDS register • PPE register • 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*	• 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. 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.
- Adhere to monitoring requirements.
- 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, and may also screen the facility. Indigenous vegetation 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 away from highly sensitive areas.
- Prevent disturbance of natural areas during operation and maintenance activities.
- The 50m buffer areas for riparian zones are to remain no-go areas during the operational phase.

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 community and Landowner.
- Any land acquisition should be conducted on a willing buyer, willing seller basis and that the owner is not treated unfairly in the process.
- Any servitude establishment should result in fair compensation for land owners.
- The establishment of servitude rights should not reduce the existing productivity of land owner's land holdings.
- Youth development should be considered as an initiative so that there is a benefit of transferring skills to the community. This can be achieved through the assistance of the local municipality.
- The main contractor should employ non-core labour from the regional study area as far as possible during the construction phase. Local SMMEs should be given an opportunity to participate in the construction of the project through the supply of services, material or equipment.
- A skills transfer plan should be put in place at an early stage and workers should be given the opportunity to develop skills whilst in employment.
- Sensitise staff in respect of gender issues that are pertinent to the workplace.
- Ensure gender inclusivity and equity with respect to all compensation.
- Prioritise gender inclusivity and equity in access to resources, goods, services and decision making with the aim of empowering women.
- Promote equal job opportunities for women and men during the construction phase.
- Employment practises should be demonstrated free of coercion or harassment.
- There should be separate changing and ablution facilities for men and women, and they should be clearly marked as such.
- A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards trespassing.
- The camp site and the project areas should be fenced for the duration of construction;
- All contractors' staff should be easily identifiable through their respective uniforms;
- A project policy on management of workers should be developed. This would include education and awareness to be conducted with regards crime, trespassing and not gathering outside the site.
- Security staff alone should be allowed to reside at contractor camps and no other employees.
- 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