ENVIRONMENTAL MANAGEMENT PROGRAMME

REVISION 2

for

BETHEL SOLAR PV AND ASSOCIATED ELECTRICAL GRID INFRASTRUCTURE

on

Farm 431 and the Remainder of Farm 466 located South of Louis Trichardt in the Makhado Local Municipality, Vhembe District, Limpopo Province.

In terms of the

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

Prepared for Applicant: Bethel Solar PV (Pty) Ltd

Date: 6 October 2025

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NAME	TITLE	SIGNATURE
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PURPOSE OF THIS REPORT:
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EMPR LEGISLATIVE REQUIREMENTS

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

Requirement	Description
Details of the EAP who prepared the EMPr; and; The expertise of the EAP to prepare an EMPr, including a curriculum vitae.	This EMPr was prepared by Dale Holder of Cape EAPrac who has more than 20 years' experience as an Environmental Assessment Practitioner. The CV of the EAP is attached in appendix D.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	This EMP covers all aspects of the project as currently proposed for Bethel Solar PV. • PV Arrays and Mounting Structures; • Inverter stations; • On-site substation; • Grid connection • Auxiliary buildings, • Laydown area; • Internal electrical reticulation network (underground cabling); • Internal road / track network; • Access road; • Electrified perimeter fencing. • Battery Energy Storage System[1]
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	The Site Development Plan attached in Appendix A, includes the sensitive features identified by participating specialists and indicates how these have been incorporated. The "exclusion areas" identified on this SDP as well as all areas outside of the perimeter fencing of the facility are considered as no go areas for construction activities.
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – (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.	Sections 1.3
A description and identification of impact management outcomes required for the aspects contemplated above.	Sections 4 -11
A description of the proposed impact management actions, identifying the way the impact management objectives and	Sections 4 – 11

[1] The environmental impact management outcomes and actions associated with the Battery Energy Storage systems need only be undertaken at a stage when such infrastructure is developed.

Requirement	Description
outcomes contemplated above 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 practises; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
The method of monitoring the implantation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
The frequency of monitoring the implementation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
An indication of the persons who will be responsible for the implementation of the impact management actions.	Sections 4 – 11
The time periods within which the impact management actions must be implemented.	Sections 4 – 11 and section 14
The mechanism for monitoring compliance with the impact management actions.	Section 2 and 4-11
A program for reporting on compliance, considering the requirements as prescribed in the Regulations.	Section 2
An environmental awareness plan describing the way – (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.	Section 5.2
Any specific information that may be required by the competent authority.	None.

DFFE COMMENT ON EMPR

Comment	Response
(i) The generic EMPrs are not signed by the applicant holder of EA. You are required to ensure that the generic EMPrs are signed by the applicant.	The generic EMPr's for both powerline and substation infrastructure as attached in Appendix I have been signed by the applicant.
(ii) Please ensure that all recommended mitigation measures recorded in the EIAr and specialist studies are carried through to the site-specific section of the Generic EMPrs. The EMPrs must also include an environmental sensitivity map indicating environmental sensitive areas and features identified during the assessment process, overlaid with the development footprint site map.	The recommendations recorded in the EIR (Section 7) have been incorporated into the EMPR as well as the Generic EMPr's for powerline and substations as attached in Appendix I.

(iii) Please also include in the EMPr, the recommended frequency for the auditing of compliance with the conditions of the EA and EMPr for the construction, post-construction monitoring, and operational (where relevant) phases of the activity, and for the submission of such compliance reports to the competent authority.	The recommended frequency for auditing is included in section 15.2 of the EMPr as attached in Appendix I. In addition to the internal environmental audit (which takes place as part of the monthly environmental control report), the following external audits are required to be undertaken: - Annually during the construction phase. - Within 1 month of completion of construction activities. - Within 1 year of commencement of operations. - Every 3 years thereafter.
(iv) The facility EMPr must include measures to protect hydrological features such as streams, rivers, pans, wetlands, dams and their catchments, and other environmental sensitive areas from construction impacts including the direct or indirect spillage of pollutants	Such measures are included in the EMPr in Appendix I
(v) You must ensure that the facility EMPr complies with Appendix 4 of the EIA Regulations, 2014, as amended.	A table indicating compliance with Appendix 4 of the EIA regulations is included in the EMPr in Appendix I.

Revision 2 – ENVIRONMENTAL MANAGEMENT PROGRAMME – BETHEL SOLAR PV

in terms of the

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

Bethel Solar PV

Farm 431 and the Remainder of Farm 466 located South of Louis Trichardt in the Makhado Local Municipality, Vhembe District, Limpopo Province.

Submitted for:

Departmental Review

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ORDER OF REPORT

Environmental Management Programme Revision 2 – Main Report

Appendix A	:	Site Layout Plan – Bethel Solar PV
Appendix B	:	DFFE Generic EMPr for sub-station infrastructure (DFFE, 2019)
Appendix C	:	DFFE Generic EMPr for powerline infrastructure (DFFE, 2019)
Appendix D	:	Environmental Authorisation and Amendment (to be appended once granted)
Appendix E	:	BESS Risk Assessment
Appendix D	:	EAP Declaration and CV
Appendix E	:	Construction Method Statements (to be appended once approved by the ECO)
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MAIN REPORT - EMPR BETHEL SOLAR PV

1. INTRODUCTION

Cape EAPrac has been appointed by the Applicant, Bethel Solar PV (Pty) Ltd, as the independent **Environmental Assessment Practitioner** (EAP) responsible for compilation of the **Environmental Management Programme** (EMPr) for the proposed Bethel Solar PV, which forms part of the greater Tabor PV Cluster.

The key purpose of this EMPr is to ensure that the remedial and mitigation requirements identified during the Environmental Assessment and decision making processes are implemented during the lifespan of the project (design to decommissioning). The EMPr is thus a management tool used to minimise and mitigate the potential environmental impacts, while maximising the benefits.

A detailed description of the proposed project and a description of the affected environment are provided in the Environmental Impact Report (Cape EAPrac, 2025) which should be referred to where necessary.

It is important that this EMPr be read in conjunction with the DFFE Generic EMPr for substation infrastructure attached in Appendix B.

Approach to the EMPr

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

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

1.1.1 Pre-construction Phase

The pre-construction phase of the development refers to the final layout design considerations and the site preparation (fine-scale design and placement, survey of development site and associated infrastructure, demarcation of no-go areas, establishment of site camp and laydown area, vegetation clearing for establishment of internal road network[2]).

1.1.2 Construction Phase

The construction phase of the development refers to the earthworks and the actual construction of the civil works (installation of the PV panel arrays, construction of internal roads, stormwater structures and auxiliary buildings and on-site substation), as well as the external infrastructure such as MV power lines, access roads and gate house. The construction phase will start with the perimeter fencing of the facility and will end with final landscaping and re-vegetation / rehabilitation of the site and surrounding areas.

1.1.3 Operation Phase

The operational phase commences once the facility starts providing power into the national grid (i.e., at Contractual Operation Date). There may be a stage where both construction and operation activities overlap i.e., occur on site at the same time. The operation phase included the monitoring and maintenance activities required for the efficient functioning of the facility (e.g., cleaning and repair of solar arrays, brush-cutting of vegetation etc.), as well as health and integrity of the surrounding environment (e.g., removal alien vegetation, management of erosion etc.).

- [2] The clearing of vegetation for the internal road network will likely commence during the pre-construction phase, but is considered to be a construction phase activity.

1.1.4 Closure and Decommissioning Phase

Closure and decommissioning refers to the decommissioning of the panel arrays at the end of their operational lifespan or at the end of the term of the Power Purchase Agreement (PPA). For the purpose of this report, two possible scenarios are considered, namely:

- The re-use, repair &/ upgrade of the facility for alternative power generation;
- The total decommissioning of the solar facility.

1.2 PURPOSE

This EMPr is relevant to the Bethel Solar PV renewable energy project, and all listed and specified activities necessary for the realisation of this project.

1.3 OBJECTIVE

The objective of this EMPr is to prescribe project specific and generally accepted impact management outcomes and impact management actions associated with the development of the Bethel Solar PV project and associated infrastructure.

To ensure compliance with the general duty of care and recommendations of participating specialists, the following overarching outcomes are applicable:

- To ensure the least possible damage to:
    - Existing infrastructure on and adjacent to the site;
    - Indigenous flora and fauna (biophysical environment); and
    - Water quality of surface and groundwater surrounding the site. Particularly the water quality exiting the site.
- To ensure that construction and development are undertaken with due consideration to all environmental factors; and
- Where such damage occurs, provision is made for re-instatement and rehabilitation.

1.4 SCOPE

The scope of this EMPr applies to all construction, operation and decommissioning requirements for the Bethel Solar PV project. This EMPr applies to all listed and specified activities authorised in the EA and amendments thereto that are necessary for the realisation of this project (once authorised, this EA must be appended to this EMPr).

1.5 EMPR APPROVAL AND REVISIONS

This EMPr, once approved, is a legally binding document and contravention with this document constitutes a contravention with the Environmental Authorisation.

The supplementary plans annexed to this EMPr must be read in conjunction with this EMPr.

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

- Changes in environmental legislation;
- Results of post-construction monitoring and audit;
- Per instruction from the competent authority; and
- Changes in technology and best practice principles.

It must be noted that any amendments to the EMPr actions that do not change the impact management outcomes or objectives may be immediately affected by the holder of the EA and submitted in the next environmental audit report submitted in terms of the regulations. Any amendments to the impact management outcomes need to be formally approved by the competent authority before they can be effected.

1.6 CONTRACTUAL OBLIGATIONS

This EMPr must be included in ALL tender and contract documentation for all phases of the Development. It must be noted that this EMPr is relevant and binding not only on the activities associated with the construction of the PV project, but also for all associated infrastructure authorised as part of the EA and any amendments thereto (A copy of the EA must be attached in **Appendix C** – Any amendments to the EA that occur during the lifecycle of the project must be added to Appendix C.).

1.7 ORGANISATIONAL STRUCTURE AND RESPONSIBILITIES.

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

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

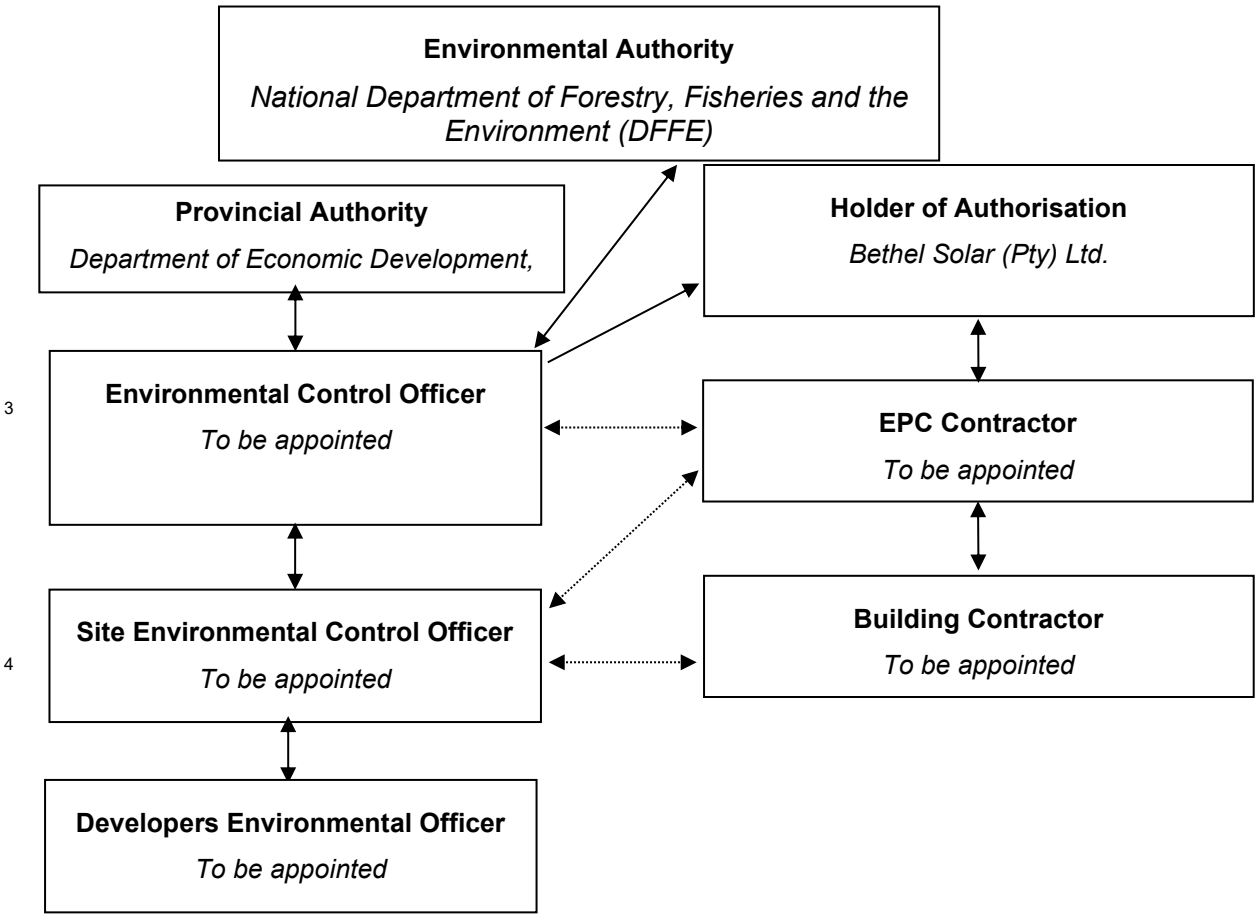

Figure 1: EMPr organisational structure during the construction phase

- [3] This refers to the Principle Environmental Control Officer
- [4] This refers to the Site Environmental Control Officer sometimes referred to as the Environmental Site Agent

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

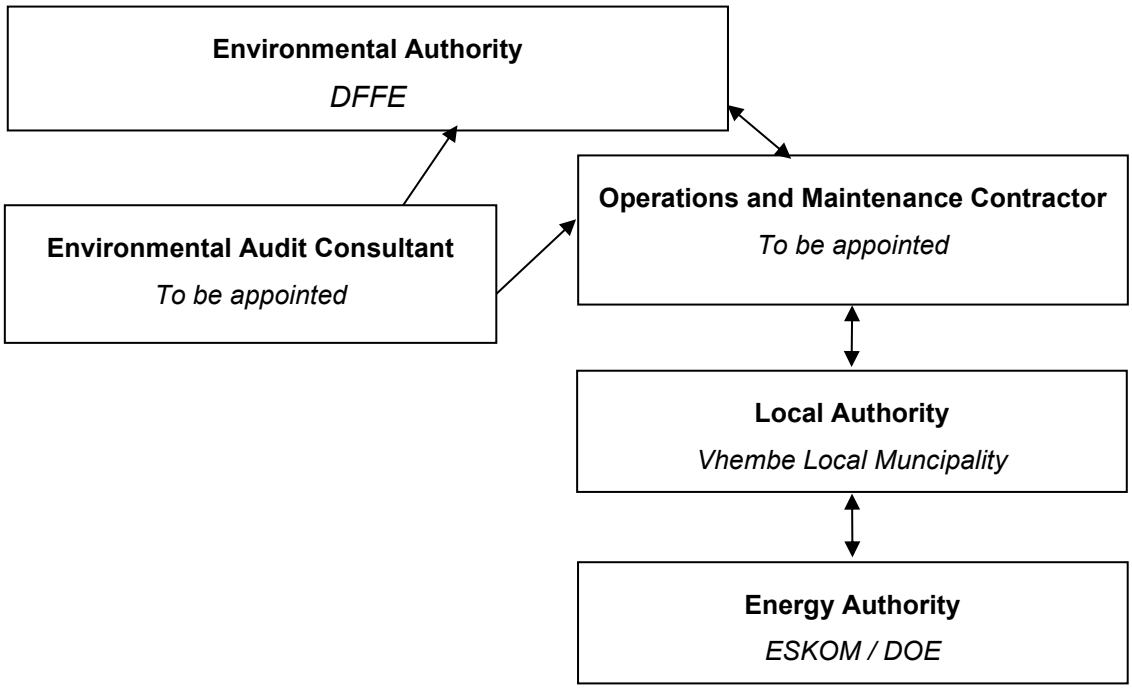

Figure 2: EMPr organisational structure during the operation phase.

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

The effective implementation of this EMPr is dependent on established and clear roles, responsibilities and reporting lines. This table below gives guidance to the various environmental roles and reporting lines,

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

Responsible Person(s)	Role and Responsibilities
Holder of the EA[5]	Role The holder of the EA is ultimately accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority. 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 EA. The holder of the EA is further responsible for providing and giving mandate to enable the ECO to perform responsibilities and 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 EPC; - Issuing of site instructions to the EPC 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 audits are undertaken on the project implementation.

- [5] In some cases the Holder of the EA and the EPC contractor may be the same entity, in which case this party will be responsible for the requirements outlined on both roles.

Responsible Person(s)	Role and Responsibilities
Principle Environmental Control Officer (ECO)	<u>Role</u> The Holder of the EA (SPV) must appoint an ECO. The ECO must be independent of the holder of the EA and the EPC and 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 monthly 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 prepare internal compliance audits (in the form of the monthly control report), verifying the weekly environmental checklists submitted by the Site ECO. The ECO provides feedback to the Holder of the EA and the competent authority regarding all environmental matters. The EPC and the holder of the EA are answerable to the Environmental Control Officer for non-compliance with the specifications as set out in the EA and EMPr. The ECO provides feedback to the holder of the EA, who in turn reports back to the EPC, as required. Issues of non-compliance raised by the ECO must be taken up by the holder of the EA and resolved with the Contractor as per the conditions of their 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 EMPr specification) must be endorsed by the Holder of the EA. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA conditions related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Manage and review all reporting undertaken by the Site ECO. - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular (at least monthly) and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Compilation and administration of Environmental control reports 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 holder of the EA 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 Holder of the EA, EPC contractor, authorities and other lead stakeholders on all environmental concerns; - Compile a monthly environmental control report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the weekly environmental checklists, which are to be prepared by the site ECO; - Checking the Site ECO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the EPC's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - In case of non-compliances, the ECO must first communicate this to the Senior Site personal, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders

Responsible Person(s)	Role and Responsibilities
	- Review and approval contractors method statements. Furthermore, in terms of condition 24. 1. The ECO must be appointed before commencement of any authorised activities. 2. Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the Department. 3. The ECO must keep record of all activities on site, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO. 4. The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.
Site Environmental Control Officer[6]	Role The Holder of the EA or the EPC must appoint an independent Site ECO in terms of this EMPr. The Site ECO must be independent of the holder of the EA and the EPC, report directly to the ECO and have appropriate training and experience in the implementation of environmental management specifications. The primary role of the Site ECO is to act as a full-time independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the Site ECO is to conduct daily site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The Site ECO is also required to undertake internal compliance audits (in the form of the weekly environmental checklist) and submit these to the ECO and the EPC contractor. The site ECO provides feedback to the ECO, who in turn communicates with the holder of the EA and the competent authority regarding all environmental matters. 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 EMPr specification) must be endorsed by the Holder of the EA. Responsibilities The responsibilities of the Site ECO will include the following: - Daily environmental monitoring - Be aware of the findings and conclusions of all EA conditions related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Report to the ECO. - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Compilation and administration of weekly environmental checklists 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; - Environmental induction of all staff entering the site to perform duties; - Maintaining a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Assisting in the resolution of conflicts; - Reporting non-compliances to the ECO; - Facilitate environmental training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the EPC contractor;
Developer / Contractor Environmental Officer (dEO)	Role The dEO is an in-house person working directly for the contractor / subcontractor. The dEOs will report to the Project Manager and are responsible for the day-to-day implementation of the EMPr, environmental monitoring and reporting, providing

- [6] To ensure consistency and integration between the roles of Principal Environmental Control Officer and Site Environmental Control Officer – these two parties should be employed by the same environmental consultancy.

Responsible Person(s)	Role and Responsibilities
	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 EA; - 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 Site ECO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as EPC Environmental Representative on site and work together with the ECO and site ECO;
EPC Contractor **NB:** All references to the EPC contractor will include all sub-contractors responsible for any tasks in respect of the development. All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.	Role The Contractor or any relevant subcontractor 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 of this facility. Responsibilities - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented, and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.

1.8 PROPOSED ACTIVITY

The Environmental Impact Report for the proposed Bethel Solar PV facility assessed the following activities / components associated with the project[7]:

- [7] This EMPr is applicable to all activities as described, and assessed Environmental Impact Report for the Bethel Solar PV and BESS.

The proposed PV Project will include the following components:

- Solar Field
    - Solar Arrays: PV modules
    - Single axis tracking technology maximum height of 5m (aligned north-south);
    - Solar module mounting structures comprised of galvanised steel and aluminium;
    - Foundations which will likely be drilled and concreted into the ground; and
    - Solar measurement and weather stations.
    - Central/string Inverters and MV transformers in in field
    - DC coupled Battery Energy Storage system (BESS) containers distributed through PV field located adjacent to inverters
        - Lithium Ion battery Cells, Modules, Racks and containers
        - Power Conversion Equipment
        - Battery Management System
        - Energy Management System
- Associated Infrastructure
    - Medium Voltage (MV =22/33 kV) overhead powerlines and underground cables;
    - MV Collector stations
    - Access road;
    - Internal gravel roads;
    - Fencing;
    - General maintenance area;
    - Storm water channels and berms;
    - Water storage tanks and pipelines;
    - Temporary work area during the construction phase (i.e. laydown area).
    - O&M buildings, store
- Project IPP Substation;
    - 132kV substation 200m x 200m
    - HV transformer
    - Substation Control Building
    - HV metering, Scada and protection building
    - MV collector switchgear buildings
    - Compensation equipment (Filters capacitors reactors statcoms)
- AC coupled BESS installation (400m x 400m) at project substation and laydown area:
    - Solid Sate Battery technology - either Lithium-Ion or Sodium Sulphide (NaS)
        - Battery Cells, Modules, Racks and containers
        - Power Conversion Equipment
        - Battery Management System
        - Energy Management System
        - MV transformers
        - MV cabling and collector stations
        - Fencing
        - Offices, workshop
        - Fire Protection systems

This environmental application process includes Electrical Grid Connection Infrastructure required to connect the Facility Substation to the National Grid via the existing Tabor Main Transmission Substation (MTS). This Electrical Grid Infrastructure includes:

- Onsite Switching Station (SS), adjacent to the IPP Substation.
- 132kV Overhead Power Line (OHPL) – 30m height from the switching station to the existing Eskom Tabor Substation.
- Access Road to Switching Station
- Maintenance access road below or adjacent to the power line.

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It is envisioned that all required services (water, sewerage and waste) will be provided by the local municipality.

The main physical activities (i.e., those activities that need to be managed from an environmental perspective) that will form part of the construction phase are:

- Removal of vegetation for the proposed infrastructure;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Stockpiling of topsoil and cleared vegetation;
- Transportation of material and equipment to site, and personnel to and from site;
- Construction of the solar field, overhead and underground power line and additional infrastructure; and
- Rehabilitation of Disturbed areas.

The following main activities will occur during the operational phase:

- Generation of electricity to add to the national grid;
- Maintenance of the solar facility, including washing of panels;
- Management of the vegetation within the PV development; and
- Maintenance of the distribution line.

In the event of decommissioning, the main aim would be to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e., if the actual SEF becomes outdated or the land needs to be used for other purposes), the decommissioning procedures will be undertaken in line with the EMPr and any legislation or guidelines relevant at the time and the site will be rehabilitated and returned to its pre-construction state. Possible decommissioning activities will include removing the infrastructure, and mechanisms to promote the re-growth of natural vegetation.

2. DOCUMENT CONTROL, REPORTING AND COMPLIANCE

To ensure accountability and effective implementation of the EMPr, a number of reporting systems[8], documentation controls and compliance mechanisms must be in place for all project infrastructure as a minimum requirement.

2.1 DOCUMENT CONTROL AND FILING

The holder of the EA is solely responsible for the upkeep and management of the official EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained by the ECO. The EMPr file must be on site and available at all times on request by the Competent Authority or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

2.2 DOCUMENTATION TO BE AVAILABLE

At the commencement of the project the following preliminary list of documents shall be placed in the EMPr file and be accessible at all times:

- Full copy of the signed EA from the Competent Authority in terms of NEMA, granting approval for the development;

- [8] These reporting systems are adapted from the various generic EMPrs gazetted by the Department of Forestry, Fisheries and the Environment.

- Any Amendments of the EA from the competent Authority;
- Copy of the EMPr as well as any amendments thereof;
- All method statements prepared by the EPC and submitted to the ECO for approval;
- All weekly checklists prepared by the Site ECO;
- All monthly ECO reports prepared by the ECO;
- Minutes and attendance register of environmental site meetings;
- Attendance registers of all environmental inductions;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record; and
- Complaints register.

In compliance with condition 30 of the EA, all the records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of the development.

2.3 WEEKLY ENVIRONMENTAL CHECKLIST

The Site ECO is required to complete a Weekly Environmental Checklist, the format of which will be determined by the ECO, with input from the EPC and the holder of the EA.

The Site ECO is required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the EPC and the ECO on a weekly basis. The EPC must utilise the weekly checklists to initiate any corrective actions detailed therein.

2.4 MONTHLY ENVIRONMENTAL CONTROL REPORT

The ECO is responsible for compilation of the monthly ECO Report. The weekly checklists above will form the basis for the Monthly Environmental Control Reports and must be supplemented by the outcomes of the ECO inspection. The monthly Environmental Control Reports must be submitted to the following parties:

- The Competent Authority – Director Compliance Monitoring;
- The Provincial Environmental Authority;
- Cape Nature;
- The DFFE' sub-directorate, Forestry;
- The SPV;
- The EPC; and
- All attendees of Environmental Site Meetings.

Copies of all completed Environmental Control reports must be attached as Annexures to the Environmental Audit Report.

2.5 ENVIRONMENTAL SITE MEETINGS[9]

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

- [9] The Environmental Site Meeting must form part of the project team meetings that take place on site.

2.6 METHOD STATEMENTS

The method statements will be done in such detail that the ECO is able to assess whether the contractor's proposal is in accordance with the EMPr. Commencement of any specific activity may not commence until such time as the method statement for that activity is approved by both the ECO and the project manager.

The method statement must cover applicable details with regard to:

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

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

- Site establishment – Site Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Workshop or plant emergency maintenance;
- Drilling and Piling operations
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected species relocation, site clearing, alien vegetation;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management; and
- Heritage, Archaeology and Palaeontology management.

It is the prerogative of the ECO to request additional method statements for any other aspect of the proposed development.

The Site ECO and ECO shall monitor and ensure that the contractors perform in accordance with these method statements. A copy of all method statements must be kept on the EMPr file and appended to the Monthly ECO report on the month following their approval.

2.7 ENVIRONMENTAL INCIDENT LOG

The Site ECO is required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance events.

An environmental incident is defined as:

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

The Site ECO must record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the SPV. The Log is to be kept in the EMPr file (and appended to the monthly environmental control reports) and at a minimum the following will be recorded for each environmental incident:

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

2.8 NON-COMPLIANCE

In response to a significant incident, re-occurring incidents or unattended incidents, a non-compliance notice will be issued to the responsible contractor by the ECO via the SPV or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.

The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO should be made aware of any complaints. Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported by the ECO to the Competent Authority for them to deal with the transgression, as it deems fit, including the issue of penalties as detailed in section 21 of this EMPr. The contractor is deemed not to have complied with the EMPr if, inter alia, there is a deviation from the environmental conditions, impact management outcomes and impact management actions as approved in the EMPr.

2.9 CORRECTIVE ACTION RECORDS

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the Site ECO or ECO, the contractor's environmental officer will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the

corrective action the contractor / contractors Environmental Officer is to issue a Corrective Action Report in writing to the ECO.

If satisfied that the corrective action has been completed, the ECO are to sign-off on the Corrective Action Report and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has been signed off by the ECO.

2.10 PHOTOGRAPHIC RECORD

A digital photographic record will be kept by the Site ECO. The photographic record will be used to show before, during and post rehabilitation evidence of the site as well as in cases of damages claims if they arise. Each image must be dated, include a co-ordinate and a brief description note attached. The Site ECO's photographic record must form part of the weekly Environmental Checklists.

The EPC shall:

- Allow the Site ECO and ECO access to take photographs of all areas, activities and actions.

The Site ECO and ECO shall keep an electronic database of photographic records which will include:

- Pictures of all areas designated as work areas, site camp, development sites and storage areas taken before these areas are set up;
- All bunding and fencing;
- Road conditions and road verges;
- Condition of all farm fences;
- Topsoil storage areas;
- All areas to be cordoned off during construction;
- Waste management sites;
- Ablution facilities (inside and out);
- All completed corrective actions for non-compliances;
- All required signage;
- Photographic recordings of incidents; and
- All areas before, during and post rehabilitation;

2.11 COMPLAINTS REGISTER

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

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

2.12 CLAIMS FOR DAMAGES

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

- Record the full detail of the complaint as described in above;
- The EPC will evaluate the claim and associated damage and submit the evaluation to SPV for approval;
- Following consideration by the SPV, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant.

2.13 INTERACTIONS WITH AFFECTED PARTIES

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

The ECO shall:

- Ensure that all queries, complaints and claims are dealt within an agreed timeframe[10];
- Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
- Ensure that telephone numbers to register complaints are made available to all landowners and affected parties; and
- Ensure that contact with affected parties is courteous at all times.

2.14 ENVIRONMENTAL AUDITS

Internal environmental audits of the activity and implementation of the EMPr must be undertaken in the form of the monthly environmental control reports. The findings and outcomes must be included in the EMPr file and submitted to the competent authority on a monthly basis.

At a minimum the monthly environmental control report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- Results of Dust Fall out Monitoring;
- General environmental findings and actions; and
- Minutes of the Environmental Site Meetings[11].

In addition to the internal environmental audit (which takes place as part of the monthly environmental control report), an external audit must be undertaken:

- Annually during the construction phase.
- Within 1 month of completion of construction activities.
- Within 1 year of commencement of operations.
- Every 3 years thereafter.

These external audits cannot be undertaken by the ECO and must be undertaken by an external audit consultant in compliance with Appendix 7 of the 2014 EIA regulations.

- [10] This relates to complaints and claims of an environmental nature only and does not pertain to complaints and claims of any other nature.
- [11] Or minutes of general site meetings, should environmental actions form part of the site meetings.

3. LEGISLATIVE AND POLICY FRAMEWORK

In terms of legislative provisions, this EMPr must satisfy:

- Section 24N of the NEMA, as amended;
- Appendix 4 of the NEMA EIA Regulations published in Government Notice No. R 326 of 7 April 2017. These regulations regulate and prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the authorities; and
- Gazetted generic EMPrs for the substation infrastructure.

Table 2: Compliance with Section 24N of NEMA

Requirements of Section 24N of NEMA	Reference in this EMPr?
2. The environmental management programme must contain- information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of: - planning and design; - pre-construction and construction activities; - the operation or undertaking of the activity in question; - the rehabilitation of the environment; and - closure, if applicable;	Section 5,6 & 14 of this EMPr
Details of the person who prepared the environmental management programme; and the expertise of that person to prepare an environmental management programme;	Please refer to the summary page at the beginning of this report for these details.
A detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1.8
Information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Section 5,6 and 14 of the EMPr detail the monitoring responsibility.
Information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	Section 5, 6, 14 and 16
As far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and	Section 8
A description of the manner in which it intends to- - modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; - remedy the cause of pollution or degradation and migration of pollutants; and - comply with any prescribed environmental management standards or practices.	Section 1.2 to 1.4
3. The environmental management programme must, where appropriate- - set out time periods within which the measures contemplated in the environmental management programme must be implemented; - contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; and - develop an environmental awareness plan describing the manner in which- - the applicant intends to inform his or her employees of any environmental risk which may result from their work; and - risks must be dealt with in order to avoid pollution or the degradation of the environment.	Sections 3 – 14 all contain the timeframes for the associated measures.
5. The Minister, the Minister responsible for mineral resources or an MEC may call for additional information and may direct that the environmental management	Not applicable at this stage.

Requirements of Section 24N of NEMA	Reference in this EMPr?
programme in question must be adjusted in such a way as the Minister, the Minister responsible for mineral resources or the MEC may require.	
6. The Minister, the Minister responsible for mineral resources or an MEC may at any time after he or she has approved an application for an environmental authorisation approve an amended environmental management programme.	Not applicable at this stage.
7. The holder and any person issued with an environmental authorisation- - must at all times give effect to the general objectives of integrated environmental management laid down in section 23; - must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment; - must manage all environmental impacts - in accordance with his or her approved environmental management programme, where appropriate; and - as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise; - must monitor and audit compliance with the requirements of the environmental management programme; - must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and - is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates.	Throughout the EMPr
8. Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation or pollution.	Section 1.7 details the responsibility of the Project Applicant.

Table 3: Compliance with Appendix 4 of the 2014 NEMA EIA Regulations (as amended on 7 April 2017)

Requirement	Description
Details of the EAP who prepared the EMPr; and; The expertise of the EAP to prepare an EMPr, including a curriculum vitae.	This EMPr was prepared by Dale Holder of Cape EAPrac who has more than 20 years' experience as an Environmental Assessment Practitioner. The CV of the EAP is attached in appendix D.
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	This EMP covers all aspects of the project as currently proposed for Bethel Solar PV. • PV Arrays and Mounting Structures; • inverter stations; • on-site substation; • grid connection[12] • auxiliary buildings, • laydown area; • internal electrical reticulation network (underground cabling); • internal road / track network;

- [12] Grid connection components are addressed in a separate EMPr. This EMPr only includes the on site substation component of the grid connection.

Requirement	Description
	• access road; • electrified perimeter fencing. • Battery Energy Storage System
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	The Site Development Plan attached in Appendix A, includes the sensitive features identified by participating specialists and indicates how these have been incorporated. The "exclusion areas" identified on this SDP as well as all areas outside of the perimeter fencing of the facility are considered as no go areas for construction activities.
A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all the phases of the development including – (vi) Planning and design; (vii) Pre-construction activities; (viii) Construction activities; (ix) Rehabilitation of the environment after construction and where applicable post closure; and (x) Where relevant, operation activities.	Sections 1.3
A description and identification of impact management outcomes required for the aspects contemplated above.	Sections 4 -11
A description of the proposed impact management actions, identifying the way the impact management objectives and outcomes contemplated above will be achieved and must, where applicable include actions to – (v) Avoid, modify, remedy control or stop any action, activity or process which causes pollution or environmental degradation; (vi) Comply with any prescribed environmental management standards or practises; (vii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (viii) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Sections 4 - 11
The method of monitoring the implantation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
The frequency of monitoring the implementation of the impact management actions contemplated above.	Sections 4 – 11 and section 14
An indication of the persons who will be responsible for the implementation of the impact management actions.	Sections 4 – 11
The time periods within which the impact management actions must be implemented.	Sections 4 – 11 and section 14
The mechanism for monitoring compliance with the impact management actions.	Section 2 and 4-11

Requirement	Description
A program for reporting on compliance, considering the requirements as prescribed in the Regulations.	Section 2
An environmental awareness plan describing the way – (iii) The applicant intends to inform his or her employees of any environmental risk which may result from their work; and (iv) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Section 5.2
Any specific information that may be required by the competent authority.	None.

Other than the Section 24N and Appendix 4 requirements detailed in the table above, the applicable legislation remains the same as what was considered in the Environmental Impact Report for Bethel Solar PV and as such, it is not re-described in this EMPr.

The table below lists the legislation that was considered in the preceding environmental assessment process, and which has been considered in the compilation of this EMPr.

Table 4: Legislation applicable to Bethel Solar PV.

Legislation
NATIONAL LEGISLATION
The Constitution of the Republic of South Africa
National Environmental Management Act (NEMA)
National Environmental Management: Biodiversity (Act 10 of 2004)
Conservation of Agricultural Resources Act – CARA (Act 43 of 1983)
The Subdivision of Agricultural Land, Act 70 Of 1970
National Water Act, No 36 of 1998
National Forests Act (No. 84 of 1998)
National Heritage Resources Act, 25 of 1998
National Energy Act (No. 34 of 2008)
PROVINCIAL LEGISLATION
Astronomy Geographic Advantage Act, 2007 (Act No 21 Of 2007)
Limpopo Green Economy Strategy (2014)
Limpopo Investment Prospectus (2019)
Regional and Municipal Legislation
Vhembe Local Municipality Integrated Development Plan (2024-2025)
GUIDELINES, POLICIES AND AUTHORITATIVE REPORTS
National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)
White Paper on the Renewable Energy Policy of the Republic of South Africa (2003)
Limpopo Province Biodiversity Plan (2016)
White Paper on the Energy Policy of the Republic of South Africa (1998)
Integrated Resource Plan for Electricity (2010-2030)
Integrated Energy Plan, 2016
National Development Plan 2030 (2012)
The New Growth Path Framework
National Infrastructure Plan
Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa
Conservation of Migratory Species of Wild Animals
The Agreement on the Convention of African-Eurasian Migratory Water Birds
Guidelines to minimise the impacts on birds of Solar Facilities and Associated Infrastructure in South Africa
Environmental Impact Assessment Guideline for Renewable Energy Projects
Sustainability Imperative

Legislation
National Freshwater Ecosystem Priority Area Status
DFFE Screening Tool and Protocols

4. PRE-CONSTRUCTION PHASE– IMPACT MANAGEMENT OUTCOMES & ACTIONS

This section provides details on the pre-construction phase impact management outcomes and actions[13] that are commonly applicable to the development of a PV Energy Facility and its associated infrastructure as well as management actions outlined by participating specialists, preceding environmental process and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of a PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

4.1 PRE-CONSTRUCTION EA CONDITIONS.

Once the EA for the PV facility is granted, any pre construction EA conditions as well as the EMPr actions necessary to achieve these conditions needs to be reflected in this section of the EMPr.

4.2 APPOINTMENT OF PRINCIPAL ECO AND SITE ECO

The holder of the EA must appoint an independent Environmental Control Officer (ECO) for the construction phase of the Development.

Impact management outcome: Independent party to ensure that the mitigation/rehabilitation. measures and recommendations referred to in the EA are implemented and to ensure compliance with the provisions of the approved EMPr						
Impact Management Actions	**Responsible person**	**Method of implementation**	**Timeframe for implementation**	**Responsible party for monitoring**	**Frequency of monitoring**	**Evidence of compliance**
• The ECO must be appointed prior to the commencement of any physical activities. • The ECO will be responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of this EMPr and the conditions of the EA. • The appointed ECO must be independent of the EPC contractor and must be suitably qualified and have experience of environmental monitoring and control on similar scale projects.	Holder of the EA	The holder of the EA to appoint independent ECO and ensure that ECO is suitably qualified and experienced.	ECO to be appointed prior to construction	ECO will undertake physical monitoring.	Monthly	The name and contact details of the appointed ECO to be submitted to the Director: Compliance Monitoring at

[13] All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.

• The main responsibilities of the ECO include but are not limited to the following: - Facilitate the pre-construction environmental compliance workshop; - Management of the Site ECO; - Be fully knowledgeable of all the licences and permits issued to the site - Review, maintenance and update of the EMPr; - Liaison between the Project Proponent, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMPr; - Compilation of monthly Environmental Control Report/s (ECR) to ensure compliance with the EMPr and authorisations. Reports should be submitted to the relevant authority on a monthly basis; - Monitor compliance with this EMPr; - Monitor compliance with the EA; - Monitor implementation of the mitigation and rehabilitation measures and recommendations referred to in the EA, preceding environmental assessment, participating specialists and this EMPr. - Recommend the issuing site instructions to the EPC contractor for corrective actions required; - ECO site inspections should be undertaken at least once a month to ensure compliance with the EMPr. The duration of these visits may be increased or decreased at the discretion of the ECO in consultation with the holder of the EA. The Environmental Site Agent as described below should be on site daily and be in communication with the ECO on a daily basis; - Attendance of regular contractors site meetings; - Maintain a record of environmental incidents (e.g., spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. - Maintain a public complaints register in which all complaints and action taken / responses must be recorded. - Keep Record of all activities on site, problems identified, transgressions noted, and a task schedule of tasks undertaken by the ECO; and • The holder of the EA, on advice from the ECO, has the authority to stop work on site if he / she consider that any actions of excessive non-compliance of the EMPr, authorisations or General Duty of Care are taking place. • The ECO must remain employed until all rehabilitation measures are completed.						DFFE in terms of condition 24.2 of the EA. ECO to submit monthly Environmental Control Report to the Director: Compliance Monitoring at DFFE.

In addition to the principal ECO, this EMPr requires the appointment of a full time independent Site ECO for the duration of the construction period of the project (this Site ECO must be appointed in the pre-construction phase, prior to the commencement of construction activities).

Impact management outcome: To ensure independent full time environmental expertise on site to monitor and report on compliance

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The Site ECO must be appointed prior to the commencement of any physical activities. • The Site ECO will be responsible for daily monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of this EMPr and the conditions of the EA. • The appointed Site ECO must be independent of the EPC contractor and must be suitably qualified and have experience of environmental monitoring and control. • The main responsibilities of the Site ECO include but are not limited to the following: - To ensure compliance with the EMPr and EA; - The Site ECO is required to be on site daily, which may be reviewed by the ECO and holder of the EA as construction requirements dictate; - Undertaking environmental induction of all staff; - Attending all on site construction meetings (including, but not limited to, technical and progress meetings); - Providing the ECO with a weekly environmental checklist; - Developing and maintaining a detailed photographic site record throughout the construction phase of the project; - Maintaining file records of all method statements provided by the contractors; - Management and ensuring timeous and effective rehabilitation of the site; - Maintain a record of environmental incidents (e.g., spills, impacts, legal transgressions etc.) as well as corrective and preventative measures taken. This information must also be included in the weekly reports; - Maintain a public complaints register in which all complaints and action taken / responses must be recorded. - In the event that the Site ECO observes non-compliance that requires a "stop work" order, the ECO must immediately be informed and will request the holder of the EA to issue such an order if necessary. • The Site ECO must remain employed until all rehabilitation measures are completed.	EPC Contractor	The EPC contractor to appoint independent Site ECO and ensure that the Site ECO is suitably qualified and experienced.	The Site ECO to be appointed prior to construction	The Site ECO will undertake physical monitoring.	The Site ECO to monitor site daily and provide a formal report back weekly.	The name and contact details of the appointed Site ECO to be submitted to the Director: Compliance Monitoring at DFFE in terms of condition 24.2 of the EA. Weekly Environmental Checklists to be provided to the EPC and the ECO.

The ECO (i.e. the Principal ECO) must have a minimum of a tertiary level qualification in the natural sciences field, as well as at least 8 years' experience and proven competency as an ECO, with extensive experience on similar scale Developments.

The Site ECO (i.e. the Site ECO) must have a minimum of a tertiary level qualification, as well as at least 1 years' experience on similar scale developments and proven competency as an ECO.

4.3 PRE-CONSTRUCTION ENVIRONMENTAL COMPLIANCE WORKSHOP

It is a required action that a pre-construction environmental compliance workshop be undertaken before any construction commences on site.

Impact management outcome: To ensure that all senior contract staff members have an in-depth knowledge of the environmental requirements for the site in terms of the EA and EMPr.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• It is a required action that a pre-construction environmental compliance workshop be undertaken before any construction commences on site. This workshop can be combined with a site handover meeting but must take place before any activities take place on site and before any plant is moved onto site. • The purpose of this workshop is to ensure that all relevant senior personnel are familiar with the provisions of the EMPr, as well as the conditions of the EA. • The following people must be present at this Environmental Compliance Workshop: - The holder of the EA; - The ECO; - The EPC Contractor (including contract manager, site agent and foreman); - The sub-EPC contractor if appointed - The Electrical Contractor (including contract manager, site agent and foreman); - The Consulting Engineers (electrical, civil and structural, whichever applicable); and - Project and Asset Management. • Provision should be made in contract and tender documentation to attend a 6-hour workshop that will be chaired by the ECO.	Holder of the EA	The holder of the EA must arrange the invites to the workshop. ECO to present the workshop	Prior to commencement of construction.	ECO	Once off.	ECO to issue minutes of the workshop, to be included in first monthly environmental control report.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Due to covid regulations and concerns, this workshop may take place on a virtual platform.						

4.4 PRE-CONSTRUCTION ECOLOGICAL REQUIREMENTS

No clearing of vegetation may take place until such time as all required permits in terms of both the provincial and national legislation are in place. Once these relevant permits are obtained, copies thereof must be submitted to the Director: Compliance Monitoring at DFFE.

The EPC will be responsible for complying with any conditions contained in these permits, and a method statement must be provided to the ECO for approval.

A single integrated permit, which covers nationally or provincially listed plant species permitting requirements, as well as meets TOPS regulations, must be obtained from the provincial conservation authority. A licence for the removal of species protected in terms of the National Forest Act may also be required.

The ECO and Site ECO should be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing.

4.5 WATER CONSERVATION.

It is important that the proposed water conservation infrastructure for both the construction as well as operational phases is considered at the pre-construction phase prior to any procurement taking place.

Impact management outcome: To ensure design criteria promotes sustainable resource use.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
All buildings should be fitted with rainwater collection and storage systems to supply water to the taps and toilets in these buildings, as well as any outdoor requirements (landscaping, washing etc). All toilets (excluding temporary toilets) should be fitted with dual flush systems[14]. All taps to be installed in the control / substation / workshop buildings must be fitted with low-flow faucets.[15]. The design of any temporary water reservoirs for construction water should have the smallest practically possible surface area to reduce evaporation. Under no circumstances will the discharge of treated water, wastewater or effluent be allowed.	Holder of the EA	The design engineers must consider all relevant resource conservation measures in the design phase of the development	Prior to commencement of construction.	ECO / Site ECO	During and on completion of all associated building infrastructure on site.	Monthly ECO Report.

4.6 AVIFAUNAL MANAGEMENT

As required in the Avifaunal Impact Assessment, the following environmental impact management outcomes and actions must be implemented by the EPC.

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Habitats				
The Very High sensitivity area is a No-Go area and must be avoided for development. The Verreaux Eagle nest 1 km buffer is a no go buffer year around, and the 2.5 km seasonal buffer restricts development between April and August.	Life of operation	Project Manager Environmental Officer	Very High sensitivity area	Ongoing

- [14] Conservative estimates have shown that a saving of more than 22 000 litres per household (this could apply to the workshops that are occupied by day and night staff) can be achieved annually with the installation of dual flush toilets (Aquanotion, 2008).
- [15] Low flow faucets use aerators to reduce the flow of the water. These can either be built into the faucet or added as an aftermarket product. The faucets in bathrooms should have a peak flow of less than 10 litres per minute.

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All High sensitivity areas must be avoided for development. The use of existing roads in these high sensitivity areas must be adhered to, but upgrading these roads is permissible.	Life of operation	Project Manager Environmental Officer	High sensitivity area	Ongoing
A nest walkdown must be performed prior to clearance of the site. If nests are found, necessary permits and appropriate relocation mitigations should be followed under the consultation with a qualified specialist.	Construction Phase	Environmental Officer	Development footprint	During Phase
Solar panels must be mounted on pile driven or screw foundations, such as post support spikes, rather than heavy foundations, such as trench-fill or mass concrete foundations, to reduce the negative effects on natural soil functioning, such as its filtering and buffering characteristics, while maintaining habitats for both below and above-ground biodiversity where possible.	Life of operation	Project Manager	Correct design and preservation of habitat under the panels	Life of operation
Management outcome: Avifauna				
Latest technology solar panels with an anti-reflective coating must be used. This will also improve the light transmittance and therefore increases the overall efficiency. If panels do not possess anti-reflective coatings, then non-polarising white tape can be used around and/or across panels to minimise reflection (Bennun *et al*, 2021).	Construction/Operational Phase	Project Manager Environmental Officer Design Engineer	Bird collisions, and drawing of insects in turn drawing of avifauna	Ongoing
All areas to be developed must be walked through prior to any activity to ensure no nests or avifauna species are found in the area. Should any Species of Conservation Concern be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Construction	Environmental Officer	Presence of avifauna species and nests	During Phase
All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution	Planning and Construction	Environmental Officer Contractor	Presence of electrocuted birds	During phase

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
		Engineer		
Outside lighting must be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (red/green) lights should be used.	Construction/Operational Phase	Project Manager Environmental Officer Design Engineer	Light pollution and period of light.	Ongoing
ClearVu or similar type fencing should be used, with markers placed on the fence to enhance visibility. Additionally, 30cm by 30cm openings must be incorporated at the bottom of the fence to facilitate the free movement of ground-dwelling species.	Life of Operation	Project Manager Environmental Officer Contractor Design Engineer	Presence of birds stuck /dead in fences	During phase
As far as possible power cables within the PAOI should be thoroughly insulated and preferably buried.	Construction and Operation	Project Manager Environmental Officer Design Engineer	Exposed cables	During phase
Any exposed parts must be covered (insulated) to reduce electrocution risk	Planning and construction	Environmental Officer & Contractor, Engineer	Presence of electrocuted birds	During phase
Plant indigenous large shrubs around the BESS facilities to act as natural sound barriers.	Planning and construction	Environmental Officer & Contractor, Engineer	Noise reduction	During phase
BESS must be in a non-reflective surface to ensure	Construction and Operation	Project Manager Environmental Officer Design Engineer	Reflective surfaces to reduce fire risk	During phase
All infrastructure, must be removed if the facility is decommissioned.	Closure/Rehabilitation	Project Manager Environmental Officer	Infrastructure removal	During Process
All mitigations must be reassessed on a 5 year basis to determine if they are still appropriate and should be updated accordingly.	Life of operation	Project Manager Environmental Officer	Reassessing mitigations	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Management outcome: Habitats				
The areas to be developed must be specifically demarcated to prevent movement into surrounding environments.	Life of operation	Project Manager Environmental Officer	Development footprint	Ongoing
Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, must under no circumstances be fragmented or disturbed further.	Life of operation	Project Manager Environmental Officer	Areas of indigenous vegetation	Ongoing
Indigenous vegetation to be maintained under the solar panels where possible to ensure biodiversity is maintained and to prevent soil erosion (Beatty *et al*, 2017; Sinha *et al*, 2018).	Life of operation	Project Manager	Indigenous vegetation under the solar panels.	Life of operation
Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion. This will also reduce the likelihood of encroachment by alien invasive plant species. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are indigenous to this vegetation type.	Decommissioning /Rehabilitation	Project Manager	Presence of erosion, rehabilitation of disturbed areas and preservation of topsoil	Decommissioning /Rehabilitation
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.,	Life of operation	Environmental Officer Contractor	Spill events, Vehicles dripping.	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.				
Cement must be mixed in a designated area on a liner away from water sources and buffers and that successful rehabilitation of the construction areas can take place.	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Water pollution and restricted rehabilitation	During phase
Leaking equipment and vehicles must be repaired immediately or be removed from PAOI to facilitate repair.	Life of operation	Environmental Officer Contractor	Leaks and spills	Ongoing
A fire management plan needs to be complied to restrict the impact of fire.	Life of operation	Environmental Officer Contractor	Fire Management	During Phase
Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all areas of construction. This includes wetting of exposed soft soil surfaces. No non-environmentally friendly suppressants may be used as this could result in the pollution of water sources.	Life of operation	Project Manager Contractor	Dustfall	As per dust monitoring program.
An Invasive Alien Plant Management Plan must be compiled and implemented. This should regularly be updated to reflect the annual changed in IAP composition	Contractor/ Environmental Officer	Design engineer to consider this for final layout	Alien species present	Life of operation
Only environmentally friendly substances may be used for the cleaning/washing of the panels	Operational Phase	Project Manager Environmental Officer	Water pollution	During Phase
Management outcome: Avifauna				
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40 km/h), to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited.	Life of Operation	Health and Safety Officer	Compliance to the training.	Ongoing

Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
All project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region	Construction/Operational Phase	Project Manager Environmental Officer	Noise	Ongoing
All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species, and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.	Life of operation	Environmental Officer	Evidence of trapping etc	Ongoing
Infrastructure must be consolidated where possible in order to minimise the amount of ground and air space used.	Planning and Construction	Project Manager Environmental Officer Contractor Engineer	Presence of bird collisions	During phase
Use environmentally friendly cleaning and dust suppressant products	Construction and Operation	Environmental Officer Contractor Engineer	Chemicals used	During phase
Make sure all excess consumables are removed from site and deposited at an appropriate waste facility	Contractor/ Environmental Officer	Restrict to designated working/storage/service areas	Construction Phase	Environmental Officer

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4.7 HERITAGE RESOURCE MANAGEMENT.

As required in the Heritage Impact Assessment, the following environmental impact management outcomes and actions must be implemented by the EPC..

Heritage Monitoring					
Aspect	Area	Responsible for monitoring and measuring	Frequency	Proactive or reactive measurement	Method
Cultural Heritage	Entire Project area	ECO	Weekly (Pre construction and	Proactively	If risks are manifested (accidental discovery of heritage resources) the chance find procedure should be implemented:

Heritage Monitoring					
Aspect	**Area**	**Responsible for monitoring and measuring**	**Frequency**	**Proactive or reactive measurement**	**Method**
Resource Chance Find			construction phase)		1. Cease all works immediately; 2. Report incident to the Sustainability Manager; 3. Contact an archaeologist to inspect the site; 4. Report incident to the competent authority; and 5. Employ reasonable mitigation measures in accordance with the requirements of the relevant authorities. Only recommence operations once impacts have been mitigated.

Area	**Mitigation measures**	**Phase**	**Timeframe**	**Responsible party for implementation**	**Target**	**Performance indicators** **(Monitoring tool)**
General Project area	Monitoring of the Project area by the ECO during pre-construction and construction phases for chance finds, if chance finds are encountered to implement the Chance Find Procedure for the Project	Pre-Construction & Construction	Weekly	Applicant Construction Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34, 35, 36 and 38 of NHRA	ECO Checklist/Report

Area	Mitigation measures	Phase	Timeframe	Responsible party for implementation	Target	Performance indicators (Monitoring tool)
General Project Area	Development activities must be confined to the approved development footprint only.	Construction	Construction	Applicant Construction Contractor	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report
Recorded Sites	Refer to Heritage register for site specific mitigation measures.	Throughout the Project	Throughout the Project	Applicant Construction Contractor Appointed Archaeologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA	ECO Checklist/Report

4.8 BATTERY ENERGY STORAGE SYSTEM (BESS)

A BESS Risk Assessment is attached in appendix E. All parties are required to fully comply with all Management outcomes and actions outlined in this Risk Assessment.

5. CONSTRUCTION PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the construction phase impact management outcomes and actions[16] that are commonly applicable to the development of a PV Energy Facility and its associated infrastructure as well as management actions outlined by participating specialists and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of a PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

The signed method statements prepared by the EPC contractor to achieve these environmental management outcomes must be appended to this EMPr as Appendix and kept on record in the EMPr file.

5.1 CONSTRUCTION PHASING

There are a number of important aspects of the construction phasing that must be implemented to ensure that the potential impact on the environment is kept to a minimum. The EPC contractor must consider the following requirements regarding phasing, when developing the construction programme. This construction programme must be approved by the by the holder of the EA with input from the ECO.

- The perimeter fence and road network to access the panel arrays should be established first and then all vehicular movement must be restricted to within this road network - This will minimise the impact of construction traffic on the undeveloped portion of the property. The only vehicles allowed to move off this road network are those needed to install the PV Mounting structures (i.e., Drills and Piling machines).
- Sites that will be temporarily disturbed by the construction activities (e.g., material loading, temporary storage, turning circles, etc.) must also be included in the road access network.

5.2 ENVIRONMENTAL AWARENESS AND TRAINING

It is a required action that the Site ECO, in consultation with the EPC, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr, EA and the environmental requirements they prescribe.

The Site ECO must keep records of all environmental training sessions, including names, dates and the information presented. Details of the environmental induction are also to be included in the weekly environmental checklists and monthly environmental control reports.

- [16] All Environmental Management Actions allocated to the EPC contractor will apply equally to all sub-contractors responsible for any specific task.

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

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• All staff must receive environmental induction training prior to undertaking any activities on site; • The EPC contractor must provide 24h notice to the Site ECO to arrange a suitable time for the Site ECO to present the induction training; • Refresher environmental awareness training is available as and when required; • All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; • The EPC contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: - Safety notifications; - Faunal Occurrences and risks; - Photographic plates of all listed and protected flora: - Hydrocarbon Spill management and correction and - Waste Management. • Environmental awareness training must include as a minimum the following: - Description of significant environmental impacts, actual or potential, related to their work activities; - Mitigation measures to be implemented when carrying out specific activities; - Environmental emergency preparedness and response procedures; - No Go Areas - Procedures to be followed when working near or within sensitive areas; - Wastewater management procedures; - Water usage and conservation; - Solid waste management procedures; - Sanitation procedures; - Fire prevention; - Faunal conflicts and	EPC Contractor and Site ECO	Site ECO to present a pre- prepared environmental induction to all staff prior to them undertaking any activities on site. EPC to ensure that all environmental awareness posters are in place at a minimum of 2 locations on site and that these posters are maintained. Site ECO to attend toolbox talks at least once a week, where an environmental topic is presented (this topic should be linked to current environmental concerns on the site at that particular stage)	Throughout construction period	Site ECO	Weekly as part of the weekly environmental checklist.	Signed environmental induction attendance registers to be appended to weekly environmental checklist and monthly environmental control report.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
- Vegetation management and protected & listed flora. • The EPC contractor must provide translation services to Ensure that the environmental induction be translated into the relevant languages.						

5.3 DEMARCATION OF NO-GO AREAS

All areas outside of the physical development footprint are to be demarcated as no-no go areas and access to these areas restricted. All construction activities must be restricted to demarcated areas to restrict the impact on sensitive environmental features. The impact management actions detailed below will help in achieving this end.

Impact management outcome: To ensure the protection of all the natural areas, sensitive features and buffer areas outside of the physical development footprint

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The exact footprint of the construction area, including panel foundations and all roads (including access, haul and internal roads which must make use of the final road layout) and infrastructure are to be surveyed and pegged before any physical construction commences on site. • In order to ensure effective demarcation of no-go areas, the construction of the perimeter fence should be the first activity that takes place on site. • All sensitive features as identified by specialists or ECO within the footprint must be demarcated for exclusion. • Appropriate signage is to be placed at all No-Go Areas. • The contractor, in conjunction with the ECO, must walk the areas determined and mark the full extent of the area to be disturbed (allowing sufficient space for the construction activity);	EPC Contractor	The EPC contractor to ensure that all no-go demarcations are in place and maintained for the duration of the contract. The Site ECO to ensure that compliance with the no-go policy forms	Survey and pegging to commencement of construction. Formal perimeter fence to be constructed in parallel to site establishment	Site ECO / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• All areas beyond these demarcated areas are considered as "no-go" areas; • Construction staff must be briefed as part of the environmental induction on the requirements regarding the no-go areas; and • Any protected trees or plants that are to remain within the development footprint are to be physically demarcated.		part of the environmental induction. Site ECO to monitor compliance with no-go areas.				

5.4 ESTABLISHMENT OF CONTRACTORS SITE CAMP AND TEMPORARY LAYDOWN AREA.

The position of the contractors site camp and temporary laydown area must as shown in the approved site layout plan. It must be noted that the contractors site camp and laydown area are temporary areas for use during the duration of construction. These areas must be rehabilitated on completion of construction as detailed in section 5.20 below. A permanent laydown area not exceeding 1 Hectare may remain for the duration of the operational phase of the project.

Impact management outcome: To ensure that the high impact activities that typically take place in a contractor's site camp / laydown area are restricted to a predefined area that does not contain any sensitive features and is rehabilitated on completion of construction.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The Contractors Site Camp and Temporary Laydown must be situated within the development area in the position identified in the approved Site Layout Plan • No temporary site camps will be allowed outside of the development footprint; • Any necessary plant rescue within the site camp and laydown area must be undertaken prior to the stripping of topsoil. • Topsoil from the site camp and laydown area must be stripped and stockpiled for re-use during rehabilitation. This must be done prior to levelling and placement of gravel;	EPC Contractor	The EPC contractor to provide method statement for site camp and temporary laydown establishment.	Site camp to be established prior to delivery of materials and plant (with the exception of	Site ECO / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The site camp must be suitably fenced off; • All construction material must be stored in the site camp and laydown area unless otherwise approved by the ECO. This may exclude PV panel mounting structures and panel components which will be stored at each installation point, as per the manufacturer plans; • No personnel may overnight in the site camp, except in the case of security personnel; • Fires for cooking and/or heating are only allowed within the site camp after consultation with the Health and Safety Representative; • Fuel and other chemicals may only be stored in the camp site; • Storage of waste and waste management must take place within the site camp and must be removed on a regular basis. • Temporary waste pick up points in the field must be moved to the site camp on a daily basis; • The site camp must be provided with sufficient ablution facilities (chemical toilets and potable water) of which the content must be disposed of regularly and at the suitable facilities.; • Any security lighting must be restricted to the Site Camp and Laydown area and no security lighting may be placed in the field; • All security lighting should be attached to motion sensers and be dark sky friendly[17]; and • On completion of construction, the site camp and temporary laydown area must be rehabilitated as directed. A permanent laydown area not exceeding 1ha may remain for operational use if not required.		The Site ECO and ECO to monitor compliance with site camp and laydown requirements. ECO to sign off on final rehabilitation of the site camp and temporary laydown area.	plant and material required for the establishment of the perimeter fence)			

• [17] In order to achieve this, all lighting should only be on when needed, only light the area that needs it, be no brighter than necessary, minimize blue light emissions and be fully shielded (pointing downward).

5.5 MANAGEMENT OF TOPSOIL

Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.

In terms of best practice and for rehabilitation purposes, it is essential that at least 200mm layer of topsoil from the building and road footprints (i.e., the on-site substation, auxiliary buildings, contractor's site camp and temporary laydown area) be stripped and stockpiled prior to the commencement of construction activities in each area. Topsoil should not be stripped from the development footprint below the solar arrays except where trenching for cabling is required (in which case topsoil should be placed on the opposite side of the trench from the subsoils and placed back in the same trench when cables are covered up).

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

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• A minimum 200mm layer of topsoil must be stripped from the access, internal and perimeter roads, on-site substation, auxiliary buildings, contractors site camp and temporary laydown area; • The topsoil stockpile sites must be situated in the areas designated for this purpose in the Site Layout Plans (Appendix A) • Any topsoil stockpiles outside of these designated areas must be approved by the ECO and may not be within any sensitive areas as defined in the original environmental assessment; • The topsoil stockpiles must be protected from erosion and dust as indicated by the ECO and this EMPr; • The topsoil stockpiles must be clearly demarcated to avoid contamination; • No topsoil may be mixed with subsoil; • No topsoil may be used as bedding material for cable trenches; • The topsoil stockpiles must not exceed 2m in height and stockpiles older than 6 months must be enriched before they are re-used. • The topsoil must be replaced into disturbed areas (road verges, cable trenches temporary laydown area and contractors site camp) on completion of construction;	EPC Contractor	The EPC contractor to provide method statement for topsoil management. The Site ECO and ECO to advise on the placement of topsoil stockpiles. The Site ECO and ECO to monitor compliance. ECO to sign off on final rehabilitation of the site camp and temporary laydown area.	Prior to construction activities in each specific area.	Site ECO / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.6 WATER SUPPLY

This section is specific to water supply during the construction phase. Water supply for the washing of panels is discussed under the operational phase requirements.

Impact management outcome: To ensure water used during construction is lawfully and sustainably utilised.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The EPC contractor must ensure that all water sources utilised are lawful. • The EPC Contractor must ensure a supply of water is available on site for sanitation, drinking, dust suppression and all construction activities. • The EPC Contractor must ensure that water supplied for drinking water is of potable standards. • Water used for dust suppression on gravel roads must be of a quality compliant with the General Special Effluent Standards (31/03/2009): Temperature: max.25ºC, pH: between 5.5 & 7.5 and conductivity: not be increased more than 15% above the intake water & not exceed 250 milli-Siemens per metre (determined at 25ºC). • No chemically treated or wastewater may be used for dust suppression. • Should any temporary water storage reservoirs need to be constructed for the purposes of construction, these must be positioned within the footprint of the development in a position agreed to with the ECO. Sufficient mechanisms to prevent fauna entrapment must be implemented to the satisfaction of the ECO. • Carry out Environmental Awareness Training with a discussion on water usage and conservation – This should form part of the Environmental Induction of all construction staff. • The EPC contractor must maintain records of all water usage (via metering and / or water tuck logs) for the duration of the construction phase.	EPC Contractor	The EPC contractor to provide method statement for Water Supply. The EPC Contractor must supply records of tests undertaken on drinking water to show that it is within potable standards (these tests should be done on a three-monthly basis or anytime the water source changes) The EPC to measure (internally) PH, TDS and Conductivity of all water sources on a weekly basis.	Lawfulness and quality testing need to take place prior to construction. Remaining actions applicable for the duration of the construction phase.	EPC Contractor to provide initial and 3 monthly quality test results to Site ECO. EPC Contractor to supply weekly tests to Site ECO. Water usage records to be provided by EPC contractor on a weekly basis.	3 Monthly for Potability tests. Weekly for internal testing	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
				Site ECO / ECO to review results and provide recommendations.		

5.7 VEGETATION CLEARING

The objective of mitigation for any development is to firstly avoid and minimise impacts on vegetation where possible and where these cannot be completely avoided, to compensate for the negative impacts of the development on vegetation and animal habitats, and to maximise re-vegetation and rehabilitation of disturbed areas. This section deals with the management of impacts associated with the clearing of vegetation. Please refer to the section below for details regarding the rehabilitation and restoration of affected areas after completion of the construction activities.

Some loss of vegetation is an inevitable consequence of the construction of PV facilities, and vegetation clearing required for the laydown area, roads, buildings etc. could impact listed plant species, as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and potentially the loss of sensitive faunal species, habitats and ecosystems.

The clearing of vegetation must be restricted to areas for the development and service infrastructure, while condition 42 of the EA requires that vegetation clearing must be limited to the footprint. The environmental impact management actions detailed in this section as well as those in the previous section on demarcation of no-go areas will help achieve this end.

It must be noted that no vegetation clearing may occur until such time as permits for the removal of provincially protected species as well as species protected in terms of the National Forest Act are in place. The EPC must submit a method statement outlining how they intend to comply with these permits once issued.

Impact management outcome: To ensure that vegetation is lawful, minimised and restricted to the development footprint.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Vegetation clearing can only commence once: - All necessary permits are in place, - Plant Rescue has been undertaken, - Development footprint has been demarcated • Vegetation clearing must be kept to a minimum and restricted to the following areas: - Internal Road Network, - Perimeter Road, - Inverter / Transformer Stations, - Laydown Area, - Site Camp and - Building Footprints • For the PV Array, the grass / scrub layer should be left intact (albeit trampled by construction activities) and only the larger woody plants cleared or trimmed where neccesary. • All areas to be cleared should be clearly demarcated, prior to the commencement of clearing activities; • Vegetation cleared / removed as part of the site clearing activities must be stockpiled for use during the re-vegetation and rehabilitation stage for brush-packing. The location of the vegetation stockpile can be in the same area as the topsoil stockpile, as designated in consultation with the ECO; • Only those individuals of protected plant species directly within the development footprint should be cleared. Those which can be safely left intact (e.g., below or between the solar panel arrays) must not be disturbed; • Any vegetation clearing that needs to take place as part of maintenance activities (during construction and operation phases) should be done in an environmentally friendly manner, using the most effective methodology suited to the target species (herbicides and/or manual clearing).	EPC Contractor	The EPC contractor to provide method statement for vegetation clearing activities.	Throughout the duration of construction.	Site ECO / ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.8 TRENCHING AND CABLING

Electric cables required to connect the inverters to the on-site switching station (i.e., AC cables) within the boundaries of the development must be installed underground, within or parallel to the internal road network and/or paths between the panel rows, as far as possible. There will also be limited trenching associated with the DC cabling (although the majority of this will be aboveground – mounted to the panel arrays.)

Cable trench excavation, cable laying and backfill must be carried out in a systematic and continuous operation, minimising the length of trench open at any one time in order to reduce the risk of runoff or faunal entrapment. Cable trenches must be backfilled in such a manner as to prevent the trench from acting as a ditch or a conduit for water flow.

Foundations and trenches must be backfilled with originally excavated materials as much as possible. Excess excavation materials must be lawfully disposed of, or if suitable, stockpiled for use in rehabilitation activities.

Impact management outcome: To ensure that trenching activities are spatially restricted and do not result in loss or contamination of topsoil resources.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Trenching shall be kept to a minimum through the use of single trenches for multiple service provision (including communication cabling and AC cabling in the same trenches); • Open trenches to be closed as quickly as possible to prevent faunal entrapment and erosion; • The planning and selection should be done in approximation to the SDP and cognisance shall be given to minimising the potential for soil erosion; • Trench routes with permitted working areas shall be clearly defined and marked with prior to excavation; • The stripping and separation of topsoil and subsoil shall occur on separate sides of the excavated trench and replaced in the same order (i.e., topsoil on top); • Trench lengths shall be kept as short as practically possible before backfilling and compacting; • The ECO may require the planting of additional indigenous vegetation along trench routes in order to speed up rehabilitation (particularly in areas that may be prone to erosion);	EPC Contractor	The EPC contractor to provide method statement trenching activities.	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Open trenches must be inspected daily for faunal entrapment (small mammals and reptiles), which are to be removed before backfilling of the trenches; • Trenches shall be backfilled to the same level as (or slightly higher to allow for settlement) the surrounding land surface to minimise erosion. Excess soil shall be stockpiled in an area designated by the ECO. • Topsoil may not be used for bedding or blanket material in trenches.						

5.9 DRILLING AND RAMMING OPERATIONS

It is envisioned that drilling and ramming will be the preferred method of installing the panel support structures / sub-structures. The following actions must be implemented in this regard.

Impact management outcome: To ensure that installation of the sub-structures do not cause pollution or undue mechanical damage to the environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
The plant required for the installation of the sub-structures (i.e., the trackers and module mounting structures) is the only plant that is allowed to leave the internal road network. The contractor shall submit a method statement detailing his proposals to prevent pollution (from hydraulic fluids, fuel or oil leaks) during ramming operations. This shall be approved by the engineer and the ECO prior to the onset of any ramming operations; • The contractor shall take all reasonable measures to limit dust generation as a result of drilling and ramming operations (also see section below addressing management of dust);	EPC Contractor	The EPC contractor to provide method statement drilling and ramming operations.	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Noise and dust nuisances shall comply with the applicable standards according to the Occupational Health and Safety (Act No. 85 of 1993) as well as the dust control regulations; • Other than the known acceptable impact from trampling, any areas damaged by the ramming and associated activities shall be rehabilitated by the contractor to the satisfaction of the ECO.						

5.10 FENCING

During construction it will be necessary to fence in the Contractor's Site Camp (to avoid theft of construction equipment and materials) and the PV Laydown Area/s (to avoid theft of the solar panels and associated infrastructure). This temporary fencing will be restricted to these areas and be removed at the end of the construction phase. The total footprint of the facility will be fenced with a permanent perimeter electrified fence in order to protect the operational assets.

Electric fencing should not have any strands within 30cm of the ground (to allow for the movement of small mammals and reptiles).

Impact management outcome: To ensure that fencing protects project assets and the environment while limiting impact on faunal passages.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The establishment of the perimeter fence should be the first activity that takes place on site, as this serves to demarcate the total disturbance footprint. • Any sensitive features within the project footprint should be temporarily fenced prior to commencement of construction (refer to above section on the demarcation of no-go areas). This temporary fencing must be replaced with permanent fencing prior to the completion of the construction phase. • Temporary storage ponds and topsoil stockpile should be temporarily fenced.	EPC Contractor	Implementation of the actions herein. EPC contractor to submit final fencing plan to the ECO for approval.	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The perimeter security fencing should be constructed in a manner which allows for the passage of small and medium sized mammals, at strategic places, such as areas of dense vegetation • In accordance with the EA, electrified strands should not be within 30cm of the ground. • Only the facility itself should be fenced-off. • Other than the fencing around the site camp / laydown area and operational buildings. No lighting may be placed on the perimeter security fencing. • The final fencing plan should be submitted to the ECO for comments and approval.						

5.11 CONSTRUCTION VEHICLES AND TRAFFIC MANAGEMENT PLAN

Prior to commencement of construction activities, a traffic management plan must be prepared in consultation with the provincial and district roads authorities. Management Outcomes and Actions identified in this Traffic Management Plan are deemed to form part of this EMPr.

5.12 CONSTRUCTION WASTE

An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling and re-use options where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licenced in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).

It is proposed that the local municipality will provide services in terms of waste removal and sewage for the construction phase of the proposed project. However, should the municipality not have adequate capacity available for the handling of waste and sewage, then the EPC Contractor must make use of private contractors to ensure that the services are provided. The EPC Contractor must also ensure that adequate waste disposal measures are implemented by obtaining waste disposal dockets / slips of all waste and sewage that is removed from site.

Impact management outcome: To promote an integrated waste[18] management approach and ensure the management of waste during the construction phase is both lawful and sustainable.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• A dedicated waste management area should be set up in the contractors site camp. This waste management area must as a minimum: - Be clearly demarcated and sign posted - Be wind and scavenger proof; - Include separation of waste streams (Recyclable waste, General Waste, Construction Rubble and Hazardous Waste); - Be maintained in a neat and tidy state with waste regularly removed. • The EPC Contractor must provide the Site ECO with a Waste Management register / report on a weekly Basis. This register / report must include as a minimum: - Records of all waste volumes for waste stream, - Proof of all volumes of recycling, - Disposal slips for all waste transported to a landfill, - Disposal slips for all hazardous waste, • All hazardous waste (including chemicals, bitumen, fuel, lubricants, oils, contaminated soil from hydrocarbon spills, paints etc.) shall be disposed of at an approved / registered hazardous-waste landfill site. The Contractor shall provide disposal certificates to the ECO. • All Hazardous waste must be temporary stored in sealed waterproof containers and may not be stored on site for longest than 30 days. • Used oil and grease must be removed from site to an approved used oil recycling company. • Under NO circumstances may any waste be spoiled on the site. • Where possible, the routine maintenance of construction plant should take place off-site. Where such maintenance must occur, it must be done in the site camp on an impermeable surface with a sump to collect any oil spills.	EPC Contractor	The EPC contractor to provide method statement for waste management.	Throughout the construction phase	Site ECO and ECO. EPC Contractor to provide records of all waste volumes and disposal slips on a weekly basis.	Daily	Weekly environmental checklists. Monthly environmental control reports.

[18] Waste in this instance excludes excess overburden from excavations.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Temporary waste receptacles in the field must be removed to the dedicated waste management area before the end of each working day. • Ensure that no waste materials or sediments are left in the surrounding drainage lines (as a result of the construction). • Wastewater must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes						

5.13 FUEL AND CHEMICAL STORAGE

The above ground storage of fuel is subject to authorisation in terms of the National Environmental Management Act (NEMA EIA regulations) if more than 30m³ is stored on site at any one time. The environmental authorisation for this development does not include authorisation for the storage of more than 30 cubic metres of fuel.

The temporary storage of hazardous or toxic materials / liquids (chemicals, fuels, lubricants and oils) must comply with legislation and the actions in the table below must be implemented.

Impact management outcome: To ensure lawful fuel storage that does not cause soil and water pollution.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Temporary fuel storage must take place within the contractors site camp and laydown area in an area approved by the ECO; • No storage of fuel may take place on any other portion of the site; • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at	EPC Contractor	The EPC contractor to provide method statement for chemical and fuel storage.	Throughout the construction phase	Site ECO and ECO. EPC Contractor maintain a	Daily	Weekly environmental checklists.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
the site should be cleaned up immediately in the appropriate manner, as related to the nature of the spill. • Mobile fuel units used to refuel plant on site must make use of drip trays when refuelling; • Storage facilities may not be located within 60m of any freshwater resources where there is a potential for any spilled fuel to enter the resource; • Fuel storage facilities should be located on flat ground. No cut and fill should take place immediately on or adjacent to fuel storage areas; • All storage tanks should be double lined and be ISO 9001 certified; • All storage tanks must be enclosed by bund walls; • Bund walls must be constructed to contain at least 110% of the total capacity of the storage tanks; • Bund walls must be constructed of impermeable material or lined to ensure that petroleum products cannot escape; • A suitable material should be placed in the base of the bund walls to soak up any accidental spillages; • The tanks should be locked and secured when not in use; • Automatic shut-off nozzles are required on all dispensing units; • Storage tanks should be drained within one week of completion of activities (only unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction program extends over the builder's shutdown, the contractor must ensure that storage tanks are emptied prior to this period; • All storage tanks, containers and related equipment should be regularly maintained to ensure safe storage and dispensing of material. The engineer is to sign off on the condition and integrity of the storage tanks; • Defective hoses, valves and containment structures should be promptly repaired; • Vehicle and equipment fuelling should be undertaken on a hard impermeable surface, over drip pans or bund walls to ensure spilled fuel or toxic liquids is captured and cleaned up; • The area must be totally rehabilitated on completion of the contract and all contaminated material must be carefully removed and disposed of at a licensed dumping site for that purpose; and				fuel and chemical register and provide this to the ECO on a monthly basis.		Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Spill kits must be made available on-site for the clean-up of spills. A minimum of 2 spill kits must be in the contractors site camp. Spill kits must also be available in the field within 500m of any drilling and ramming operations.						

5.14 NOISE MANAGEMENT

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

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

Impact management outcome: To ensure nuisance from noise and vibration does not occur.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• It is recommended that noise generation be kept to a minimum and that construction activities be confined to normal working hours (07:00 - 17:00 on Monday to Saturday). Should the Contractor wish to deviate from these work hours, approval must be granted by the Holder of the EA, • The following noise reduction actions in respect of plant should be implemented: - Provide baffle and noise screens on noisy machines as necessary; - Provide absorptive linings to the interior of engine compartments; - Ensure machinery is properly maintained (fasten loose panels, replace defective silencers); - Switch off machinery immediately when not in use; and - Reduce impact noise by careful handling.	EPC Contractor	As per the stated actions	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.15 CONCRETE MANAGEMENT

Proper concrete management is of utmost importance. Concrete works are likely to be limited to the construction of the on-site sub-station and auxiliary buildings and are not likely to be extensive (the preferred alternative for the panel support structures will make use of a technology that does not require concrete footings, due to rammed piles/earth screws/rock anchors). However, in instances where rammed piles/earth screws or rock anchors will not be practically possible and for other concrete work associated with the substation and inverter stations, the following actions in terms of concrete management should take place.

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

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

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

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Trucks should deliver pre-mixed concrete to the site and pour the concrete directly into the prepared excavations. • When concrete trucks have unloaded, there is a requirement to wash out the inside of the concrete drum. Water can be provided to the trucks for this purpose (at the discretion of the contractor). Concrete suppliers may NOT dispose of this wash water anywhere on site. Trucks should return to their depot for this purpose. • Any spillages of concrete outside of the excavations (including haulage routes) must be cleaned up immediately by the supplier. • Where small batching of concrete or plaster takes place on site, the following actions must be implemented: - Concrete batching may only take place in areas approved by the ECO (preferably in the Site Camp); - Concrete mixing must take place on batching plates unless it is on an area that is to be hard surfaced as part of the development; - Equipment (wheelbarrows, shovels etc) must be washed into a lined settling pond;	EPC Contractor	The EPC contractor to provide method statement for all on site concrete batching.	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
- Once the settling ponds dry out, the concrete must be removed and dispatched to a suitable disposal site. Ideally, all concrete batching should take place on an area that is to be hard surfaced as part of the development (building floor, road or paved area); • In order to avoid resource contamination, concrete batching should not be located within 60m of any stormwater management structure. • If an area outside of the site camp is identified for batching it must first be approved by the ECO and all topsoil must be stripped and stockpiled for re-use. • Batching at satellite sites must be done on a batching plate to prevent soil contamination. • Empty cement bags must be treated as hazardous waste and must be treated accordingly. • Cement wash water may not be discharged into the environment.						

5.16 FIRE MANAGEMENT AND PROTECTION

As required in the veld and fire management act, it is the landowner's responsibility to develop and maintain firebreaks as well as be sufficiently prepared to combat veld fires. This requirement will fall on the lawful user of the land in respect of the PV Development.

The PV development site is considered to be in an area that may from time to time have sufficient biomass to carry fires. Therefore, management of plant biomass within the site should be part of the management of the facility. Grazing by livestock is the simplest and most ecologically sound way to manage plant biomass and is recommended the preferred method to manage plant biomass at the site. Alternative management practices can include brush cutting. Utilisation of non-selective herbicides for the management of biomass is prohibited on site.

Impact management outcome: To reduce the risk of fire to infrastructure and environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Fires should only be allowed within fire-safe demarcated areas (and only within the site camp); • No fuelwood collection is allowed on-site; • The total removal of all invasive alien vegetation should take place in order to decrease the fire risk – Although there were few invasive plants identified during the environmental process, these may establish to a degree as a result of site disturbance. This must be done in accordance with the Alien Vegetation Management Plan; • Cigarette butts may not be thrown in the veld but must be disposed of correctly. The contractor, must designate smoking areas (in compliance with the Tobacco Products Control Amendment Act 63 of 2008) with suitable receptacles for disposal; • In case of an emergency, the contact details of the local fire and emergency services must be readily available; • Contractors must ensure that basic firefighting equipment and suitably qualified/experienced personnel are available on site at all times, as per the specifications defined by the health and safety representative / consultant; • The fire risk on site is a point of discussion that must take place as part of the pre-construction compliance workshop and the environmental induction training prior to commencement of construction; and • The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection.	EPC Contractor	In compliance with the actions defined as well as requirements detailed in the health and safety plan.	Throughout the construction phase	Site ECO and ECO	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.17 SANITATION

The holder of the EA / EPC must provide sanitation facilities within the construction area and along the road so that workers do not pollute the surrounding environment. These facilities must be removed from the site when the construction phase is completed. Associated waste must be disposed of at a registered waste disposal site.

Impact management outcome: To ensure safe and healthy sanitation for construction staff without increasing pollution risk.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
Portable chemical ablution facilities must be made available for the use by construction staff for the duration of the construction period. The following actions must be implemented in this regard: • Toilet and washing facilities must be available to the site personnel at all times (at the site camp and in the field); • These facilities must be situated away from freshwater resources; • One toilet for every 15 personnel is required; • The facilities must be serviced on a regular basis to prevent any overflow or spillage; • The servicing contractor must dispose of the waste in an approved manner (e.g., via the municipal wastewater treatment system); • The ECO must be provided with the service providers' details and the service schedule for the site; • The toilets should be secured to ensure that they do not blow over in windy conditions; • All toilet facilities must be removed from site on completion of the contract period, and; • Should the construction period be interrupted by a builder's break, the toilets should be emptied prior to the break.	EPC Contractor	As per the stated actions	Throughout the construction phase	Site ECO and ECO. The EPC Contractor to supply chemical toilet service records to the Site ECO on a weekly basis.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Sanitation during operation is discussed separately in the sections below.

5.18 BLASTING ACTIVITIES

Due to the fact that the PV panel mountings will be drilled / rammed into the earth and will thus not require extensive excavation for foundations, it is therefore unlikely that blasting will be required. Should blasting be required for whatever reasons, the following actions must be implemented:

Impact management outcome: To ensure any blasting activities do not disturb sensitive environmental nor social features.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• No blasting may take place within 50m of a borehole without approval of a suitably qualified engineering geologist. Preventative mitigation actions could include installing PVC casing and screens in potentially affected boreholes before blasting, while damaged boreholes will have to be re-drilled; • A current and valid permit shall be obtained from the relevant authorities prior to any blasting activity; • A method statement shall be required for any blasting related activities; • All laws and regulations applicable to blasting activities shall be adhered to at all times; • A qualified and registered blaster shall supervise all blasting and rock splitting operations at all times; • The contractor shall ensure that appropriate pre-blast monitoring records are in place (i.e., photographic and inspection records of structures in close proximity to the blast area); • The contractor shall allow for good quality vibration monitoring equipment and record keeping on site at all times during blasting operations; • The contractor shall ensure that emergency services are notified, in writing, a minimum of 24 hours prior to any blasting activities commencing on site; • The contractor shall take necessary precautions to prevent damage to special features and the general environment, which includes the removal of fly-rock. Environmental damage caused by blasting / drilling shall be repaired at the contractor's expense to the satisfaction of the ECO; • The contractor shall ensure that adequate warning is provided immediately prior to all blasting. All signals shall also be clearly given;	EPC Contractor	The EPC contractor to provide method statement for blasting activities should they be needed.	Throughout the construction phase	Site ECO and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The contractor shall use blast mats for cover material during blasting. Topsoil may not be used as blast cover; • During demolition, the contractor shall ensure, where possible, that trees in the area are not damaged; • Appropriate blast shaping techniques shall be employed to aid in the landscaping of blast areas, and a method statement to be approved by the Engineer, shall be required in this regard; and • At least one week prior to blasting, the relevant occupants/owners of surrounding land shall be notified by the contractor and any concerns addressed. Buildings within the potential damaging zone of the blast shall be surveyed, preferably with the owner present and any cracks or latent defects pointed out and recorded either using photographs or video. Failing to do so shall render the contractor fully liable for any claim of whatsoever nature, which may arise. The contractor shall indemnify the employer in this regard.						

5.19 THEFT AND ENVIRONMENTAL CRIME

An increase in crime during the construction phase is often a concern. In the case of this development, the risk is likely to be low due to the remote nature of the site. Theft and other crime associated with construction sites is not only a concern for surrounding residents, but also the developer and the contractor. Considering this, contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site.

It is recommended that the contractor develop a jobsite security plan prior to commencement of construction. This jobsite security plan should take into account protection of the construction site from both internal and external crime elements, as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported to the South African Police Service, no matter how seemingly insignificant. A copy of the jobsite security plan should be included in the first environmental control report to be submitted to the competent authority.

It is likely that the Contractor's Site Camp and the PV Laydown area/s will be fenced with a temporary fence to avoid theft during construction. Additional security measures during construction may include CCTV camera surveillance and security guards.

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

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The following actions are relevant in this regard (refer to the section above for details of the facility permanent security fencing): • The EPC Contractor must develop a Job Site Security Plan for the project. • All portable construction equipment and material must be locked away within the Contractor's Site Camp overnight and during holiday periods; • Fuel storages tanks must be locked when not in use; • All unassembled / un-installed PV materials must be locked within the fenced Laydown areas overnight and during holiday periods. • The minimum amount of lighting should be used at night and this should be of the low-UV emitting kind that attracts less insects. • In compliance with condition 86 of the EA, the collection, hunting or harvesting of any plants or animals at the site is strictly forbidden, and thus any person found undertaking any of these actions will be considered guilty of committing a crime. Any incidents of such crimes on nature must be reported to the ECO immediately, who will report the incident to the SAPS.	EPC Contractor	Implementation of a Job site security plan to be compiled by the EPC.	Jobsite Security Plan to be prepared prior to site establishment Throughout the construction phase	Site ECO and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.20 REHABILITATION AND HABITAT RESTORATION

All areas not forming part of the development's hard surfaces must be rehabilitated and restored on completion of construction. These include:

- The temporary laydown area (a maximum laydown of less than 1ha may for operational requirements);
- The contract site camp;
- Temporary water storage ponds;
- Overburden spoil sites;
- Temporary haul roads;
- Batching areas; and
- All other areas within the PV array and adjacent to buildings that have been compacted or impacted by any of the construction activities.

One of the primary objectives of all the previously listed impact management outcomes are to avoid and reduce impact on the receiving environment, thus minimising the rehabilitation and restoration requirements on completion of construction. The EPC contractor must be mindful of this primary objective as part of all activities taking place on site. A detailed Habitat Rehabilitation and Restoration Plan must be developed by a suitable specialist and included in this EMPr.

Impact management outcome: To restore habitat disturbed during construction activities

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
Topsoil management • Effective topsoil management is a critical element of rehabilitation, particularly in arid and semi-arid areas where soil properties are a fundamental determinant of vegetation composition and abundance. Although some parts of the site consist of exposed bedrock, most parts of the site have at least some topsoil. Where any excavation or topsoil clearing is required, the topsoil should stockpiled and later used to cover cleared and disturbed areas once construction activity has ceased. • Excess inert material and other disturbed areas should be reshaped to blend in with the natural contours of the area; • The contractor must be mindful that should insufficient topsoil be available for rehabilitation purposes, additional topsoil will need to be sourced from a commercial source at a cost to the contractor. • Topsoil is the top-most layer (0-30cm) of the soil in undisturbed areas. This soil layer is important as it contains nutrients, organic matter, seeds, micro-organisms fungi and soil fauna. All these elements are necessary for soil processes such as nutrient cycling and the growth of new plants. The biologically active upper layer of the soil is fundamental in the maintenance of the entire ecosystem. • Topsoil should be retained on site in order to be used for site rehabilitation. The correct handling of the topsoil (as detailed earlier in the report) is a key element to rehabilitation success. Firstly, it is important that the correct depth of topsoil is excavated. If the excavation is too deep, the topsoil will be mixed with sterile deeper soil, leading to reduction in nutrient levels and a decline in plant performance on the soil. • Wherever possible, stripped topsoil should be placed directly onto an area being rehabilitated. This avoids stockpiling and double handling of the soil. Topsoil placed	EPC Contractor	Implementation of the actions detailed here. Provision of a sufficient budget to undertake rehabilitation activities	Throughout the construction phase. Physical rehabilitation activities to be completed prior to contractual operations date.	Site ECO and ECO and Rehabilitation Specialist	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
directly onto rehabilitation areas contains viable seed, nutrients and microbes that allow it to revegetate more rapidly than topsoil that has been in stockpile for long periods. • If direct transfer is not possible, the topsoil should be stored separately from other soil heaps until construction in an area is complete. The soil should not be stored for a long time and should be used as soon as possible. The longer the topsoil is stored, the more seeds, micro-organisms and soil biota are killed. • Ideally stored topsoil should be used within a month and should not be stored for longer than three months. In addition, topsoil stores should not be too deep, a maximum depth of 1m is recommended to avoid compaction and the development of anaerobic conditions within the soil. **Ripping & Substrate preparation** • Before commencement with restoration activities detailed below, all identified rehabilitation areas that are compacted as a result of construction activities must be mechanically ripped. • Imported gravel layers (such as in the laydown area and site camp) must be removed prior to ripping and commencing with rehabilitation. **Mulching** • Mulching is the covering of the soil with a layer of organic matter of leaves, twigs bark or wood chips, usually chopped quite finely. The main purpose of mulching is to protect and cover the soil surface as well as serve as a source of seed for revegetation purposes. • During site clearing the standing woody vegetation should not be cleared and burned, removed or mixed with the soil, but should be cleared separately[19]. The cleared vegetation should be stockpiled and used whole or shredded by hand or machine to protect the soil in disturbed areas and promote the return of indigenous species. Where there is a low shrub or grass layer, this material can be cleared						

• [19] Woody vegetation within the PV array should not be mechanically cleared, but rather slashed with a brush-cutter or by hand.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
and mixed as part of the topsoil (or applied as a top mulch) as this will aid revegetation and recovery when it is reapplied. • All mulch should be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants; • No harvesting of vegetation may be done outside the area to be disturbed by construction activities; • Brush-cut mulch should be stored for as short a period as possible, and seed released from stockpiles can also be collected for use in the rehabilitation process. **Seeding** • In some areas the natural regeneration of the vegetation may be poor and the application of seed to enhance vegetation recovery may be required as directed by the ECO. • Seed should be collected from plants present at the site and should be used immediately or stored appropriately and used at the start of the following wet season. Seed can be broadcast onto the soil but should preferably be applied in conjunction with measures to improve seedling survival such as scarification of the soil surface or simultaneous application of mulch. • Indigenous seeds may be harvested[20] for purposes of re-vegetation in areas that are free of alien or invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites; • Seed may be harvested by hand and if necessary dried or treated appropriately; • No seed of alien or foreign species should be used or brought onto the site. **Transplants** • Where succulent plants are available or other species which may survive translocation are present, individual plants can be dug out from areas about to be cleared and planted into areas which require revegetation. This can be an effective means of establishing indigenous species quickly, this is however unlikely to be a						

• [20] Any seed harvesting required must be done with the appropriate permits in place.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
viable option at the current site as there are few suitable species present, but if the conditions are wet then most species have some probability of surviving. • Plants for transplant should only be removed from areas that are going to be cleared. • Perennial grasses, shrubs, succulents and geophytes are all potentially suitable candidates for transplant. • Transplants should be placed within a similar environment from where they came in terms of aspect, slope and soil depth. • Transplants must remain within the site and may not be transported off the site. • Some species can also grow from cuttings and branches of many succulent species can be rooted in the field. **Use of soil savers** • On steep slopes (unlikely on the development site) and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed. • In areas where soil saver is used, it should be pegged down to ensure that is captures soil and organic matter flowing over the surface. • Soil saver may be seeded directly once applied as the holes in the material catch seeds and provide suitable microsites for germination. Alternatively, fresh mulch containing seed can be applied to the soil saver. **General recommendations** Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible. • Once re-vegetated, areas should be protected to prevent trampling and erosion. • No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been vegetated. • Where rehabilitation sites are located within actively grazed areas, they should be fenced. • Fencing should be removed once a sound vegetative cover has been achieved.						

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Any runnels, erosion channels or washaways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.						

As highlighted in the introduction to this section, the most cost-effective way to reduce the cost and effort for rehabilitation is to reduce and minimise the disturbance footprint. The installation of the panel arrays without clearing the site, is the biggest benefit that can be applied in this regard.

The PV panels and roads within the development represent hard surfaces that will generate a lot of runoff. As a result, effective runoff management is essential as is an effective vegetation cover to prevent widespread erosion across the site.

5.21 FAUNAL MANAGEMENT

Impact management outcome: To reduce the direct impact on animals affected by the construction activities.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Any animals (including snakes, tortoises and lizards) directly threatened by the clearing or construction activities should be removed to a safe location outside of the construction area by the ECO or other suitably qualified/experienced person. • All trenches, open excavations and fence lines should be inspected on a daily basis (first thing in the morning) for any trapped fauna (particularly small mammals and reptiles). These should be removed to a safe location outside of the construction area by the ECO or other suitably qualified / experienced person. • Faunal ladders to be installed in all temporary water storage areas. • The development footprint may need to be flushed prior to completion of the perimeter fence to ensure that no large mammals become trapped within the development site.	EPC Contractor	Implementation of the actions detailed here.	Throughout the construction phase.	Site ECO and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• All faunal mortalities are to be reported to the Site ECO, who must maintain a register of faunal mortalities. • The Site ECO must maintain a register of all faunal observations within the development site.						

In addition to the above actions, the avifaunal specialist recommends the following actions in respect of avifauna.

Impact	Mitigation/Management Objectives and Outcomes	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
Avifauna: Disturbance					
The noise and movement associated with the construction activities at the development footprint will be a source of disturbance which would lead to the displacement of avifauna from the area	Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (EMPr.)	A site-specific EMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the EMPr and should apply good environmental practice during construction. The EMPr must specifically include the following: • No off-road driving; • Maximum use of existing roads; • Measures to control noise and dust according to latest best practice; • Restricted access to the rest of the property; • Strict application of all recommendations in the botanical specialist report pertaining to the limitation of the footprint.	• Implementation of the EMPr. Oversee activities to ensure that the EMPr is implemented and enforced via site audits and inspections. Report and record any non-compliance. • Ensure that construction personnel are made aware of the impacts relating to off-road driving. • Construction access roads must be demarcated clearly. Undertake site inspections to verify. • Monitor the implementation of noise control mechanisms via site inspections and record and report non-compliance. • Ensure that the construction area is demarcated clearly and that construction personnel are made aware of these demarcations. Monitor via site inspections and report non-compliance.	On a daily basis	Contractor and ECO

5.22 AVIFAUNAL MANAGEMENT

The Avifaunal Specialist Identified the following environmental impact management actions that need to be implemented during the construction phase of the development.

Impact management outcome: Minimising impact on Avifauna.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• .Activity should as far as possible be restricted to the footprint of the infrastructure. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. • Access to the rest of the property must be restricted. • The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint is concerned.	EPC Contractor	Implementation of the actions detailed here.	Throughout the construction phase.	Site ECO and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

5.23 HERITAGE MANAGEMENT

Impact management outcome: Impact to heritage resources is minimised.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure detailed above; • Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; • All work in a specific area must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences in that area.	EPC Contractor	Implementation of the actions detailed here. Implementation of chance find procedure.	Throughout the construction phase.	Site ECO and ECO.	Daily	Weekly environmental checklists. Monthly environmental control reports.

The following chance find procedure must be implemented, as recommended by the Palaeontology specialist during the EIA process.

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

- The following procedure is only required if fossils are seen on the surface and when drilling/excavations/mining commence.
- When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or 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 (for example see Figure 12). This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.

- If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit 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.

5.24 BATTERY ENERGY STORAGE SYSTEM (BESS)

A BESS Risk Assessment is attached in appendix E. All parties are required to fully comply with all Management outcomes and actions outlined in this Risk Assessment.

6. OPERATIONAL PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

This section provides details on the operational phase impact management outcomes and actions[21] that are commonly applicable to the operation of a PV Energy Facility and its associated infrastructure, as well as management actions outlined by participating specialists and those contained in the EA for the facility.

Each subsection includes an aspect identified for the development of a PV Energy Facility, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified.

The holder of the EA is ultimately responsible to ensure the implementation of these outcomes and actions.

Written notice of intent to commence operations must be submitted to the DFFE at least 14 days prior to the commencement of operations.

6.1 CLEANING OF PV MODULES

Any rainfall on the solar panels would be welcomed due to its cleaning effect, but as mentioned before, the annual predicted rainfall is very low. Water for cleaning panels should take place using water from lawful sources and can be supplemented from the rainwater collection / storage systems on site. To further reduce the use of water at the solar facility, the use of alternative panel cleaning methods could be investigated.

- [21] All Environmental Management Actions allocated to the O&M contractor will apply equally to all sub-contractors responsible for any specific task.

The washing of panels during maintenance must be done with biodegradable soaps to avoid soil contamination.

Impact management outcome: To ensure that cleaning of PV modules is lawful, resource efficient and does not cause erosion or pollution of the surrounding environment.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Water for the cleaning of PV modules must be lawful. • Only clean water or biodegradable cleaning materials may be used for washing purposes. • Care should be taken that the wash-water does not cause any erosion (the use of labour intensive, or high pressure/low volume techniques is recommended in this regard). • Water used in the cleaning process is likely to encourage the growth of natural vegetation around the panel arrays and rows, which will require routine brush-cutting / trimming to avoid vegetation shading the panels, interfering with tracking mechanisms or the risk of fires. Under no circumstances should vegetation beneath or around the panel arrays and rows be cleared / removed entirely, as this will result in significant erosion and associated sandblasting of infrastructure. Due to stunted nature of the xerophytic vegetation, it is unlikely that this will need to be done often. Biomass produced from these trimming activities could be chipped and used as mulch under the PV panels (to increase stormwater infiltration and reduce erosion). • The management of a vegetated cover on as much of the site as possible must take place. This will reduce fugitive dust emissions and thus cleaning frequencies. • Where practical, adopt "dry" cleaning methods, such as dusting and sweeping the site before washing down. • Low level and ongoing cleaning of PV panels over time to reduce demand on aquifers.	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor Audit consultant.	Daily by O&M Contractor. Annually as part of operational environmental audits	Operational Environmental Audit Report.

6.2 OPERATIONAL WASTE

During the operational phase of the development, the amount of waste generated is likely to be very minimal and limited to normal domestic waste generated in the office, workshop waste from maintenance activities and damaged PV modules.

It is proposed that the local municipality will provide services in terms of waste removal and sewage for the operational phase (excluding Hazardous Waste and damaged PV Modules) of the proposed project. However, should the municipality not have adequate capacity available for the handling of waste and sewage; then the O&M Contractor must make use of private contractors to ensure that the services are provided. The O&M Contractor must also ensure that adequate waste disposal measures are implemented by obtaining waste disposal dockets / slips of all waste and sewage that is removed from site.

Impact management outcome: To promote an integrated waste[22] management approach and ensure the management of waste during the construction phase is both lawful and sustainable

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Wind and scavenger proof bins must be installed at the maintenance / control buildings and on-site substation and must be emptied on a weekly basis • All hazardous waste (including bitumen, fuel, oils, paints etc.) used during the operation and maintenance of the solar facility shall be disposed of at an approved/registered hazardous-waste landfill site. The contractor responsible for the disposal shall provide disposal certificates to the site manager. • Used oil and grease must be removed from site to an approved used oil recycling company. • Under NO circumstances may any hazardous waste be spoiled on the site. • The servicing of operation/maintenance vehicles may not take place on site. • Damaged PV modules should be stored in a designated area within the O&M complex before being returned to supplier[23] for recycling.	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

- [22] Waste in this instance excludes excess oils that may be spilled as a result of transformer failure. Such an incident is discussed separately under the Hazardous Substances, Leakage and Spillage Plan below.
- [23] Or third-party recycler.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Biomass from vegetation management activities must not be disposed of off-site but must be utilised as mulch as part of the ongoing rehabilitation[24]. • Wastewater must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes						

6.3 OPERATIONAL GENERAL ECOLOGY CONSIDERATIONS

This section provides general management actions to ensure that operational activities do not degrade the ecological functioning of the site.

Impact management outcome: Ensure that operational activities do not degrade the ecological functioning of the site.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Dust control should be continued into operation. • Any trimming of protected species that may establish under the modules must be done in accordance with a permit. • Other than the maintenance of the vegetated layer under the PV modules, NO further clearing of vegetation should take place. • Speed limits within the facility must be maintained and enforced. • Specialist advice to be sought for the management of any fauna that establishes within the site during operations.	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

[24] This Biomass can be chipped should the volumes be high enough as to pose a fire risk.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The O&M contractor must implement an Avifaunal Management Plan that is to be developed by an avifaunal specialist.						

6.4 GENERAL OPERATIONAL MAINTENANCE

The section in the table below details general operational maintenance environmental impact management actions that are not covered in the sections above.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• Lubricants used to grease bearing of panel tracking systems should be conservatively used to avoid leakage or spills. Any leaks or spills that occur during maintenance operations must be cleaned up immediately and the contaminated soil / material disposed on at a registered disposal site for hazardous materials. • The tracks / pathways between the PV panel rows used for cleaning and maintenance of the panels, should be maintained as single tracks and regularly brush-cut and/or mowed to allow reasonable access. • Access roads and the internal road network must be maintained in a condition that allows for reasonable access and minimised erosion potential. All drainage, stormwater management and erosion control structures must be maintained to ensure their proper functioning. • Regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible. • All maintenance vehicles to remain on the demarcated roads. • The conservancy tank, associated with the ablution facilities at the on-site sub-station / maintenance buildings, must be maintained in full working condition. • The perimeter security fence should be routinely patrolled to ensure that is still allows for the passage of small and medium sized mammals, at least at strategic places, and that the electrified strands are not causing animal electrocution. • No unauthorized persons should be allowed onto the site.	O&M Contractor	Implementation of the actions detailed in this section.	Throughout the Operational Phase	O&M Contractor to implement and maintain records. Audit consultant.	Daily by O&M Contractor. Annually / three yearly as part of operational environmental audits	Operational Environmental Audit Report.

Impact Management Actions	Responsible person	Method of implementation	Timeframe for implementation	Responsible party for monitoring	Frequency of monitoring	Evidence of compliance
• The maintenance of the transmission line infrastructure must retain the bird-friendly design features (bird-flappers and insulation). Any bird electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented. • Staff present during the operational phase should receive environmental education so as to ensure that that no hunting, killing or harvesting of plants and animals occurs. • All alien plants present at the site should be controlled at least twice a year using the best practice methods for the species present. • Bare soil should be kept to a minimum, and at least some grass or low shrub cover should be encouraged under the panels. • No pets (cats and dogs) should be allowed within the solar facility.						

6.5 BATTERY ENERGY STORAGE SYSTEM (BESS)

A BESS Risk Assessment is attached in appendix E. All parties are required to fully comply with all Management outcomes and actions outlined in this Risk Assessment.

7. ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

An Alien Invasive Vegetation Management Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

8. PLANT RESCUE AND PROTECTION PLAN / RE-VEGETATION AND HABITAT REHABILITATION PLAN

A Plant Rescue and Protection Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

9. OPEN SPACE MANAGEMENT PLAN

An Open Space Management Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

10. HAZARDOUS SUBSTANCES LEAKAGE AND SPILLAGE MONITORING SYSTEM

A Hazardous Substance Leakage and Spillage Monitoring System must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

11. STORMWATER MANAGEMENT PLAN

A project specific Stormwater Management Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

12. EROSION MANAGEMENT PLAN

A project specific Stormwater Management Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

13. FIRE MANAGEMENT PLAN

A project specific Fire Management Plan must be developed by a relevant specialist prior to commencement of construction activities. The outcomes and monitoring requirements identifies in this plan, must be adopted throughout the lifespan of the project.

14. DECOMISSIONING PHASE – IMPACT MANAGEMENT OUTCOMES AND ACTIONS

In compliance with condition 33 of the EA, should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements.

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

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

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

[25] For the purposes of this section, the lifespan of the facility is deemed to be the period of the power purchase agreement.

Requirement
(iii) The minutes of any meetings held by the EAP with interested and affected parties and other role players which record the views of the participants; (iv) Where applicable, an indication of the amendments made to the plan as a result of public participation processes conduction in terms of regulation 41 of these Regulations.
(j) Where applicable, details of any financial provisions for the rehabilitation, closure and ongoing post decommissioning management of negative environmental impacts.

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

Two possible scenarios are considered for this decommissioning phase, as follows:

14.1 SCENARIO 1: TOTAL CLOSURE & DECOMMISSIONING OF SOLAR FACILITY

If the decision is taken at the end of the project lifespan (20 - 25 years) to totally decommission the solar facility i.e., make the land available for an alternative land use, a closure plan as detailed above should be developed and should include provision for the following:

- All concrete and solar infrastructure etc. must be removed from the solar site i.e., panels, support structures etc.;
- The holes where the panel support structures are removed must be levelled and covered with subsoil and topsoil;
- Tracks that are to be utilised for the future land use operations should be left in-situ. The remainder of the tracks to be removed (ripped), topsoil replaced and brush-packed to encourage re-vegetation and minimise erosion;
- All auxiliary buildings and access points should be demolished, and rubble removed, unless they can be used for/by the future land use. The competent authority may prescribe that the landscaping and underground infrastructure i.e., foundations be left *in situ;*
- The underground electric cables must be removed, if they cannot be used in the future land use;
- All material (cables, PV Panels etc.) must be re-used or recycled wherever possible. Functional panels that still produce sufficient output could be repurposed upon decommissioning;
- The disturbed portions of the site must be brush-packed, replanted and/or seeded with locally sourced indigenous vegetation (as prescribed by the competent authorities) to allow re-vegetation and rehabilitation of the site (see plant species list attached);
- Discontinuation of Lease and Easement Agreements for main land and assess roads;
- Consider whatever is economically or socially beneficial and risky for the project's Owners and other Stakeholders at this last stage
    - This could include selling equipment on secondary market, recycling of metals and modules as scrap, using some or all of the proceeds to pay the local labour for uninstallation work, etc?
    - PV leaves no pollution and the equipment other than the modules which should be reused or recycled (There is an existing market for this).

14.2 SCENARIO 2: PARTIAL DECOMMISSIONING / UPGRADE OF SOLAR FACILITY

Due to low variable costs and loans repaid long ago, any owner of the facility may be interested in prolonging technical, functional, legal and economic lives of the plants for as long as possible, even beyond Power Purchase Agreement.

- This will require disposal of assets with shorter technical lives are critical (inverters, etc). PV modules, substructures, cables have a lifespan that should be longer than 25 years;
- Under this option, the O&M contractor will have to ensure that the validity period of all licences / permits and agreements is extended where necessary and that any legislation that has subsequently been promulgated is considered.

Should more advanced technology become available it may be decided to continue to use the site as a renewable energy / photovoltaic / solar facility. Should this be the case, it is likely that much of the existing infrastructure will be re-used in the upgraded facility.

All infrastructure that will no longer be required for the upgraded facility must be removed as described in Scenario 1 above. The remainder of the infrastructure should remain in place or upgraded depending on the requirements of the new facility. As described for Scenario 1 above, the function PV panels that are still capable of producing sufficient output, could be donated to local schools and clinics. Any upgrades to the facility at this stage must comply with relevant legislation and guidelines of the time.

15. MONITORING AND AUDITING

This section provided additional information of the monitoring and auditing requirements for the facility. It should be read in conjunction with the monitoring requirements outlined in the environmental impact management action tables as well the section on document control and reporting (which mainly deals with the internal monitoring requirements).

Environmental monitoring and audits are fundamental in ensuring the implementation of the management actions contained within this EMP are environmentally sustainable during development and operation of this PV Facility.

15.1 ENVIRONMENTAL MONITORING

15.1.1 Construction ECO

The ECO, assisted by the Site ECO, is responsible for environmental monitoring during of the construction phase impact management actions as outlined in of this EMPr. The monthly environmental control reports compiled by the ECO (which include the weekly environmental checklists compiled by the Site ECO), as well as the photographic record of works, must be submitted to the Holder of the EA, the EPC contractor, the local authority, the provincial environmental authority, the national environmental authority and Eskom.

The following overarching recording and reporting requirements are required[26]:

- The holder of the authorisation must keep all records relating to monitoring and auditing on site and make it available for inspection to any relevant and competent authority in respect of this development.
- In compliance with condition 25 of the EA, these compliance records must be submitted to the Director: Compliance monitoring at the DFFE.

[26] This must be read in conjunction with section 2 of the EMPr

15.1.2 Construction Phase Alien Vegetation Monitoring

This section must be read in conjunction with the Alien Invasive Vegetation Management Plan above.

The following monitoring actions should be implemented during the construction phase of the development.

Table 5: Alien vegetation monitoring requirements during the construction phase.

Monitoring Action	Indictor	Timeframe
Document alien species present at the site	List of alien species	Preconstruction
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien control measures implemented	Record of clearing activities	3 Monthly
Review & evaluation of control success rate	Decline in documented alien abundance over time	Biannually

15.1.3 Operational Phase Alien Vegetation Monitoring

This section must be read in conjunction with the Alien Invasive Vegetation Management Plan above.

The following monitoring actions should be implemented during the operational phase of the development.

Table 6: Alien vegetation monitoring requirements during the operational phase

Monitoring Action	Indictor	Timeframe
Document alien species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented, and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

15.1.4 Rehabilitation and Habitat Restoration Monitoring requirements

As rehabilitation success, particularly in arid areas is unpredictable, monitoring and follow-up actions are important to achieve the desired cover and soil protection.

- Re-vegetated areas should be monitored every 4 months for the first 12 months following construction.
- Re-vegetated areas showing inadequate surface coverage (less than 20% within 12 months after re-vegetation) should be prepared and re-vegetated;
- Any areas showing erosion, should be re-contoured and seeded with indigenous grasses or other locally occurring species which grow quickly.

15.1.5 Plant Rescue Monitoring Requirements

It is important to monitor the success of the plant rescue operations, in order to the licencing authority on such conditional rescue.

Post construction monitoring of plants translocated during search and rescue must be undertaken to evaluate the success of the intervention. Biannual monitoring for 2 years post-transplant should be sufficient to gauge success.

The condition and numbers of all the rescued plants should be recorded and provided to the Audit consultant for inclusion in the environmental audit report.

15.2 ENVIRONMENTAL AUDITING[27]

In addition to the internal environmental audit (which takes place as part of the monthly environmental control report), the following external audits must also be undertaken:

- Annually during the construction phase.
- Within 1 month of completion of construction activities.
- Within 1 year of commencement of operations.
- Every 3 years thereafter.

These external audits cannot be undertaken by the ECO and must be undertaken by an external audit consultant in compliance with Appendix 7 of the 2014 EIA regulations.

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

- The operators of the facility;
- The local authority Vhembe Local Municipality);
- The provincial environmental authority;
- The national environmental authority: (DFFE); and
- Eskom.

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

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

Table 7: Contents of an audit report

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

- [27] To ensure independence, the auditing defined in this section cannot be undertaken, by the Holder of the EA, the EPC contractor, nor the Environmental Control Officer. These should be undertaken by an external audit consultant.

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

16. METHOD STATEMENTS

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

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

Method statements must be submitted at least (14) fourteen working days prior to the proposed date of commencement of the specific activity. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

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

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

The method statements should include relevant details, such as:

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

16.1 METHOD STATEMENTS REQUIRED

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

- Site establishment – Site Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Workshop or plant emergency maintenance;
- Drilling and Piling operations
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected species relocation, site clearing, alien vegetation;
- Access management – Roads, gates, crossings etc.;

- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management; and
- Heritage, Archaeology and Palaeontology management.

17. HEALTH & SAFETY

The holder of the Authorisation must train safety representatives, managers and workers in workplace safety. The construction process must be compliant with all safety and health measures by the relevant act.

This section aims to provide a high-level overview to occupational Health and Safety Act but does not in any manner replace the project specific Health and Safety plan which would need to be compiled and approved in terms of this act and associated regulations.

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

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

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

General duties of employers to their employees

(1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.

(2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-

(a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;

(b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;

(c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;

(d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

(e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;

(f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;

(g) taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;

(h) enforcing such measures as may be necessary in the interest of health and safety;

(i) ensuring that work is performed, and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and

(j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

18. CONTRACTORS CODE OF CONDUCT

The Contractor's Code of Conduct is a document to be drawn up by the holder of the EA[28] and provided to all contractors or subcontractors that undertake any service on site. This code of conduct should include generic conduct rules for construction and operation activities on this Solar Energy Facility and must be signed by all contractors. **This code of conduct does not exonerate contractors from complying with this EMPr and must not be viewed as a stand-alone document**.

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

18.1 OBJECTIVES

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

- To ensure the least possible damage to:
  - Existing infrastructure on and adjacent to the site;
  - Indigenous flora and fauna (biophysical environment); and
  - Water quality of surface and groundwater on and surrounding the site;
- Construction and development are undertaken with due consideration to all environmental factors;
- Where such damage occurs, provision is made for re-instatement and rehabilitation;

18.2 ACCEPTANCE OF REQUIREMENTS

In order to achieve these objectives, the Developer and EPC Contractor bind themselves jointly and severally to fulfil and comply with all the obligations contained herein, as well as prescriptions and obligations contained in other documents controlling the development of this Solar Energy Facility.

18.3 CONTRACTOR'S PRE-CONSTRUCTION OBLIGATIONS

- [28] or delegated to the EPC contractor.

Contractors may not commence any construction of this Solar Energy Facility until:

- The Contractor and the ECO have carried out a joint site inspection (this is to be done as part of the pre-construction compliance workshop as detailed in the EMPr above);
- A qualified ecologist has undertaken an inspection of the final development footprint and determined the number, species and extent of protected / listed plant species within this area;
- A permit for the removal or relocation-and-transplant of any protected / listed plant species has been obtained, where necessary;
- Search and rescue of sensitive plants, within the development footprint has been carried out in compliance with the plant rescue and protection plan, method statement to be provided and signed off by the ECO (where this is necessary);
- The construction and no-go areas are suitably demarcated to the satisfaction of the ECO;
- Where necessary, approval of Building / Construction Plans has been obtained from the local authority (Witzenberg) Local Municipality); and
- All contract staff have attended the required environmental induction training and on-going environmental education sessions, as necessary.

18.4 CONTRACTOR'S OBLIGATIONS DURING CONSTRUCTION

- The Contractor is required to comply with the necessary Health and Safety requirements as required by the Occupational Health and Safety Act of 1993;
- The Contractor must comply with the construction requirements as detailed in the EMPr, including the following plans that are required:
    - Transport & Traffic Management Plan,
    - Stormwater and Erosion-Control Management Plan,
    - Vegetation Clearing & Plant Rescue Plan,
    - Re-vegetation & Rehabilitation Plan,
    - Alien Management Plan,
    - Open Space Management Plan;
- The contractor must comply with all the requirements detailed in the Environmental Authorisation;
- All conditions, processes and fees as prescribed by the Local Authority must be complied with.

19. SITE DEVELOPMENT PLAN

The Site Layout Plan (SLP) is attached in Appendix A of this EMPr. Approval of this EMPr infers approval of the SLP. The holder of the EA and the contractor must ensure that all works are undertaken in approximation to the SLP. Should there be any dispute on any aspect of the works in relation to the SDP, the ECO must make ruling, which should be referred to the Competent Authority if necessary.

The table below shows the key components as defined in the SDP and the EMPr applicability of each of these components.

Table 8: EMPr Sections applicable to SLP Components

SDP Component	EMPr Applicability
Construction Road	Sections 4, 5, 6,7 & 8
Perimeter Road	Sections 4, 5, 6,7 & 8
Internal Roads	Sections 4, 5, 6,7 & 8
Access Road	Sections 4, 5, 6,7 & 8
Perimeter Fencing	Sections 5
PV Arrays including sub-structures	Sections 4, 5, 6,7 & 8
Inverter Stations	Sections 4, 5, 6,7 & 8
AC Cabling	Sections 4 & 5,
Sub-Station	Appendix B
Auxilliary Building	Sections 4 & 5

Laydown Area	Section 5

20. PENALTIES

Should any person commit an action of non-compliance he/she may be convicted of an offence, in terms of Sub-regulation (1) of the National Environmental Management Act, to imprisonment for a period not exceeding ten years or to a fine not exceeding R10 Million as prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

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

20.1 PROCEDURES

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

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

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

20.2 OFFENCES AND PENALTIES

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

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

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

21. ABBREVIATIONS

AIA	Archaeological Impact Assessment
BGIS LUDS	Biodiversity Geographic Information System Land Use Decision Support
CBA	Critical Biodiversity Area
CDSM	Chief Directorate Surveys and Mapping
CEMPr	Construction Environmental Management Programme
DEFF	Department of Environment, Forestry and Fisheries
DEA&NC	Department of Environmental Affairs and Nature Conservation
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
EAP	Environmental Impact Practitioner
EHS	Environmental, Health & Safety
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan

IFC	International Finance Corporation
IPP	Independent Power Producer
kV	Kilo Volt
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NPAES	National Protected Area Expansion Strategy
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PM	Post Meridiem; “Afternoon”
PSDF	Provincial Spatial Development Framework
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
S.A.	South Africa
SACAA / CAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework
TOPS	Threatened and Protected Species