



FINAL ENVIRONMENTAL  
MANAGEMENT PROGRAMME  
November 2022

**DEVELOPMENT OF A POWER LINE AND SWITCHYARD FOR THE  
PROPOSED SONNEBLOM PHOTOVOLTAIC SOLAR FACILITY AND  
ASSOCIATED INFRASTRUCTURE, NEAR BLOEMFONTEIN, FREE  
STATE PROVINCE**



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**APPENDICES**

- Appendix A: Environmental incidents log & Complaints record sheet
- Appendix B: Management of soils: Guidelines
- Appendix C: Environmental Awareness and Fire Management Plan
- Appendix D: Site Sensitivity Map

## GLOSSARY OF TERMS

**Construction Phase:** The activities pertaining to the preparation for and the physical construction of the proposed development.

**Contractor:** Persons/organisations contracted by Sonneblom Solar Power Plant to carry out parts of the work for the proposed development.

**Decommissioning:** Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.

**Engineer (E) / Project Manager (PM):** Person/organisation appointed by Sonneblom Solar Power Plant to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

**Environmental Control Officer (ECO):** Person/organisation appointed by Sonneblom Solar Power Plant who will provide direction to the Project Manager concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Programme.

**Environmental Management Programme (EMPR):** The EMPR is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMP contributes to the preparation of the contract documentation by developing clauses to which the Contractor must adhere for the protection of the environment. The EMPR specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

**Operational Phase (Post-Construction):** The period following the Construction Phase, during which the proposed development will be operational.

**Pre-Construction Phase:** The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

**Rehabilitation:** Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

**Site Manager:** The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the project is conducted in accordance with the Environmental Management Programme.

## ABBREVIATIONS

C	Contractor
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIR	Environmental Impact Report
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EP	Equator Principles
EPCM	Engineering Procurement and Contracts Management
IFC	International Finance Corporation (World Bank Group)
I&APs	Interested and Affected Parties
MC	Main Contractor
MF	Monitoring Forum
MMM	Mangaung Metropolitan Municipality
OECD	Organisation for Economic Co-operation and Development
SM	Site Manager
PM	Project Manager
PPE	Personal Protective Equipment
PV	Photovoltaic
MSDS	Material Safety Data Sheets

## **CHAPTER 1: INTRODUCTION**

Environamics was appointed as an independent consultant to undertake a Scoping and Environmental Impact Assessment (EIA) process and Environmental Management Programme (EMPr) for the proposed construction of a photovoltaic solar facility on Portion 1 of the farm Blydschap 504, Registration Division Bloemfontein, Free State, South Africa. The objective of the project is to generate electricity to feed into the national grid. The project is in line with the government's commitment to provide renewable energy as an alternative source of energy.

The proposed development obtained Environmental Authorisation from the then Department of Environmental Affairs (now known as the Department of Forestry, Fisheries and the Environment (DFFE)) on 19 June 2015. The holder of the Environmental Authorisation (EA) of the Sonneblom SPP is proposing amendments to the EA which mainly involves changes to the facility layout which was approved as part of the EA. The amendments are related to the resizing of project specific infrastructure associated with the layout within the assessed and authorised project area. Further amendments include the removal of specific associated infrastructure from the EA which will be assessed as part of a new Basic Assessment process to be undertaken by Environamics in the near future. Please see the points below which indicate the amendments being applied for:

- Amendment 1: Increase in Panel Height
- Amendment 2: Reduction of the generation capacity
- Amendment 3: Change of the location of the switchyard, BESS, connect point, grid connection corridor, O&M buildings and the laydown areas within the authorised development footprint
- Amendment 4: Increase in size of associated infrastructure
- Amendment 5: Inclusion of a substation component as part of the BESS footprint
- Amendment 6: Splitting of the EA into three separate EAs into:
  1. Photovoltaic Solar energy Facility, on-site facility (IPP) substation and associated infrastructure
  2. Battery Energy Storage System (BESS) and associated infrastructure
  3. Overhead power line and switchyard and associated infrastructure

The EMPr was approved in the EA dated 19 June 2015.

This EMPr includes the recommendations of the Environmental Impact Report (EIR), the relevant specialist studies, as well as from issues identified by Environamics during the EIA process. Furthermore, the EMPr has been updated to include the amended layout and the details thereof, and to also include measures proposed by the Phase 1: Groundwater Availability Assessment, the Termite Survey as well as the Conceptual Stormwater Management Plan (Appendices E-G). The specific conditions listed in the EA have also been included. Furthermore, this EMPr is specific to the overhead power line and switchyard and associated infrastructure as is being split as per Amendment 6.

It is further requested that the DFFE approve this updated EMPr and amended layout map.



## 1.1 Project Responsibilities

Several professionals will form part of the construction team. The most important from an environmental perspective are the Project Manager, the Environmental Control Officer (ECO) and the Contractor. The Project Manager is responsible for the implementation of the EMPR on the site during the pre-construction and construction phases of the project. The ECO is responsible for monitoring the implementation of the EMPR during the design, pre-construction and construction phases of the project. The Contractor is responsible for abiding by the mitigation measures of the EMPR which are implemented by the Project Manager during the construction phase. The Contractor is responsible for the implementation of the EMPR during the operational and decommissioning phases of the project.

### 1.1.1 Project manager

The Project Manager is responsible for overall management of the project as well as the implementation of the EMPR. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the specialist studies, Environmental Impact Report (EIR) and the conditions stated within the environmental authorisation.
- Be familiar with the recommendations and mitigation measures of this EMPR, and implement these measures.
- Monitor site activities on a daily basis for compliance.
- Conduct internal audits of the construction site against the EMPR.
- Confine the construction site to the demarcated area.
- Rectify transgressions through the implementation of corrective action.

### 1.1.2 Environmental control officer

The environmental control officer is responsible for the implementation of the EMPR during the construction phase and liaison between the Contractor and the landowners. The ECO will liaise and report to the Contractor, landowners and authorities. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the specialist studies, Environmental Impact Report and the conditions stated within the environmental authorisation.
- Be familiar with the recommendations and mitigation measures of this EMPR.
- Conduct monthly audits of the construction site according to the EMPR and EA.
- Educate the construction team about the management measures of the EMPR and EA.
- Regular liaison with the construction team and the project leader.
- Recommend corrective action for any environmental non-compliance incidents on the construction site.
- Compile a regular report highlighting any non-compliance issues. Good compliance with the EMPR will also be noted.
- All negotiations for any reason shall be between the ECO, the affected parties, and the Contractor. No verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.

- The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

### 1.1.3 Contractor

The Contractor is responsible for the implementation and compliance with recommendations and conditions set out in the EMPR and to:

- Ensure compliance with the EMPR at all times during construction.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints.
  - Health and safety incidents.
  - Hazardous materials stored on site.
  - Non-compliance incidents.

The Contractor shall under no circumstances interfere with the property of landowners or nearby communities.

### 1.1.4 The Environmental Liaison Officer (ELO)

The Environmental Liaison Officer (ELO) will be appointed by the Contractor to monitor activities on site on a daily basis. The ELO will be the ECO's representative on the site and will report back on all audit trips. The ELO must report any major incidents immediately to the ECO.

### 1.1.5 Environmental management responsibilities

Table 1 provides a summary of the various parties and their responsibilities during the construction and operational phases:

**Table 1:** Responsible Parties and Auditing Process

TITLE	PARTY	ROLE DURING CONSTRUCTION	ROLE DURING OPERATION
Proponent	Sonneblom Solar Power Plant	Assume ultimate responsibility	Assume ultimate Responsibility
Project Management	Engineering Procurement and Contracts Management (EPCM) contractor.	Project Management	Project Management
Main Contractor/s	There will be multiple contracts placed and managed by the EPCM contractor for the construction phase. These will cover civil earthworks and concrete, structural	Main Contractor	N/A

	mechanical and electrical / instrumentation (CI). Then there could also be the construction camp management contract.		
Environmental Liaison Officer	To be appointed by Main Contractors.	Day to day environmental responsibility, point of contact for ECO	N/A
Environmental Control Officer	To be appointed by proponent.	Monthly audits	Annual audits
Determining Authority	National Department of Environmental Affairs (DEA).	Conduct site visits when necessary.	Conduct site visits when necessary.

The following are the environmental management responsibilities of the various parties during the construction, operational and decommissioning phases. Unless otherwise stated the EMPR will be adhered to as follows:

- The ELO will be the responsible party for all compliance of this EMPR during the construction phase.
- The monitoring party will be the ECO.
- Method of record keeping will be monthly audits.
- Audit Technique will be the review of records that will be kept on site by the ELO and/or site inspections.
- Sonneblom Solar Power Plant will bear ultimate responsibility.

**Table 2:** Environmental Management Responsibilities

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
1.1	PRE-CONSTRUCTION (SITE ESTABLISHMENT)			
	Site preparation	Sonneblom Solar Power Plant, MC, ELO, ECO	Sonneblom Solar Power Plant, ECO	Site visits
	Consultation	MC	ELO, ECO	Site visits
	Cumulative impacts	MC	ELO	Site visits
	Site clearing	MC	ELO, ECO	Site visit
	Social and Environmental Management Systems	MC	ELO	Site visits
2.1	CONSTRUCTION ACTIVITIES			
	Construction camp	MC, ELO, ECO	ECO	Site visit
	Construction traffic and access	MC, ELO	ECO	Site visit
	Environmental education and training	MC, Sonneblom Solar Power Plant	Sonneblom Solar Power Plant	Site visit
	Soils and geology	MC, ELO	ECO	Site visit
	Erosion control	ELO	ECO	Site visit

	Water Use and quality	ELO	ECO	Records review
	Surface and groundwater	ELO	ECO	Records review
	Waste management	ELO	ECO	Site visit
	Flora	ELO	ECO	Site visit
	Fauna	ELO	ECO	Records review, site visit
	Air quality	ELO	ECO	Records review
	Noise and vibrations	ELO	ECO	Records review
	Energy use	ELO	ECO	Records review
	Employment	Sonneblom Solar Power Plant	ECO	Records review
	Occupational health and safety	MC	Safety officer	Site visit
	Security	MC	ECO	Site visit
	Social environment	Sonneblom Solar Power Plant, MC, ELO	ECO	Records review, site visit
	Heritage	ELO	ECO	Records review, site visit
	Community engagement	ELO	ECO	Site visit
	Visual impact	ELO	ECO	Site visit
3.1	OPERATION ACTIVITIES			
	Construction site decommissioning	LA, Sonneblom Solar Power Plant	ECO	Records review
	Operation and maintenance	Sonneblom Solar Power Plant	ECO	Records review
	Surface and groundwater	LA, MC	ECO	Records review
	Biodiversity	Sonneblom Solar Power Plant	Sonneblom Solar Power Plant	Monitoring
	Waste management	Sonneblom Solar Power Plant	Sonneblom Solar Power Plant	Monitoring
	Health and safety	Sonneblom Solar Power Plant	Sonneblom Solar Power Plant	Monitoring
	Visual impact	Sonneblom Solar Power Plant	Sonneblom Solar Power Plant	Monitoring
	Employment	Sonneblom Solar Power Plant	ECO	Records review
4.1	DECOMMISSIONING ACTIVITIES			
	Ongoing stakeholder involvement	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Site visits

Community health and safety	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Monitoring
Waste management	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Monitoring
Surface and groundwater	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Monitoring
Biodiversity	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Monitoring
Air quality	ELO	ECO	Records review
Noise and vibrations	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Records review
Decommissioning traffic	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Site visits
Visual impact	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Monitoring
Employment	Sonneblom Solar Power Plant, ELO	Sonneblom Solar Power Plant	Records review

1.1.6 Environmental Audits

Table 3 below provides an outline of the generic process involved in the auditing process. It briefly describes the activities of the process initially beginning with defining the objectives and scope of the auditing process as well as the responsibilities of the various parties. The procedure for the auditing process is explained through to the production of audit findings and the compliance (or non-compliance) of the audit findings.

**Table 3:** Example of Procedure for Conducting Audits

Objective	To ensure that formal audits of the EMPR are scheduled and performed so as to verify compliance with the requirements of the EMPR.
Scope	This procedure describes the sequence of events required to perform a compliance audit and the verification of implemented corrective action.
Responsibilities	The ECO or a person authorised and appointed by him, is responsible for the maintenance of the Environmental Audit System. The ECO is responsible for the scheduling and execution of the audit, as well as the verification of the implementation of corrective action. At his/her discretion, this authority may be delegated to responsible company personnel or to an independent Environmental Auditing Authority to perform the audit on his/her behalf. Auditors shall have no direct responsibility in the area/system being audited. They will be

	trained in techniques for auditing environmental systems. The head of department (HOD)/ supervisor for an area/system to be audited (or a responsible person nominated by him/ her) will assist the audit team in the execution of the audit. The HOD will also be responsible for timely corrective actions based on the findings of the audit.
Planning the audit	The ECO or his authorised delegate, shall plan the audit of a particular environmental area or system as follows: <ul style="list-style-type: none"> <li>• He shall inform, in writing, the division to be audited of the intention to conduct an audit at least two weeks prior to the audit. This notification should include the audit objective, scope and duration and any assistance required from the division.</li> <li>• On completion of the audit, an audit findings sheet shall be prepared and submitted to company senior management as well as to the Department/ section, which was audited.</li> <li>• Corrective actions shall be implemented, within eight weeks after the audit, where possible.</li> </ul>
Audit External Schedule	The external environmental audits will be scheduled annually.
Audit Check List	Auditing will be performed by collecting evidence for verification through interviews, relevant documentation and observation of activities and conditions. Instances of nonconformity to EMPR criteria should be recorded. An environmental audit checklist can be used as a guide to address all relevant issues.
Audit Compliance	See below.
Audit Findings and Reporting of non-compliances	The audit team shall review all evidence of their audit findings to decide on non-compliance. Audit findings of non-compliance must be documented and supported by evidence in the Audit Findings Report. The non-compliance findings will be communicated to the Operations Manager and his representatives during an audit feedback meeting. The person responsible for corrective actions, will sign the audit findings report sheet to indicate acceptance and commitment to the required corrective action.

The Independent auditor will:

- Conduct audits.
- Submit audit reports to ECO and relevant authority.
- Engage specialist sub consultants when required.

## 1.2 Layout of Environmental Management Programme

### 1.2.1 Introduction

This EMPR addresses both generic issues as well as specific issues. The generic and issues specific EMPRs are each separated into different phases. Each phase has specific issues unique to that period of the

development and operation of the photovoltaic plants as well as associated infrastructure. The impact is identified and given a brief description. The phases of the development are then identified as below:

- Pre-construction (Site Establishment)
- Construction (including associated rehabilitation of affected environment)
- Operation Phase
- Decommissioning

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

The EMPr specifies mitigation measures for the following environmental aspects:

#### 1.2.2 Pre-construction (Site establishment)

- Site preparation
- Consultation
- Site clearing
- Social and Environmental Management Systems

#### 1.2.3 Construction

- Construction Camp
- Construction Traffic and Access
- Environmental Education and Training
- Soils and Geology
- Erosion Control
- Water Use and Quality
- Surface and Groundwater
- Waste Management
- Flora
- Fauna
- Air Pollution
- Noise and Vibrations
- Energy Use
- Climate Change
- Agricultural Potential
- Employment
- Occupational Health and Safety
- Security
- Social Environment
- Community Engagement
- Visual Impact
- Cultural and Heritage Artefacts

- Operation and Maintenance

#### 1.2.4 Operation

- Construction Site Decommissioning
- Operation and Maintenance
- Surface and Groundwater
- Noise
- Biodiversity
- Waste Management
- Health and Safety
- Visual Impact

#### 1.2.5 Decommissioning Phase

- Ongoing Stakeholder involvement
- Community health and safety
- Waste Management
- Surface and Groundwater
- Biodiversity
- Air Pollution
- Noise and vibrations
- Decommissioning traffic
- Visual impact
- Employment

### 1.3 Objectives of an EMPr

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- To identify measures that could optimise beneficial impacts.
- To create management structures that addresses the concerns and complaints of I&APs with regards to the development.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.



- Specify time periods within which the measures contemplated in the Environmental Management Programme are implemented, where appropriate.
- Conform to the relevant IFC Performance Standards.

The EMPR seeks to highlight the following:

- Avoiding impacts by not performing certain actions.
- Minimising impacts by limiting aspects of an action.
- Rectifying impacts through rehabilitation, restoration, etc of the affected environment.
- Compensating for impacts by providing substitute resources or environments.
- Minimising impacts by optimising processes, structural elements and other design features.
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions/good performances.
- The EMPr is a legally binding document that all parties involved in the project must be made aware of.

### 1.3.1 Environmental monitoring

A monitoring programme will be implemented for the duration of the life of proposed development. This programme will include:

- Monthly audits according to the EMPr conditions will be conducted by the Environmental Control Officer. These audits can be conducted randomly and do not require prior arrangement with the project manager.
- Compilation of an audit report with a rating of the compliance with the EMPr. This report will be submitted to the relevant authorities.
- An annual audit will also be undertaken by an external specialist.

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. A register shall be kept of all complaints from the landowner or community (refer to Appendix A). All complaints/claims shall be handled immediately to ensure timely rectification/payment by the responsible party.

A copy of the EMPr must be kept on site during the life of the Plant. The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

## 1.4 Compliance with the EMPr

The Contractor is deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time,
- The Contractor fails to respond adequately to complaints from the public.

Sonneblom Solar Power Plant is deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- They fail to respond adequately to complaints from the public.

#### 1.4.1 Penalties for non-compliance

Application of a penalty clause to the Contractor will apply for incidents of non-compliance. The penalty imposed will be per incident and will be deducted from the Contractor's monthly payment certificate. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be pre-determined and agreed upon between the Contractor and the ECO. These will vary in amount based upon the severity and/or regularity of the incidence occurring.

The ECO in consultation and with the approval of the Senior Site Supervisor shall issue spot fines if the Contractor infringes specifications of the specialist studies, EMPr and EA. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant employee. The Contractor (through the Environmental Officer) shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings from the authorities, landowners and/or members of the public that may institute against the Contractor. Spot fines for minor offences shall be between R500.00 and R5 000.00, depending upon the severity of the infringement. The decision on how much to impose will be made by the ECO and will be final. In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense. A preliminary list of infringements for which spot fines will be imposed is as follows:

- Using areas outside the working areas without permission/accessing "no-go areas";
- Clearing and/or levelling area outside of the working areas;
- Littering of the site and surrounds;
- Burying waste on site and surrounds;
- The undertaking of informal ablutions;
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;
- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction.

In this context the ECO shall retain records of all fines issued. Monies for the spot fines will be deducted from the Contractors monthly certificate. It is recommended that these monies be collected and donated to a suitable charity or cause.

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

#### 1.4.2 Training and awareness

- Training of construction workers

The Construction Workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical/archaeological artefacts that may be uncovered. They must also be apprised of the EMPr's requirements.

- Contractor performance

The Contractor must ensure that the conditions of the EMPr are adhered to. Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the ECO for advice.

### 1.5 Applicable Legislation, Development Strategies and Guidelines

The following legislation applies:

- Constitution of South Africa (Act No. 108 of 1996)
- National Environmental Management Act (Act No 107 of 1998)
- Environment Conservation Act (Act No 73 of 1989)
- National Heritage Resources Act (Act No 25 of 1999)
- National Water Act (Act No 36 of 1998)
- Hazardous Substances Act (Act No. 15 of 1973)
- Protected species – provincial ordinances
- National Forests Act (Act No 84 of 1998)
- Conservation of Agricultural Resources Act (Act No 43 of 1983)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Veld and Forest Fire Act (Act No 101 of 1998)
- Occupational Health and Safety Act (Act No 85 of 1993)
- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
- Atmospheric Pollution Prevention Act (Act No. 45 of 1965)

Several regulations will be applicable to the construction phase of the project. These guidelines are mentioned in the EMPr tables. Also of significance in this EMPr are:

- IFC Performance Standards;
- World Bank EHS Guideline; and
- Equator Principles.

#### 1.5.1 The Equator Principles

The Equator Principles (EPs) were developed by the financial services sector for the purpose of creating a level playing field in the application of environmental and social risk management in project financing and advisory services. The EPs aim to provide a common baseline and framework against which a financial institution can develop and implement its own internal social and environmental risk management system. Under Principle 3, the Equator Principles establish the International Finance Corporations (IFC) Performance Standards (January 2012) and associated General and Sector Specific EHS Guidelines as the applicable social and environmental standards that a project should comply with if the project is located in a non-OECD country or OECD country that is not designated as high income. The social and environmental assessment that is undertaken for a project establishes whether or not the project is in compliance with the IFC Performance Standards. According to these principles, the performance standards are summarised in Table 4.

**Table 4:** IFC Performance Standards

No	Performance Standard	Intent and objective
1	Assessment and Management of Environmental and Social Risks and Impacts	<ul style="list-style-type: none"> <li>• To identify and evaluate environmental and social risks and impacts of the project.</li> <li>• To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimise, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment.</li> <li>• To promote improved environmental and social performance of clients through the effective use of management systems.</li> <li>• To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately.</li> <li>• To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.</li> </ul>

2	Labour and Working Conditions	<p>Looks at the working conditions by following these principles:</p> <ul style="list-style-type: none"> <li>• To promote the fair treatment, non-discrimination, and equal opportunity of workers.</li> <li>• To establish, maintain, and improve the worker-management relationship.</li> <li>• To promote compliance with national employment and labor laws.</li> <li>• To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain.</li> <li>• To promote safe and healthy working conditions, and the health of workers.</li> <li>• To avoid the use of forced labor.</li> </ul>
3	Resource Efficiency and Pollution Prevention	<ul style="list-style-type: none"> <li>• To avoid or minimise adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.</li> <li>• To promote more sustainable use of resources, including energy and water.</li> <li>• To reduce project-related GHG emissions.</li> </ul>
4	Community Health, Safety and Security	<ul style="list-style-type: none"> <li>• To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances.</li> <li>• To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimises risks to the Affected Communities.</li> </ul>
5	Land Acquisition and Involuntary Settlement	<ul style="list-style-type: none"> <li>• To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs.</li> <li>• To avoid forced eviction.</li> <li>• To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.</li> <li>• To improve, or restore, the livelihoods and standards of living of displaced persons.</li> <li>• To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.</li> </ul>

6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	<ul style="list-style-type: none"> <li>• To protect and conserve biodiversity.</li> <li>• To maintain the benefits from ecosystem services.</li> <li>• To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.</li> </ul>
7	Indigenous People	<ul style="list-style-type: none"> <li>• To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.</li> <li>• To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimise and/or compensate for such impacts.</li> <li>• To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner.</li> <li>• To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle.</li> <li>• To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present.</li> <li>• To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.</li> </ul>
8	Cultural Heritage	<ul style="list-style-type: none"> <li>• To protect cultural heritage from the adverse impacts of project activities and support its preservation.</li> <li>• To promote the equitable sharing of benefits from the use of cultural heritage.</li> </ul>

## **CHAPTER 2: MITIGATION GUIDELINES**

### **2.1 Introduction**

Mitigation guidelines are addressed through four phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); Operational Phase (Post-Construction) as well as Decommissioning Phase. Each phase has specific issues unique to that period of the development and operation of the plants and associated infrastructure. The impact is identified and given a brief description. The four phases of the development are then identified as below:

### **2.2 Pre-construction (Site Establishment)**

Requirements for the pre-construction phase:

- Proper and continuous liaison between the ECO, the Contractor and Landowners to ensure all parties are appropriately informed at all times.
- The Contractor must adhere to all conditions of the contract including the Environmental Management Programme.
- Adequate planning of the construction programme to allow for disruptions due to rain and very wet conditions.
- Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. This will allow for easy assessment of any damage to the roads which may result from the construction process.

If necessary some repairs should be done to prevent damage to equipment. All roads no matter what the condition need to be documented prior to construction. The following should also be ensured:

- Proper documentation and record keeping of all complaints and actions taken.
- Appointment of an Environmental Control Officer to implement this EMPR.
- Regular site inspections by the ECO and good control over the construction process throughout the construction period.
- Independent Environmental Audits to be carried out during and upon completion of construction.
- A formal communications protocol should be set up during the construction phase. The aim of the protocol should be to ensure that effective communication on key issues that may arise during this phase be maintained between key parties such as the ECO, Project Manager and Contractor. The protocol should also ensure that concerns / issues raised by I&APs are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. This could be done through an Environmental Monitoring Committee that would meet on a regular basis. The communications protocol should be maintained throughout the construction phase.

## 2.3 Pre-Construction Phase

### 2.3.1 Site preparation

**Table 5:** Site preparation

<b>IMPACT</b>	<b>SITE PREPARATION</b> This section deals with the preparation of the site and actions that need to be implemented before construction commences	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>SITE ESTABLISHMENT</b>	<b>MC, ELO, ECO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Appoint construction team and suitable manager</b></p> <ol style="list-style-type: none"> <li>1. Appoint an Environmental Control Officer and Environmental Liaison Officer. The ELO is from the Contractor's side while the ECO is from the client's side.</li> </ol> <p><b>Site demarcation and compliance</b></p> <ol style="list-style-type: none"> <li>2. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable.</li> <li>3. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access.</li> <li>4. The Contractor and ECO must ensure compliance with conditions described in the EA.</li> <li>5. Records of compliance/non-compliance with the conditions of the authorisation must be kept and be available on request.</li> <li>6. Records of all environmental incidents must be maintained and a copy of these records be made available to the department on request throughout the project execution.</li> <li>7. The footprint of the development must be limited to the areas required for actual construction works and operational activities. Vegetation clearing must be limited to the required footprint.</li> <li>8. Areas outside of the footprint, including sensitive areas and buffer areas, must be clearly demarcated (using fencing and appropriate signage) before construction commences and must be regarded as "no-go" areas. Contractors and construction workers must be clearly informed of the no-go areas.</li> </ol>	



9. The pollutions measures in terms of Section 19 (1) of the National Water Act, 1998 (Act No. 36 of 1998) must be adhered to at all times as follows: 19 (1) An owner of land a person in control of land or a person who occupies or uses the land on which any activity or process is or performed or undertaken; or any other situation exists which causes, has caused or is likely to cause pollution of a water resource, must take a reasonable measure to prevent any such pollution of a water resource, from occurring, continuing or recurring.
10. Watercourses outside the approved footprint/layout must be treated as “no-go” areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction material, fuel, oil, bitumen or waste must be allowed into these areas without the express permission of and supervision by the ECO, except for rehabilitation work in these areas.
11. Underground cables and internal access roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation and watercourses.
12. Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.
13. The closest portion of the structure must be positioned at least 60 meters from the National road Reserve boundary.
14. Should abnormal loads have to be transported by road to the site, a permit must be obtained from the relevant Provincial and National Transport Authority.
15. The holder of the authorisation must comply with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983) articles 7.1 and (3)b of Regulation 9238.

**Construction Camp**

16. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site.
17. All construction equipment must be stored within this construction camp.
18. All associated oil changes etc (no servicing) must take place within this camp on a sealed surface such as a concrete slab.
19. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment.
20. All Construction Camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.
21. The Contractor must provide sufficient ablution facilities, in the form of portable/VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit

latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 50 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area.

22. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed.
23. Lighting for both the construction period and through the operation of the facility must be of low-pressure sodium type, preferably yellow. All perimeter and security lighting must be attached to motion detectors, and should be dark-sky friendly.
24. Electric fencing should not have any strands within 30cm of the ground, which should be sufficient to allow smaller mammals, reptiles and tortoises to pass through (tortoises retreat into their shells when electrocuted and eventually succumb from repeated shocks), but still remain effective as a security barrier.

**Veld fires**

25. Sonneblom Solar Power Plant should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;
26. A fire-break should be constructed around the perimeter of the site prior to the commencement of the construction phase;
27. Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;
28. Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months;
29. Contractor to provide adequate firefighting equipment on-site, including a fire fighting vehicle;
30. Contractor to provide fire-fighting training to selected construction staff;
31. No construction staff, with the exception of security staff, to be accommodated on site over night;
32. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.

33. The facility must register with local fire-fighting organisation and periodically conduct drills in conjunction with local fire-fighting unit.

**Labour**

34. Where reasonable and practical Sonneblom Solar Power Plant should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories.

35. Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.

36. Before the construction phase commences Sonneblom Solar Power Plant should meet with representatives from the MMM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase.

37. The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that Sonneblom Solar Power Plant intends following for the construction phase of the project.

38. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

**Training of site staff**

39. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artifacts.

40. Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase.

41. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks.

42. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.

43. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager.

44. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.

	<p>45. Staff must be trained in the hazards and required precautionary measures for dealing with these substances</p> <p>46. Spillage packs must be available at construction areas.</p> <p>47. The holder of this authorisation must train safety representatives, managers and workers in workplace safety. The construction process must be compliant with all safety and health measures as prescribed by the relevant act.</p>	
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### 2.3.2 Consultation

**Table 6:** Consultation

<b>IMPACT</b>	<b>CONSULTATION</b> This section deals with the public consultation of the site and actions that need to be implemented before construction commences	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>PRE-CONSTRUCTION</b>	<b>MC</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Provide a mechanism through which information could be exchanged between the project proponent and stakeholders.</li> <li>2. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction.</li> <li>3. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures</li> <li>4. Determine stakeholder satisfaction levels.</li> <li>5. The MMM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.</li> <li>6. Sonneblom Solar Power Plant should consider the option of establishing a monitoring forum that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.</li> </ol>	

### 2.3.3 Site Clearing

**Table 7: Site Clearing**

<b>IMPACT</b>	<b>SITE CLEARING</b> This section deals with site clearing and actions that need to be implemented before construction commences	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>PRE-CONSTRUCTION</b>	<b>MC</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Site clearing must take place in a phased manner, as and when required.</li> <li>2. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks.</li> <li>3. The area to be cleared must be clearly demarcated and this footprint strictly maintained.</li> <li>4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site.</li> <li>5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent.</li> <li>6. Before the clearing of the site, the appropriate permits must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF) for the removal of plants listed in the National Forest Act and from the relevant provincial department for the destruction of species protected in terms of the specific provincial legislation. No construction activities can commence without having obtained the necessary permits for threatened or protected species (TOPS) listed and provincially protected species within the study area. Copies of the permits must be kept by the ECO.</li> <li>7. No protected tree may be damaged, disturbed, cut or destroyed without a valid license issued under the National Forest Act.</li> </ol>	

### 2.3.4 Social and Environmental Management Systems

**Table 8:** Social and Environmental Management Systems

<b>IMPACT</b>	<b>SOCIAL AND ENVIRONMENTAL MANAGEMENT SYSTEMS</b> This section deals with the Social and Environmental Management Systems and actions that need to be implemented before construction commences	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>SITE ESTABLISHMENT</b>	<b>MC</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Performance Standard One underscores the importance of managing social and environmental performance throughout the life of a project.</li> <li>2. An effective social and environmental management system is a dynamic, continuous process initiated by management and involving communication between the client, its workers and the local communities directly affected by the project. The client must establish and maintain a Social and Environmental Management System, appropriate to the nature and scale of the project and commensurate to the level of social and environmental risks and impacts. The management system should incorporate the following elements:               <ul style="list-style-type: none"> <li>○ Social and Environmental Assessment</li> <li>○ Management program</li> <li>○ Organizational capacity</li> <li>○ Training</li> <li>○ Community Engagement</li> <li>○ Monitoring and Reporting</li> </ul> </li> </ol>	

### 2.3.5 Termite Management

**Table 9:** Termite Management

<b>IMPACT</b>	<b>TERMITE MANAGEMENT</b> This section deals with the mitigation measure to alleviate termite problems that may arise. The actions that need to be considered and implemented before construction commences	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>SITE ESTABLISHMENT</b>	<b>MC</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Additional protective metallic sheaths (iron or aluminum) that cover the driver portion of the cables and their outer plastic sheath.</li> <li>2. Immersion of the cables in a concrete jacket or cover the cables from all sides with prefabricated concrete during their laying. This creates an additional protective hard sheath that protects the driver portion of the cables and their outer sheath. However, this entails high costs when laying the cables, and is difficult to maintain and repair.</li> <li>3. Additional protective hard plastic sheaths, such as nylon-12, that cover and surround the driver portion of the cables and their outer sheath. This can substantially reduce termite attacks, but not eliminate them completely.</li> <li>4. Additional protective plastic sheaths containing repellents or chemicals toxic to termites can be used to cover and surround the driver portion of the cables and their outer sheaths. This will kill the termites and interfere with their reproduction for a limited time. However, this may hold adverse effects for the local environment and ecosystem.</li> <li>5. Termitaria (mounds and nests) surrounding the cable burial areas can be destroyed. This doesn't prove to be very effective, as the termites will reconstruct these nests elsewhere in the vicinity of the destroyed nest or build new mounds when the alates (winged reproductive) settle on a patch of ground. Care must be taken not to remove more plant material from these sites as is necessary. Disturbed ground cover can lead to higher levels of infestation by these species as they tend to colonise bare ground. There are enough food resources on the surrounding land to supply these termites with energy, and they can forage for extensive distances collecting grass. Furthermore, removing all mounds and vegetation cover may lead to serious erosion problems.</li> <li>6. Massive deployment of chemicals (pesticides) for the control of termites can be applied (chemicals, such as Cypermethrin or permethrin) in the ground surrounding the cable burying sites. This will only provide short term protection against the termites and repeated treatment with pesticides will be</li> </ol>	

	<p>necessary. However, care must be taken to switch between different insecticide classes to prevent the termites from becoming resistant to the pesticides over time. An insecticide specialist will be able to provide the correct chemicals and dosages that should be applied. Draw backs to this approach may include dilution of the insecticides during the rainy season, where more frequent applications will be necessary. The use of chemicals for the control of insects has severe implications for the environment. Ground water may be polluted, and these chemicals are toxic to beneficial organisms as well.</p> <ol style="list-style-type: none"><li>7. The cables can be laid at greater depths to try and minimise the chance of being in the way of foraging tunnels. However, Hodotermes nests extend to a depth of 6m, thus making this option somewhat unpractical due to high construction and maintenance costs.</li><li>8. Elevating the cables above ground out of the reach of termite activity will greatly reduce or even nullify the risk of termite attacks. However, the cables will be exposed to sunlight and other environmental factors and may be a target of vandalism or theft. Rodents and other mammals may additionally cause damage by their foraging actions, increasing maintenance and repair costs.</li><li>9. Install commercially available termite traps to continuously monitor for their presence and increase in densities in the vicinity of the cables and wells.</li></ol>	
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## 2.4 Construction Phase

### 2.4.1 Construction Camp

**Table 9:** Construction Camp

IMPACT	<b>CONSTRUCTION CAMP</b> This section deals with construction camp (equipment and batching camp) and actions that need to be implemented during construction	RESPON-SIBILITY
PHASE	CONSTRUCTION	MC/ELO/ECO
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Site of construction camp</b></p> <ol style="list-style-type: none"> <li>1. The size of the construction camp should be minimised.</li> <li>2. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and/or sheet erosion.</li> <li>3. Suitable control measures over the Contractor's yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented.</li> <li>4. The holder of this authorisation must take note that no temporary site camps will be allowed outside the footprint of the development area as the establishment of such structures might trigger a listed activity as defined in the Environmental Impact Assessment Regulations, 2010.</li> </ol> <p><b>Storage of materials (including hazardous materials)</b></p> <ol style="list-style-type: none"> <li>5. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary.</li> <li>6. Storage areas must be designated, demarcated and fenced if necessary.</li> <li>7. Storage areas should be secure so as to minimise the risk of crime. They should also be safe from access by unauthorised persons i.e. children/animals etc.</li> <li>8. Fire prevention facilities must be present at all storage facilities.</li> <li>9. Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and</li> </ol>	

this should be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events.

10. All fuel storage areas must be roofed to avoid creation of dirty stormwater.
11. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources.
12. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
13. Storage areas containing hazardous substances/materials must be clearly signposted.
14. Staff dealing with these materials/substances must be aware of their potential impacts and follow the appropriate safety measures.
15. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The Contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.
16. All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site.
17. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the MC and ECO for information. Emergency response procedures to be followed and implemented.
18. Emergency and spillage plans need to be developed and submitted to the relevant authorities for approval.

**Drainage of construction camp**

19. Surface drainage measures must be established in the Construction Camps so as to prevent:
  - Ponding of water;
  - Erosion as a result of accelerated runoff; and,
  - Uncontrolled discharge of polluted runoff.

## 2.4.2 Construction traffic and access

**Table 10:** Construction Traffic and Access

IMPACT	<b>CONSTRUCTION TRAFFIC AND ACCESS</b> This section deals with construction traffic and access and actions that need to be implemented during construction	RESPON-SIBILITY
PHASE	CONSTRUCTION	MC/ELO
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Construction traffic</b></p> <ol style="list-style-type: none"> <li>1. Construction routes and required access roads must be clearly defined.</li> <li>2. Delivery of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities.</li> <li>3. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.</li> <li>4. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</li> <li>5. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc.</li> <li>6. Servicing must be done in dedicated service areas on site or else off site if no such area exists.</li> <li>7. Oil changes must take place on a concrete platform and over a drip tray to avoid pollution.</li> <li>8. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels.</li> <li>9. Signs must be placed along construction roads to identify speed limits, travel restrictions and other standard traffic control information.</li> </ol> <p><b>Access</b></p> <ol style="list-style-type: none"> <li>10. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-contractors.</li> <li>11. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign.</li> </ol>	

	<p><b>Road maintenance</b></p> <ol style="list-style-type: none"> <li>12. Where necessary suitable measures shall be taken to rehabilitate damaged areas.</li> <li>13. Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and stormwater damages as soon as these develop.</li> <li>14. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt.</li> </ol> <p><b>Noise</b></p> <ol style="list-style-type: none"> <li>15. Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should not take place over weekends.</li> </ol> <p><b>General</b></p> <ol style="list-style-type: none"> <li>16. The Contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.</li> <li>17. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.</li> <li>18. Care for the safety and security of community members crossing access roads should receive priority at all times.</li> </ol>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• The contractor must ensure that damage caused by construction related traffic to any local roads is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor;</li> <li>• Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;</li> <li>• All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</li> </ul>	

### 2.4.3 Environmental Education and Training

**Table 11:** Environmental Education and Training

<b>IMPACT</b>	<b>ENVIRONMENTAL EDUCATION AND TRAINING</b> This section deals with the environmental training of construction employees who will work at the proposed power plants	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Environmental training</b></p> <ol style="list-style-type: none"> <li>1. The project manager must appoint an ECO prior to construction.</li> <li>2. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: <ul style="list-style-type: none"> <li>○ What is meant by “Environment”</li> <li>○ Why the environment needs to be protected and conserved</li> <li>○ How construction activities can impact on the environment</li> <li>○ What can be done to mitigate against such impacts</li> <li>○ Awareness of emergency and spills response provisions</li> <li>○ Social responsibility during construction e.g. being considerate to local residents</li> </ul> </li> <li>3. Training should be undertaken by a party such as the ECO who has sufficient expertise and knowledge of environmental issues.</li> <li>4. It is the Contractor’s responsibility to provide the site foreman with no less than 1 hour’s environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff.</li> <li>5. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary.</li> <li>6. Use should be made of environmental awareness posters on site.</li> <li>7. The need for a “clean site” policy also needs to be explained to the workers.</li> <li>8. Staff operating equipment (such as loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks.</li> </ol>	

	<p><b>Monitoring of environmental training</b></p> <p>9. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and/or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.</p>	
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#### 2.4.4 Soils and Geology

General guidelines for management of soils are provided in Appendix B.

**Table 12:** Soils and Geology

<b>IMPACT</b>	<b>SOILS AND GEOLOGY</b> This section deals with soils and geology and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC/ ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Soil compaction</b></p> <p>1. The most effective mitigation will be the minimisation of the project footprint by using the existing roads in the area and not create new roads to prevent other areas also getting compacted.</p> <p><b>Chemical soil pollution</b></p> <p>2. All waste generated on site during construction should be stored in waste bins and removed from site on a regular basis.</p> <p>3. Vehicles accessing the site should regularly be checked for fuel and oil spills. In case of spillage, the contaminated soil should be removed and transported to a designated waste site.</p> <p>4. Broken or old batteries or components of the PV plant should be stored in a demarcated area in quarantine for the shortest period of time possible until it can be collected and taken to a special chemical waste facility.</p> <p><b>Topsoil</b></p> <p>5. The Contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should</p>	

	<p>include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.</p> <ol style="list-style-type: none"> <li>6. Care must be taken not to mix topsoil and subsoil during stripping.</li> <li>7. Should any topsoil become polluted the Contractor must remove the polluted soil to the full depth of pollution and replace it at his own expense with clean topsoil.</li> <li>8. Removed polluted topsoil should be transported to a licensed landfill site.</li> <li>9. The topsoil must be conserved on site in and around the pit area.</li> <li>10. Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.</li> </ol> <p><b>Soil Stripping</b></p> <ol style="list-style-type: none"> <li>11. No soil stripping must take place on areas within the site that the Contractor does not require for construction works or areas of retained vegetation.</li> <li>12. Subsoil and overburden in all construction and lay down areas should be stockpiled separately to be returned for backfilling in the correct soil horizon order.</li> <li>13. Construction vehicles must only be allowed to utilise existing tracks or pre-planned access routes.</li> </ol> <p><b>Soil Stockpiles</b></p> <ol style="list-style-type: none"> <li>14. Stockpiles should not be situated such that they obstruct natural water pathways.</li> <li>15. Topsoil stockpiles must not exceed 2m in height, stockpiles older than 6 months must be enriched before they can be used to ensure the effectiveness of the topsoil.</li> <li>16. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.</li> <li>17. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.</li> <li>18. Where contamination of soil is expected, analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage/leakage occurs should be attained and given to the project manager.</li> <li>19. Topsoil and subsoil must be stockpiled separately and replaced according to the correct profile i.e. topsoil replaced last. Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels.</li> </ol>	<p>Main Contractor/ ECO</p>
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**Fuel storage**

20. Topsoil and subsoil to be protected from contamination. This should be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities.
21. Fuel and material storage must be away from stockpiles.
22. Concrete and chemicals must be mixed on an impervious surface and provisions should be made to contain spillages or overflows into the soil.
23. Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.

**Concrete mixing**

24. The concrete batching plant must be contained within a bunded area.
25. Concrete mixing must only take place within designated areas.
26. Ready mixed concrete must be utilised where possible.
27. No vehicles transporting concrete to the site may be washed on site.
28. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Run-off from the batch plant must not be allowed to enter the storm water system.

**Earthworks**

29. Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas.
30. It is recommended that a suitably qualified engineering geologist or geotechnical engineer inspect all foundation trenches prior to construction in order to identify and evaluate any soil characteristics in variance with that found during the detailed geotechnical investigation.
31. Should there be mining of gravel for the proposed new access road, approval must be obtained from the Department of Minerals and Energy.
32. Foundations and trenches must be backfilled with originally excavated materials as much as possible. Excess excavation materials must be disposed of only in approved areas or, if suitable, stockpiled for use in reclamation activities.
33. Borrow materials must be obtained only from authorised and permitted sites. Permits must be kept on site by the ECO.



<b>SITE SPECIFIC MITIGATION MEASURES</b>	
	<ul style="list-style-type: none"> <li>• If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface and stockpiled for re-spreading during rehabilitation.</li> <li>• Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them.</li> <li>• Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land.</li> <li>• During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</li> <li>• Erosion must be controlled where necessary on top soiled areas.</li> <li>• Establish an effective record keeping system for each area where soil is disturbed for constructional purposes. These records should be included in environmental performance reports, and should include all the records below. <ul style="list-style-type: none"> <li>○ Record the GPS coordinates of each area.</li> <li>○ Record the date of topsoil stripping.</li> <li>○ Record the GPS coordinates of where the topsoil is stockpiled.</li> <li>○ Record the date of cessation of constructional (or operational) activities at the particular site.</li> <li>○ Photograph the area on cessation of constructional activities.</li> <li>○ Record date and depth of re-spreading of topsoil.</li> <li>○ Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.</li> </ul> </li> <li>• All areas of disturbed soil must be reclaimed using only indigenous grass and shrubs. Reclamation activities shall be undertaken according to the rehabilitation plan to be included in the final EMPr.</li> </ul>

#### 2.4.5 Erosion Control

**Table 13:** Erosion Control

<b>IMPACT</b>	<b>EROSION CONTROL</b> This section deals with erosion and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ECO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.	

	<ol style="list-style-type: none"> <li>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.</li> <li>3. Wind screening and storm water control should be undertaken to prevent soil loss from the site.</li> <li>4. The use of silt fences and sandbags must be implemented in areas that are susceptible to erosion.</li> <li>5. Other erosion control measures that can be implemented are as follows: <ul style="list-style-type: none"> <li>○ Brush packing with cleared vegetation</li> <li>○ Mulch or chip packing</li> <li>○ Planting of vegetation</li> <li>○ Hydroseeding/hand sowing</li> </ul> </li> <li>6. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented.</li> <li>7. All erosion control mechanisms need to be regularly maintained.</li> <li>8. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces.</li> <li>9. Retention of vegetation where possible to avoid soil erosion.</li> <li>10. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.</li> <li>11. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses.</li> <li>12. No impediment to the natural water flow other than approved erosion control works is permitted.</li> <li>13. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings.</li> <li>14. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.</li> <li>15. Anti-erosion measures such as silt fences must be installed in disturbed areas.</li> <li>16. Monitoring for erosion must take place 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 as outlined in the erosion management plan.</li> </ol>	
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## 2.4.6 Water Use and Quality

**Table 14:** Water Use and Quality

IMPACT	<b>WATER USE AND QUALITY</b> This section deals with water use and quality and actions that need to be implemented during construction	RESPON- SIBILITY
PHASE	CONSTRUCTION	ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Water Use</b></p> <ol style="list-style-type: none"> <li>1. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.</li> <li>2. Water must be reused, recycled, or treated where possible.</li> <li>3. Consultation with key stakeholders to understand any conflicting water use demands and the community's dependency on water resources and conservation requirements within the area.</li> <li>4. Measures should be put in place to prevent wasteful water usage.</li> </ol> <p><b>Water Quality</b></p> <ol style="list-style-type: none"> <li>5. The quality and quantity of effluent streams discharged to the environment including stormwater should be managed and treated to meet applicable effluent discharge guidelines.</li> <li>6. Quality of water being discharged must be tested on a monthly basis.</li> <li>7. Discharge to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria outside a scientifically established mixing zone.</li> <li>8. Efficient oil and grease traps or sumps should be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans.</li> </ol> <p><b>Stormwater</b></p> <ol style="list-style-type: none"> <li>9. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants.</li> <li>10. Silt fences should be used to prevent any soil entering the stormwater drains.</li> <li>11. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration.</li> </ol>	<p>Engineer</p> <p>ECO</p> <p>ECO</p>

12. Promote a water saving mind set with construction workers in order to Contractor ensure less water wastage.
13. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency.
14. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution.
15. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase.
16. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers.
17. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed.
18. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.

**Groundwater resource protection**

19. Process solution storage ponds and other impoundments designed to hold non fresh water or non treated process effluents should be lined and be equipped with sufficient wells to enable monitoring of water levels and quality.

**Sanitation**

20. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).
21. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.

**Concrete mixing**

22. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.

	<p><b>Public areas</b></p> <p>23. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.</p> <p>24. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.</p> <p>25. No washing or servicing of vehicles on site.</p>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Construct a closed circuit drainage system.</li> <li>• Introduce berms and/or channels to keep clean and dirty water separated.</li> <li>• Minimise on site housing and ablution facilities.</li> <li>• Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records occurrence or not of any seeps and signs of a compromised drainage system.</li> <li>• Link this inspection to the groundwater quality monitoring data.</li> </ul>	

#### 2.4.7 Surface and Groundwater

**Table 15:** Surface and Groundwater

<b>IMPACT</b>	<b>SURFACE WATER AND GROUNDWATER</b> This section deals with surface and groundwater and actions that need to be implemented during construction	<b>RESPON-SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ECO / Main Contractor</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Sanitation</b></p> <ol style="list-style-type: none"> <li>1. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers).</li> <li>2. Water saving devices and technologies such as the use of dual flush toilets should be considered.</li> <li>3. The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution.</li> </ol>	

**Hazardous materials**

4. Use and or storage of materials, fuel and chemicals which could potentially leak into the ground must be controlled.
5. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.
6. Facilities for sanitary convenience, fuel storage or any substance which causes or is likely to cause pollution of a water resource should not be placed within the 1:50 year flood-line and/or 100 metres from any watercourse.
7. The Contractor (monitored by the Environmental Control or Liaison Officer) should be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry.
8. Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.

**Concrete mixing**

9. Concrete contaminated water must not enter soil or any natural drainage system as this disturbs the natural acidity of the soil and affects plant growth.

**Public areas**

10. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis.
11. The Contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines.
12. No washing or servicing of vehicles on site.

**Water resources**

13. Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities.

	<p>14. Municipal water (or another source approved by the ECO) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.</p> <p>15. Relevant departments and other emergency services should be contacted in order to deal with spillages and contamination of aquatic environments.</p> <p>16. The pollution prevention measures in terms of Section 19 (1) of the National Water Act, 1998 (Act No. 36 of 1998) should be adhered to at all times.</p> <p>17. The Department of Water and Sanitation should be informed of any incidents that may have detrimental impact on water resources within 24 hours of any occurrence of such.</p>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Construction vehicles and machinery ideally should not cross drainage channels and should be routed away from these surface water features. This will avoid impacting structurally and functionally on these systems entirely. Moreover, construction should not take place within the buffer zones stipulated. The buffer zone and any surface water features need to be fenced off to prevent access and other related impacts occurring such as uncontrolled interaction between people and the surface water features as well as the entry of leaked hazardous materials into these resources. Where access roads (temporary or permanent) are constructed, stormwater management measures need to be implemented for the duration of the lifecycle of the roads. This specifically relates to the use of any appropriate stormwater structure that will assist in reducing the rate of run-off generated on access roads entering water courses and that will help prevent additional sediment loads entering the water courses. Structures can include silt nets, grass blocks or berms.</li> <li>• Storm water management measures need to be implemented for the duration of the lifecycle of the development and importantly must take into consideration to the larger scale to be applied. This specifically relates to the use of any appropriate stormwater structure that will assist in reducing the rate of run-off generated on the proposed development entering nearby water courses and that will help prevent additional sediment loads entering the water courses.</li> <li>• The implementation of a rehabilitation plan designed for the specific impact caused to the natural area.</li> <li>• The implementation of an adequate stormwater management plan and associated structures tailored to the design of the proposed development and the underlying topography must be incorporated as part of the proposed development. The storm water management design and plan should consider using structures that area semi-permeable, structures that impede or reduce the rate of run-off and structures that can accommodate the volume of run-off (such as attenuation dams/ponds).</li> </ul>	

- Leakage of transformer oils must be prevented by constructing oil bunds to ensure that any oil spills are contained and not released into the environment.
- Don't place any permanent buildings or support infrastructure on the valley bottom.
- Construct berms along the border to trap sediments and chemical spills during the construction period.
- Monitor any vehicles for leaks of petroleum products that could pollute runoff water.
- Suppress dust by spraying construction roads.
- Do not install PV panels within the wetland and buffers.
- Monitor recovery of disturbed areas in the period following construction.
- Undertake a habitat assessment study annually for 3 years after completion of construction.

#### **Groundwater**

- Inventories should be made of all substances that are potentially hazardous to groundwater, which will be stored, used or transported over the sites. The risk of each substance to the groundwater should be considered.
- All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely bunded (impermeable floor and sides) to prevent accidental discharge to groundwater.
- A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing down the outside of the casing. Full construction details of monitoring boreholes must be recorded when they are drilled (e.g. screen and casing lengths, diameters, total depth, etc). Sampling of monitoring boreholes should be done according to recognised standards.



## 2.4.8 Waste Management

**Table 16:** Waste Management

IMPACT	<b>WASTE MANAGEMENT</b> This section deals with waste management and actions that need to be implemented during construction	RESPON-SIBILITY
PHASE	CONSTRUCTION	ELO
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. An integrated waste management approach must be implemented that is based on waste minimisation. Where waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environment Management Waste Act, 2008 (act 59 of 2008).</li> </ol> <p><b>Litter management</b></p> <ol style="list-style-type: none"> <li>2. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site.</li> <li>3. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill.</li> <li>4. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site.</li> <li>5. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling.</li> <li>6. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite.</li> <li>7. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly.</li> <li>8. The contractor together with the Waste Management Officer should agree on an onsite disposal of general waste which will be monitored by the municipality on an ongoing basis.</li> <li>9. All waste must be removed from the site and transported to a landfill site promptly to ensure that it does not attract vermin or produce odours.</li> <li>10. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management.</li> </ol>	

11. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant.
12. Under no circumstances may solid waste be burnt on site.
13. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.

**Hazardous waste**

14. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of offsite at a licensed landfill site, where practical. Incineration may be used where relevant.
15. Contaminants to be stored safely to avoid spillage.
16. Machinery must be properly maintained to keep oil leaks in check.
17. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately be cleaned up and all affected areas rehabilitated.

**Sanitation**

18. The Contractor shall install mobile chemical toilets on the site.
19. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed.
20. Ablution facilities shall be within 50m from workplaces and not closer than 50m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1:15 workers). Male and females must be accommodated separately where possible.
21. Toilets shall be serviced regularly and the ECO shall inspect toilets regularly.
22. Toilets should be no closer than 50m or above the 1:100 year flood line from any natural or manmade water bodies or drainage lines or alternatively located in a place approved of by the Engineer.
23. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility.
24. The construction of "Long Drop" toilets is forbidden, but rather toilets connected to the sewage treatment plant.
25. Potable water must be provided for all construction staff.

	<p><b>Remedial actions</b></p> <p>26. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site.</p> <p>27. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site.</p> <p>28. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil.</p> <p>29. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material.</p> <p>30. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>31. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>32. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.</p>	
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#### 2.4.9 Flora

**Table 17:** Flora

<b>IMPACT</b>	<b>FLORA</b> This section deals with flora and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Existing vegetation</b></p> <ol style="list-style-type: none"> <li>1. Vegetation removal must be limited to the construction site.</li> <li>2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step.</li> <li>3. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected.</li> <li>4. No vegetation to be used for firewood.</li> <li>5. Exotic and invasive plant species should not be allowed to establish, if the development is approved.</li> </ol>	

**Rehabilitation**

6. All damaged areas shall be rehabilitated upon completion of the contract.
7. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.
8. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit.
9. Rehabilitation must take place in a phased approach as soon as possible.
10. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding.
11. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas.
12. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged.

**Demarcation of construction and laydown areas**

13. All plants not interfering with the operation of the power line construction shall be left undisturbed clearly marked and indicated on the site plan.
14. The construction area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint.
15. Vegetation removal must be phased in order to reduce impact of construction.
16. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.
17. Strict and regular auditing of the power line construction process to ensure containment of the construction and laydown areas.
18. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.

**Utilisation of resources**

19. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO.

	<p><b>Exotic vegetation</b></p> <p>20. Alien vegetation on the site will need to be controlled.</p> <p>21. The Contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion.</p> <p>22. The spread of exotic species occurring throughout the site should be controlled.</p> <p><b>Herbicides</b></p> <p>23. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used.</p> <p>24. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.</p>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• The site should be fenced off prior to commencement of construction activities;</li> <li>• The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be confined to the fenced off area and minimised where possible;</li> <li>• An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;</li> <li>• All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase;</li> <li>• The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. Specifications for the rehabilitation are provided throughout the EMPr.</li> <li>• The implementation of the Rehabilitation Programme should be monitored by the ECO.</li> <li>• The establishment of exotic and invasive plant species should be avoided and where these have been found at the site continuous eradication should take place.</li> <li>• Cleared alien vegetation must be temporarily stored in a demarcated area. Once clearing is completed, they must be moved to a licenced waste disposal facility.</li> </ul>	

## 2.4.10 Fauna

**Table 18:** Fauna

<b>IMPACT</b>	<b>FAUNA</b> This section deals with fauna and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ECO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Demarcation of sensitive areas must be verified on site by the ECO prior to construction activities starting.</li> <li>2. Use of appropriate construction techniques.</li> <li>3. Rehabilitation to be undertaken as soon as possible after construction has been completed.</li> <li>4. No trapping or snaring to fauna on the construction site should be allowed.</li> <li>5. No faunal species must be disturbed, trapped, hunted or killed by maintenance staff during any routine maintenance at the development.</li> <li>6. All new power lines must be marked with bird flight diverters along their entire length. To create a net benefit, where possible, the new lines must run parallel to existing marked lines so as to reduce the collision risk posed by the older lines. The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures away from the potentially risky insulators. All pylons to be constructed must make use of "bird friendly" structures, fitted with a bird perch, as per Eskom standard guidelines.</li> <li>7. Any fauna directly threatened by the construction activities should be removed to a safe location by a suitably qualified person.</li> </ol>	

## 2.4.11 Air Quality

**Table 19:** Air Pollution

<b>IMPACT</b>	<b>AIR POLLUTION</b> This section deals with air pollution and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD</b>	<b>Dust control</b> <ol style="list-style-type: none"> <li>1. Wheel washing and damping down of un-surfaced and un-vegetated areas.</li> </ol>	

<p><b>STATEMENT</b></p>	<ol style="list-style-type: none"> <li>2. Retention of vegetation where possible will reduce dust travel.</li> <li>3. Clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas.</li> <li>4. Damping down of all exposed soil surfaces with a water bowser or sprinklers when necessary to reduce dust.</li> <li>5. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the neighbouring communities.</li> <li>6. A speed limit of 30km/h must not be exceeded on site.</li> <li>7. Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor.</li> <li>8. Any dirt roads that are utilised by the workers must be regularly maintained to ensure that dust levels are controlled.</li> <li>9. Appropriate dust suppression techniques must be implemented on all exposed surfaces during the construction phase. Such measures may include wet suppression, chemical stabilization, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.</li> </ol> <p><b>Odour control</b></p> <ol style="list-style-type: none"> <li>10. Regular servicing of vehicles in order to limit gaseous emissions.</li> <li>11. Regular servicing of onsite toilets to avoid potential odours.</li> </ol> <p><b>Rehabilitation</b></p> <ol style="list-style-type: none"> <li>12. The Contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks.</li> </ol> <p><b>Fire prevention</b></p> <ol style="list-style-type: none"> <li>13. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires.</li> <li>14. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.</li> </ol>	
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## 2.4.12 Noise and Vibrations

**Table 20:** Noise and Vibrations

IMPACT	NOISE This section deals with noise and actions that need to be implemented during construction	RESPON- SIBILITY
PHASE	CONSTRUCTION	ELO
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</li> <li>2. Construction site yards, workshops, concrete batching plants, and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the Contractor(s), the sites must be evaluated in detail and specific measures designed in to the system.</li> <li>3. Truck traffic should be routed away from noise sensitive areas, where possible.</li> <li>4. Noise levels must be kept within acceptable limits.</li> <li>5. Noisy operations should be combined so that they occur where possible at the same time.</li> <li>6. Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas should not be allowed.</li> <li>7. Construction workers to wear necessary ear protection gear.</li> <li>8. Noisy activities to take place during allocated construction hours.</li> <li>9. Noise from labourers must be controlled.</li> <li>10. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.</li> <li>11. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</li> <li>12. Implementation of enclosure and cladding of processing plants.</li> <li>13. Applying regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine.</li> </ol>	



<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>Gravel roads used during construction of the plant should be kept in good order. Corrugations and drainage ruts should not be allowed to develop as these can contribute to mechanical rattling and banging noise on vehicles traversing these roads.</li> </ul>	

#### 2.4.13 Energy use

**Table 21:** Energy use

<b>IMPACT</b>	<b>ENERGY USE</b> This section deals with energy use and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>Energy saving lighting must be implemented across the board.</li> <li>Water saving measures must be implemented across the plant to ensure little wastage.</li> <li>Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations.</li> <li>Equipment not in use must be switched off and unplugged to save on unnecessary energy costs.</li> </ol>	

#### 2.4.14 Employment

**Table 22:** Employment

<b>IMPACT</b>	<b>EMPLOYMENT</b> This section deals with employment and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Labour</b></p> <ol style="list-style-type: none"> <li>The use of labour intensive construction measures should be used where appropriate.</li> <li>Training of labour to benefit individuals beyond completion of the project.</li> <li>Sonneblom Solar Power Plant and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;</li> </ol>	

	<p><b>Recruitment Plan</b></p> <ol style="list-style-type: none"> <li>4. Recruitment must comply with national employment and labour laws.</li> <li>5. Where reasonable and practical, Sonneblom Solar Power Plant's service providers should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories.</li> <li>6. The Project Manager must ensure that all staff working on the proposed project is in possession of a South African Identity Card or a relevant work permit.</li> <li>7. Ensure adequate advertising in the project community areas, local papers for skilled labour.</li> <li>8. Local community leaders must be utilised to source labour.</li> <li>9. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process.</li> <li>10. The recruitment of skilled labour will follow standard advertising process in national newspapers and interview based selection.</li> <li>11. Record of official complaints by employees to authorities i.e. Labour and Social Security.</li> <li>12. Where feasible, efforts should be made to employ local contractors that are compliant with Black Economic Empowerment (BEE) criteria.</li> <li>13. Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.</li> <li>14. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> <li>15. Establish, maintain a healthy worker-management relationship.</li> </ol>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<p>In order to enhance local employment and business opportunities associated with the construction phase the following measures should be implemented:</p> <p><u>Employment:</u></p> <ul style="list-style-type: none"> <li>• Where reasonable and practical Sonneblom Solar Power Plant should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area;</li> </ul>	

	<ul style="list-style-type: none"> <li>• Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;</li> <li>• Before the construction phase commences Sonneblom Solar Power Plant should meet with representatives from the MMM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.</li> <li>• The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that Sonneblom Solar Power Plant intends following for the construction phase of the project.</li> <li>• Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase.</li> <li>• The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> </ul> <p><u>Business:</u></p> <ul style="list-style-type: none"> <li>• Sonneblom Solar Power Plant should liaise with the MMM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;</li> <li>• Where possible, Sonneblom Solar Power Plant should assist local BBBEE companies to complete and submit the required tender forms and associated information.</li> <li>• The MMM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.</li> </ul>	
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## 2.4.15 Occupational Health and Safety

**Table 23:** Occupational Health and Safety

<b>IMPACT</b>	<b>HEALTH AND SAFETY</b> This section deals with health and safety and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC/ ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Worker safety</b></p> <ol style="list-style-type: none"> <li>1. Implementation of safety measures, work procedures and first aid must be implemented on site.</li> <li>2. Workers should be thoroughly trained in using potentially dangerous equipment.</li> <li>3. Contractors must ensure that all equipment is maintained in a safe operating condition.</li> <li>4. A safety officer must be appointed.</li> <li>5. A record of health and safety incidents must be kept on site.</li> <li>6. Any health and safety incidents must be reported to the Project Manager immediately.</li> <li>7. First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures.</li> <li>8. Workers have the right to refuse work in unsafe conditions.</li> <li>9. The Contractor shall take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc.</li> <li>10. A record shall be kept of drugs administered or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against Sonneblom Solar Power Plant or the Contractor.</li> <li>11. The Contractor must ensure that all construction workers are well educated about HIV/AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers.</li> <li>12. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers/local residents.</li> <li>13. The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site</li> </ol>	

14. Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks
15. It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site

**Worker facilities**

16. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness.
17. Fires are not to be allowed outside controlled areas.

**Hazardous substances**

18. Working areas should be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels.

**Machine and Equipment**

19. Use of contrast colouring on equipment/ machinery including the provision of reflective markings to enhance visibility.
20. Use of moving equipment/machinery equipped with improved operator sight lines.
21. Issuing workers with high visibility clothing.
22. Use of reflective markings on structures, traffic junctions, and other areas with a potential for accidents.
23. Installing safety barriers in high risk locations.

**Fitness for work**

24. Review shift management systems to minimise risk of fatigue. Establish alcohol and other drugs policy for the operation.

**Travel and remote site health**

25. Develop programs to prevent both chronic and acute illnesses through appropriate sanitation and vector control systems.

	<p>26. Where food is prepared on site, food preparation storage and disposal should be reviewed regularly and monitored to minimise risk of illness.</p> <p><b>Protective gear</b></p> <p>27. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs etc.</p> <p>28. No person is to enter the site without the necessary PPE.</p> <p><b>Site safety</b></p> <p>29. The construction camp must remain fenced for the entire construction period.</p> <p>30. Potentially hazardous areas are to be demarcated and clearly marked.</p> <p>31. Adequate warning signs of hazardous working areas.</p> <p>32. Emergency numbers for local police and fire department etc. must be placed in a prominent area.</p> <p>33. Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank.</p> <p>34. The facility must register with local firefighting organisation and periodically conduct drills in conjunction with local firefighting unit.</p> <p>35. Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site.</p> <p>36. All speed limits must be adhered to.</p> <p><b>Construction equipment safety</b></p> <p>37. All equipment used for construction, including drills, TLB's must be in good working order with up to date maintenance records.</p> <p><b>Hazardous Material Storage</b></p> <p>38. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. These areas should be roofed to avoid contamination of stormwater.</p>	
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39. Material Safety Data Sheets (MSDS) which contain the necessary information pertaining to a specific hazardous substance must be present for all hazardous materials stored on the site.

**Procedure in the event of a petrochemical spill**

- 40. A spill kit needs to be kept on site to address any unforeseen spillages.
- 41. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO.
- 42. The problem must be assessed and the necessary actions required will be undertaken.
- 43. The immediate response must be to contain the spill.
- 44. The source of the spill must be identified, controlled, treated or removed wherever possible.

**Fire management**

- 45. Firefighting equipment should be present on site at all times.
- 46. All construction staff must be trained in fire hazard control and fire fighting techniques.
- 47. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.
- 48. Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced.
- 49. No open fires will be allowed on site.
- 50. Smoking may only be conducted in demarcated areas.

**Safety of surrounding residents**

- 51. All I & AP's should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are:
  - Blasting
  - Risk to residence along haulage roads/access routes

**Emergency evacuation plan**

- 52. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.
- 53. All permanent staff must undergo safety training.

	<p><b>Maintenance</b></p> <p>54. The surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.</p>	
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2.4.16 Security

**Table 24:** Security

<b>IMPACT</b>	<b>SECURITY</b> This section deals with security and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC/ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. A security company should be employed to guard the construction site and monitor access. This company should also be utilised for the operation phase.</li> <li>2. Labour should be transported to and from the site to discourage loitering in adjacent areas and possible increase in crime or disturbance.</li> <li>3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site shall be prohibited. Any persons found to be engaged in such activities should receive disciplinary or criminal action taken against them.</li> <li>4. Only pre-approved staff must be permitted to stay within the staff accommodation which will be provided.</li> <li>5. The site shall be fenced, where necessary to prevent any loss or injury to persons during the construction phase.</li> <li>6. No alcohol/ drugs to be present on site.</li> <li>7. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel).</li> <li>8. No harvesting of firewood from the site or from the business property adjacent to it without prior consent from the ECO.</li> <li>9. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility is forbidden).</li> <li>10. Trespassing on private/ commercial properties adjoining the site is forbidden.</li> <li>11. Driving under the influence of alcohol is prohibited.</li> </ol>	



	<p>12. All employees must undergo the necessary safety training and wear the necessary protective clothing.</p> <p>13. The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.</p>	
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2.4.17 Social Environment

**Table 25:** Social Environment

<b>IMPACT</b>	<b>SOCIAL ENVIRONMENT</b> This section deals with social environment and actions that need to be implemented during construction	<b>RESPON-SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC /ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times.</li> <li>2. A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor.</li> <li>3. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site.</li> <li>4. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect.</li> <li>5. Care must be taken not to damage irrigation equipment, lines, channels and crops.</li> <li>6. Sonneblom Solar Power Plant should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers</li> <li>7. Contractors appointed by Sonneblom Solar Power Plant must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.</li> </ol>	

## SITE SPECIFIC MITIGATION

### **Influx of people**

- Sonneblom Solar Power Plant should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities;
- Sonneblom Solar Power Plant should implement a policy that no employment will be available at the gate.

### **Change to municipal infrastructure**

- Where possible, construction workers should be housed within the local community to reduce the possible additional strain on local resources.
- Contractors to supply and install infrastructure needed to access municipal services, e.g. water and sewerage pipelines. On site, sufficient portable services must be available (e.g. portable toilet facilities) and serviced regularly to prevent contamination.
- The use of local labour during construction will negate the need for additional housing; therefore contractors are again urged to make use of as much local labour as possible.

### **Technical advice for local farmers and municipalities**

- Sonneblom Solar Power Plant in consultation with the contractor should hold a workshop/s with local farmers and representatives from TLM to discuss options for installing solar energy facilities and the technology and costs involved.

### **Impact of construction workers on local communities**

- Where possible Sonneblom Solar Power Plant should make it a requirement for contractors to implement a ‘locals first’ policy for construction jobs, specifically for semi and low-skilled job categories;
- Sonneblom Solar Power Plant should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the MMM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers;

- Sonneblom Solar Power Plant and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation;
- Sonneblom Solar Power Plant and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area;
- The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site;
- Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks;
- It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

**Risk to safety, livestock and farm infrastructure**

- Sonneblom Solar Power Plant should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences;
- The construction area should be fenced off prior to the commencement of the construction phase. The movement of construction workers on the site should be confined to the fenced off area;
- Contractors appointed by Sonneblom Solar Power Plant should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties;
- Sonneblom Solar Power Plant should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site;
- Sonneblom Solar Power Plant should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers.

	<p>This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below);</p> <ul style="list-style-type: none"> <li>• The Environmental Management Programme (EMPr) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;</li> <li>• Contractors appointed by Sonneblom Solar Power Plant must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.</li> <li>• Contractors appointed by Sonneblom Solar Power Plant must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;</li> <li>• The housing of construction workers on the site should be strictly limited to security personnel.</li> </ul>	
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#### 2.4.18 Heritage

**Table 26:** Heritage

<b>IMPACT</b>	<b>CULTURAL AND HERITAGE ARTEFACTS</b> This section deals with the impact that the new development has on potential archaeological artefacts of the site	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>MC /ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Strict implementation of the conditions set in the heritage report (Appendix D2 in EIR).</li> <li>2. Any finds must be reported to the nearest National Monuments office to comply with the National Heritage Resources Act (Act No 25 of 1999) and to DEA.</li> <li>3. Local museums as well as the South African Heritage Resource Agency (SAHRA) should be informed if any artefacts are uncovered in the affected area.</li> <li>4. The Contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken.</li> <li>5. Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits</li> </ol>	

	shall be obtained from the SAHRA should the proposed site affect any world heritage sites or if any heritage sites are to be destroyed or altered.	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. Where possible, the graves should be relocated.</li> <li>• If during construction any archaeological, paleontological or other heritage resources are found, the operations must be stopped and a professional archaeologist or paleontologist must be contacted for an assessment of the find. SAHRA (Mrs Colette Scheermeyer, tel. 021 462 4502) must also be alerted immediately. If the newly discovered heritage resource/s is considered significant, a Phase 2 mitigation assessment with a permit from the responsible heritage authority may be required.</li> <li>• Should substantial fossil remains (e.g. well-preserved fossil fish, reptiles or petrified wood) be exposed during construction, however, the ECO should carefully safeguard these, preferably in situ, and alert SAHRA as soon as possible so that appropriate action (e.g. recording, sampling or collection) can be taken by a professional palaeontologist. The cost of this process will have to be covered by the developer.</li> </ul>	

#### 2.4.19 Community Engagement

**Table 27:** Community Engagement

<b>IMPACT</b>	<b>COMMUNITY ENGAGEMENT</b> This section deals with surrounding community and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ELO</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. A communication guideline to be drafted and agreed upon with authority representatives and affected communities.</li> <li>2. Open and transparent community engagement to be followed as culturally appropriate.</li> <li>3. Records (written) to be kept of all community engagements (e.g. complaints, resolutions, etc)</li> </ol>	

2.4.20 Visual Impact

**Table 28:** Visual Impact

<b>IMPACT</b>	<b>VISUAL</b> This section deals with visual issues and actions that need to be implemented during construction	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>CONSTRUCTION</b>	<b>ELO/ LA</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p>There is good screening opportunity since the land is relatively flat and with scattered trees and bushes. Generation of dust will increase the visibility of the project, and it is therefore important to employ techniques to suppress dust generation during construction. Other measures include:</p> <ol style="list-style-type: none"> <li>1. Carefully plan to reduce the construction period.</li> <li>2. Locate laydown and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas.</li> <li>3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</li> <li>4. Dust suppression is important as dust will raise the visibility of the development.</li> <li>5. New road construction should be minimised and existing roads should be used where possible.</li> <li>6. The contractor should maintain good housekeeping on site to avoid litter and minimise waste.</li> <li>7. Although there are no readily erodible slopes on the site, erosion risks should be assessed and minimised as erosion scarring can create areas of strong visual contrast with the surrounding vegetation, which can often be seen from long distances since they will be exposed against the hill slopes.</li> <li>8. Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for the PV plant and the ancillary infrastructure will go far to contain rather than spread the light.</li> <li>9. Fires and fire hazards need to be managed appropriately.</li> <li>10. Screening should be implemented by erection of the security fence, and by retaining existing and establishing ecologically appropriate additional vegetation. The growth of vegetation will improve screening into the operational phase.</li> </ol>	

	11. The holder of this authorisation must reduce visual impacts during construction by minimising areas of surface disturbance, controlling erosion, using dust suppression techniques and restoring exposed soil as closely as possible to their original contour and vegetation.	
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## 2.5 Operation Phase

### 2.5.1 Construction Site Decommissioning

**Table 29:** Construction Site Decommissioning

IMPACT	CONSTRUCTION SITE DECOMMISSIONING RESPONSIBILITY	RESPON- SIBILITY
PHASE	OPERATION	MC/Developer /ECO/ELO
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Removal of equipment</b></p> <ol style="list-style-type: none"> <li>1. All structures comprising the construction camp are to be removed from site.</li> <li>2. The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up.</li> <li>3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document.</li> </ol> <p><b>Temporary services</b></p> <ol style="list-style-type: none"> <li>4. The Contractor must arrange the cancellation of all temporary services.</li> <li>5. Temporary roads must be closed and access across these, blocked.</li> <li>6. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO.</li> </ol> <p><b>Associated infrastructure</b></p> <ol style="list-style-type: none"> <li>7. Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.</li> <li>8. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed.</li> <li>9. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited.</li> <li>10. The site is to be cleared of all litter.</li> </ol>	



	<p>11. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials.</p> <p>12. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.</p> <p>13. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.</p> <p>14. All leftover building materials must be returned to the depot or removed from the site.</p> <p>15. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.</p> <p><b>Rehabilitation plan</b></p> <p>16. Rehabilitate and re-vegetate cleared areas with indigenous plant species.</p>	
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## 2.5.2 Operation and Maintenance

**Table 30:** Operation and Maintenance

IMPACT	OPERATION AND MAINTENANCE RESPONSIBILITY	RESPON- SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
MITIGATION / METHOD STATEMENT	<p><b>Maintenance</b></p> <ol style="list-style-type: none"> <li>1. All applicable standards, legislation, policies and procedures must be adhered to during operation.</li> <li>2. Regular inspection of Battery Management System including the inert fire system.</li> </ol> <p><b>Public awareness</b></p> <ol style="list-style-type: none"> <li>3. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.</li> </ol>	

### 2.5.3 Soil Erosion & Geology

**Table 31** Soil Erosion & Geology

IMPACT	SOIL EROSION & Geology	RESPON-SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Soil erosion</b></p> <ol style="list-style-type: none"> <li>1. An effective system of run-off control should be implemented, where it is required, that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion.</li> <li>2. Periodical site inspection should be included in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records the occurrence of any erosion on site or downstream.</li> <li>3. To avoid soil erosion, it will be a good practice to design storm water canals into which the water from the panels can be channelled. These canals should reduce the speed of the water and allow the water to drain slowly onto the land.</li> <li>4. Another important measure is to avoid stripping land surfaces of existing vegetation by only allowing vehicles to travel on existing roads and not create new roads.</li> </ol> <p><b>Monitoring and Reporting</b></p> <ol style="list-style-type: none"> <li>5. Specific activities that should be monitored include:               <ul style="list-style-type: none"> <li>○ Erosion potential (specifically in and around roads and stormwater discharge points).</li> <li>○ Identified problem areas</li> </ul> </li> </ol> <p><b>Geology</b></p> <ol style="list-style-type: none"> <li>6. Surface drainage should be provided to prevent water ponding.</li> <li>7. Bulk infrastructure should be designed by a specialist.</li> <li>8. The occurrence of a seasonal perched groundwater table/ferricrete at relatively shallow depth requires the implementation of damp course and an efficient surface drainage system.</li> <li>9. Mitigation measures to be proposed by the detailed engineering geological investigation should be implemented.</li> </ol>	

## 2.5.4 Surface and Groundwater

**Table 32:** Surface and Groundwater

IMPACT	SURFACE AND GROUNDWATER	RESPON- SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Surface water</b></p> <ol style="list-style-type: none"> <li>1. Correct drainage of the site should ensure that contaminants do not impact upon surface water.</li> <li>2. The stormwater system on the proposed site needs to be regularly maintained to ensure effective working.</li> <li>3. All infrastructures for the project should not be located in a manner that will endanger lives or property due to flooding.</li> </ol> <p><b>Monitoring and Reporting</b></p> <ol style="list-style-type: none"> <li>4. The pollution prevention measures in terms of Section 19 (1) of the National Water Act, 1998 (Act No. 36 of 1998) should be adhered to at all times.</li> <li>5. Specific activities that should be monitored include:               <ul style="list-style-type: none"> <li>○ Erosion potential (specifically in and around roads and stormwater discharge points).</li> <li>○ Stormwater management and design</li> <li>○ Identified problem areas</li> </ul> </li> <li>6. The Department of Water and Sanitation should be informed of any incidents that may have detrimental impact on water resources within 24 hours of any occurrence of such.</li> <li>7. Monitoring for erosion must take place 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 as outlined in the erosion management plan.</li> </ol> <p><b>Water Use</b></p> <ol style="list-style-type: none"> <li>8. Develop a sustainable water supply management plan to minimise the impact to natural systems by managing water use, avoiding depletion of aquifers and minimising impacts to water users.</li> </ol>	

	<p>9. Measures should be put in place to prevent wasteful water usage. Water must be reused, recycled or treated where possible.</p> <p>10. Drinking water supplied should comply with the SANS:241 quality requirements and it must be noted that the Local Municipality remains the Water Service Authority in that area of jurisdiction.</p>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<p><b>Surface water</b></p> <ul style="list-style-type: none"> <li>• Development and implementation of an adequate storm water management plan to be designed by an appropriate engineer.</li> <li>• The storm water management plan must include the construction of appropriate design measures that allow surface and subsurface movement of water along drainage lines so as not to impede natural surface and subsurface flows.</li> <li>• Drainage measures must promote the dissipation of storm water run-off.</li> <li>• The Department of Water and Sanitation must be appropriately consulted regarding onsite treatment of waste water on the site; the technology to be used should be specified (proposed conservancy tank) in the Final EMP and included in the site plans.</li> </ul> <p><b>Groundwater</b></p> <ul style="list-style-type: none"> <li>• Inventories should be made of all substances that are potentially hazardous to groundwater, which will be stored, used or transported over the sites. The risk of each substance to the groundwater should be considered.</li> <li>• All areas in which substances potentially hazardous to groundwater are stored, loaded, worked with or disposed of should be securely banded (impermeable floor and sides) to prevent accidental discharge to groundwater.</li> <li>• A groundwater monitoring programme (quality and groundwater levels) should be designed and installed for the site. Monitoring boreholes should be securely capped, and must be fitted with a suitable sanitary seal to prevent surface water flowing down the outside of the casing. Full construction details of monitoring boreholes must be recorded when they are drilled (e.g. screen and casing lengths, diameters, total depth, etc). Sampling of monitoring boreholes should be done according to recognised standards.</li> </ul>	

## 2.5.5 Biodiversity

**Table 33:** Biodiversity

IMPACT	BIODIVERSITY (FAUNA AND FLORA)	RESPON-SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Vegetation</b></p> <ol style="list-style-type: none"> <li>1. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed off appropriately.</li> <li>2. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction.</li> <li>3. Vegetative re-establishment shall, as far as possible, make use of indigenous or locally occurring plant varieties within a 20-metre radius of the site.</li> <li>4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas during and following rehabilitation.</li> <li>5. Any vegetation clearing that needs to take place as part of maintenance activities (during the operational phase of the approved development), must be done accordance to the approved EMPr.</li> </ol> <p><b>Other fauna</b></p> <ol style="list-style-type: none"> <li>6. No faunal species must harmed by maintenance staff during any routine maintenance at the development.</li> <li>7. During operation, any electrocution and collision events of avifauna 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.</li> </ol>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that may be undertaken during the operation phase.</li> <li>• Correct rehabilitation with locally indigenous species.</li> <li>• Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion and the edge effect are avoided.</li> <li>• Constant maintenance of the area to ensure re-colonisation of floral species.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Regular removal of alien species which may jeopardise the proliferation of indigenous species.</li> <li>• Regular maintenance of bird flappers and guards must be undertaken.</li> </ul>	
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## 2.5.6 Waste Management

**Table 34:** Waste Management

IMPACT	WASTE MANAGEMENT	RESPON-SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Recycling and litter management</b></p> <ol style="list-style-type: none"> <li>1. The site should be kept clear of litter at all times.</li> <li>2. An integrated waste management approach that is based on waste minimisation, and which must incorporate reduction, recycling, re-use and disposal, where appropriate, must be implemented.</li> <li>3. Light emitting diode (LED) lights, hazardous waste (including the panels) and big stones may not be disposed of at landfill site.</li> <li>4. Solid waste separation and recycling should take place for the duration of the operational phase for the development.</li> <li>5. All waste must be removed promptly to ensure that it does not attract vermin or produce odours.</li> <li>6. In house treatment procedures must be followed strictly.</li> <li>7. Solid waste should be collected on a regular basis.</li> <li>8. Package treatment plant must be regularly serviced.</li> <li>9. Broken or old batteries must be stored in a demarcated area in quarantine for the shortest period of time possible until it can be collected and taken to a special chemical waste facility.</li> <li>10. Once the batteries become obsolescent, either due to the facility decommissioning or the batteries reaching their useful design life and require replacement, the used batteries will be broken down and recycled as far as possible and unrecoverable wastes disposed of through appropriate channels.</li> </ol>	

## 2.5.7 Health and Safety

**Table 35:** Health and Safety

IMPACT	HEALTH AND SAFETY	RESPON- SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Emergency evacuation plan</b></p> <ol style="list-style-type: none"> <li>1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.</li> </ol> <p><b>Maintenance</b></p> <ol style="list-style-type: none"> <li>2. The power line and switchyard is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.</li> </ol> <p><b>Fire safety</b></p> <ol style="list-style-type: none"> <li>3. Firefighting equipment in the form of fire hydrants or fire extinguishers must be available on the site. These must be regularly maintained by an appropriate company.</li> <li>4. The facility must register with local firefighting organisation and periodically conduct drills in conjunction with local firefighting unit.</li> </ol> <p><b>Storage and handling of hazardous waste</b></p> <ol style="list-style-type: none"> <li>5. Transformer oil containers must be regularly maintained to ensure that leaks do not occur.</li> <li>6. A spill kit needs to be kept on site to address any unforeseen spillages.</li> <li>7. Transport of all hazardous substances must be in accordance with the relevant legislation.</li> <li>8. The bund wall surrounding the transformer oil containers must be regularly maintained to ensure that any spills are completely contained.</li> </ol>	

## 2.5.8 Visual Impact

**Table 36:** Visual Impact

IMPACT	VISUAL IMPACT	RESPON- SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Maintenance and lighting</b></p> <ol style="list-style-type: none"> <li>1. Lighting must be kept to a minimum and restricted to low level, downward facing lights to reduce light spill.</li> <li>2. The area and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts.</li> <li>3. Rehabilitation of surrounding areas must take place with indigenous species.</li> <li>4. Surrounding roads must be well maintained.</li> <li>5. Regular maintenance of exteriors and associated infrastructure must be undertaken.</li> </ol>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Apart from the power line and support infrastructure, structures must be limited to a height of no more than 3.5 m.</li> <li>• Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer.</li> <li>• Security lighting should make use of down-lights to minimise light spill, and motion detectors where possible so that lighting at night is minimised.</li> <li>• Care should be taken with the layout of the security lights to prevent motorists on the R702 from being blinded by lights at the approach to the site.</li> <li>• Screening should be implemented by means of vegetation in conjunction with security fencing.</li> </ul>	



## 2.5.9 Employment

**Table 37: Employment**

IMPACT	EMPLOYMENT This section deals with employment and actions that need to be implemented during operation	RESPON- SIBILITY
PHASE	OPERATION	Developer
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Labour</b></p> <ol style="list-style-type: none"> <li>1. Training of labour to benefit individuals beyond completion of the project.</li> </ol> <p><b>Recruitment Plan</b></p> <ol style="list-style-type: none"> <li>2. Recruitment must comply with national employment and labour laws.</li> <li>3. Where reasonable and practical, Sonneblom Solar Power Plant's service providers should appoint local residents and implement a 'locals first' policy, especially for semi and low-skilled job categories.</li> <li>4. The Project Manager must ensure that all staff working on the proposed project is in possession of a South African Identity Card or a relevant work permit.</li> <li>5. Ensure adequate advertising in the project community areas, local papers for skilled labour.</li> <li>6. Local community leaders must be utilised to source labour.</li> <li>7. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process.</li> <li>8. The recruitment of skilled labour will follow standard advertising process in national newspapers and interview based selection.</li> <li>9. Record of official complaints by employees to authorities i.e. Labour and Social Security.</li> <li>10. Where feasible, efforts should be made to employ local contractors that are compliant with Black Economic Empowerment (BEE) criteria.</li> <li>11. Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the operation phase.</li> <li>12. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</li> <li>13. Establish, maintain a healthy worker-management relationship.</li> </ol>	

	<p><b>Grievance Mechanism</b></p> <p>14. A grievance mechanism as part of the management system should be established.</p> <p>15. The grievance procedure does not replace normal Manager employee dialogue, but is another open form of communication.</p> <p>16. The procedure should assist employees to resolve grievance situations quickly and effectively in order to restore harmonious working conditions for all employees.</p> <p>17. Management is responsible for listening and responding to all employee concerns raised through this procedure.</p> <p>18. In all cases, matters will be dealt with in as confidential a manner as possible.</p>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Sonneblom Solar Power Plant should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project;</li> <li>• Sonneblom Solar, in consultation with the MMM, should investigate the options for the establishment of a Community Development Trust.</li> </ul>	

#### 2.5.10 Social Environment

**Table 38:** Social Environment

<b>IMPACT</b>	<b>SOCIAL ENVIRONMENT</b> This section deals with social environment and actions that need to be implemented during operation	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>OPERATION</b>	<b>Developer</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Corporate Social Investments</b></p> <ol style="list-style-type: none"> <li>1. Consult with the community to determine their needs. Following a top-down approach without community consultation can result in irrelevant interventions that are disregarded by the community.</li> <li>2. Sonneblom Solar Power Plant should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project;</li> </ol>	

	<b>Sense of Place</b> 3. Job opportunities should be afforded to local individuals as far as possible to enhance their sense of place.	
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## 2.5 Decommissioning phase

The mitigation measures presented below are of relevance to the decommissioning of the power line and switchyard. Furthermore, mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again.

### 2.6.1 Ongoing Stakeholder involvement

This is the process that is recommended when the proposed power line is decommissioned.

**Table 39:** Ongoing Stakeholder involvement

<b>IMPACT</b>	<b>ONGOING STAKEHOLDER INVOLVEMENT</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Closure must be planned from inception through adequate social planning and infrastructure development that can be maintained by the communities after closure and opportunities to redirect skills must be sought.</li> <li>2. Community to be notified, as culturally appropriate, timeously of the planned decommissioning.</li> <li>3. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them:               <ul style="list-style-type: none"> <li>○ What activities will take place during the decommissioning phase.</li> <li>○ How these activities will impact upon the communities and/or their properties.</li> <li>○ Regarding the timeframes of scheduled activities.</li> </ul> </li> <li>4. Regular interaction between Sonneblom Solar Power Plant and community leader(s) during the decommissioning phase.</li> <li>5. A reporting office/channel to be established should community members experience problems with contractors/sub-contractors during the decommissioning phase.</li> <li>6. A register to be kept of problems reported by community members and the steps taken to address/ resolve it.</li> </ol>	

## 2.6.2 Community health and safety

**Table 40:** Community health and safety

<b>IMPACT</b>	<b>COMMUNITY HEALTH AND SAFETY RESPONSIBILITY</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Demarcated routes to be established for construction vehicles to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes.</li> <li>2. Where dust is generated by trucks passing on gravel roads, dust mitigation to be enforced.</li> <li>3. Any infrastructure that would not be decommissioned must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community.</li> </ol>	

## 2.6.3 Waste Management

**Table 41:** Waste Management

<b>IMPACT</b>	<b>WASTE MANAGEMENT</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. All decommissioned equipment must be removed from site and disposed of at a registered land fill. Records of disposal must be kept.</li> <li>2. The panels need to be disposed of appropriately and returned to the manufacturer to be recycled.</li> <li>3. The applicant must ensure that the final disposal site can accept the waste and the anticipated volumes thereof. Any hazardous waste must be disposed of at a hazardous waste disposal site.</li> <li>4. A method statement need to be developed to guide the safe decommissioning of Battery storage which will consider appointment of accredited battery recyclers.</li> </ol>	

## 2.6.4 Surface and Groundwater

**Table 42:** Surface and Groundwater

<b>IMPACT</b>	<b>SURFACE AND GROUNDWATER RESPONSIBILITY</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Removal of any historically contaminated soil as hazardous waste.</li> <li>2. Removal of hydrocarbons and other hazardous substances by a suitable contractor to reduce contamination risks.</li> <li>3. Removal of all substances which can result in groundwater (or surface water) contamination.</li> <li>4. Re-vegetation of exposed soil surfaces to ensure no erosion in these areas.</li> <li>5. Measures should be put in place to prevent wasteful water usage.</li> <li>6. The pollution prevention measures in terms of Section 19 (1) of the National Water Act, 1998 (Act No. 36 of 1998) should be adhered to at all times.</li> <li>7. The Department of Water and Sanitation should be informed of any incidents that may have detrimental impact on water resources within 24 hours of any occurrence of such.</li> </ol>	

## 2.6.5 Biodiversity

**Table 43:** Biodiversity

<b>IMPACT</b>	<b>BIODIVERSITY RESPONSIBILITY</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Loss of Habitat</b></p> <ol style="list-style-type: none"> <li>1. Maintain footprint strictly during decommissioning.</li> <li>2. Existing access roads must be used.</li> </ol>	

	<ol style="list-style-type: none"> <li>3. All infrastructure must be removed from the site.</li> <li>4. Re-vegetation of affected areas must be made a priority to avoid erosion.</li> <li>5. Suitable stormwater/wind controls must be put in place until rehabilitation is complete.</li> <li>6. Constant removal of alien invasive species in and around plant.</li> </ol> <p><b>Edge Effect</b></p> <ol style="list-style-type: none"> <li>7. The Contractor should be responsible for implementing a programme of weed control.</li> <li>8. Present exotic and invasive plant species, in particular <i>Prosopis glandulosa</i>, should be eradicated at the site.</li> <li>9. By no means should any declared invaders, such as the mesquite tree (<i>Prosopis</i> species) be planted or allowed to establish if the development is approved.</li> <li>10. All exotic vegetation must be removed from the site (if present).</li> </ol>	
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2.6.6 Air Quality

**Table 44:** Air Pollution

<b>IMPACT</b>	<b>AIR POLLUTION RESPONSIBILITY</b>	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Regular maintenance of equipment to ensure reduced exhaust emissions.</li> </ol>	

## 2.6.7 Noise and Vibrations

**Table 45:** Noise and Vibrations

IMPACT	NOISE This section deals with noise and actions that need to be implemented during decommissioning	RESPON- SIBILITY
PHASE	DECOMMISSIONING	Sonneblom Solar Power Plant
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
MITIGATION / METHOD STATEMENT	<ol style="list-style-type: none"> <li>1. The decommissioning phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development.</li> <li>2. Any noisy fixed facilities should be located well away from noise sensitive areas.</li> <li>3. Truck traffic should be routed away from noise sensitive areas, where possible.</li> <li>4. Noise levels must be kept within acceptable limits.</li> <li>5. Noisy operations should be combined so that they occur where possible at the same time.</li> <li>6. Construction workers to wear necessary ear protection gear.</li> <li>7. Noisy activities to take place during allocated construction hours.</li> <li>8. Noise from labourers must be controlled.</li> <li>9. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the Contractor may be instructed to remove the offending vehicle or machinery from site.</li> <li>10. The Contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the Contractor or his Sub-Contractors by the Contractors own transport.</li> <li>11. Implementation of enclosure and cladding of processing plants.</li> <li>12. Applying regular and thorough maintenance schedules to equipment and processes.</li> </ol>	
<b>SITE SPECIFIC MITIGATION MEASURES</b>		
	<ul style="list-style-type: none"> <li>• Gravel roads used should be kept in good order. Corrugations and drainage ruts should not be allowed to develop.</li> </ul>	



2.6.8 Decommissioning traffic

**Table 46:** Decommissioning Traffic

<b>IMPACT</b>	<b>DECOMMISSIONING TRAFFIC AND ACCESS</b> This section deals with construction traffic and actions that need to be implemented during decommissioning	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p><b>Decommissioning traffic</b></p> <ol style="list-style-type: none"> <li>1. Routes and required access roads must be clearly defined.</li> <li>2. The removal of equipment must be undertaken with the minimum amount of trips to reduce the carbon footprint of these activities.</li> <li>3. Access of all vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure.</li> <li>4. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance.</li> <li>5. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc.</li> <li>6. Servicing must be done in dedicated service areas on site or else off site if no such area exists.</li> <li>7. Oil changes must take place on a concrete platform and over a drip tray to avoid pollution.</li> <li>8. Soils compacted by construction vehicles shall be deep ripped to loosen compacted layers and re-graded to even running levels.</li> </ol> <p><b>Access</b></p> <ol style="list-style-type: none"> <li>9. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-contractors.</li> <li>10. Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a "NO ENTRY for construction vehicles" sign.</li> </ol>	

	<p><b>Noise</b></p> <p>11. Movement of heavy construction vehicles through residential areas should be timed to avoid peak morning and evening traffic periods. In addition, movement of heavy construction vehicles through residential areas should not take place over weekends.</p> <p><b>General</b></p> <p>12. The Contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place.</p> <p>13. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.</p> <p>14. Care for the safety and security of community members crossing access roads should receive priority at all times.</p>	
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#### 2.6.9 Visual Impact

**Table 47:** Visual Impact

<b>IMPACT</b>	<b>VISUAL</b> This section deals with visual issues and actions that need to be implemented during decommissioning	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<p>Generation of dust will increase the visibility of the project, and it is therefore important to employ techniques to suppress dust generation during decommissioning. Other measures include:</p> <ol style="list-style-type: none"> <li>1. Carefully plan to reduce the decommissioning period.</li> <li>2. Locate laydown and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas.</li> <li>3. Existing roads should be used where possible.</li> <li>4. The contractor should maintain good housekeeping on site to avoid litter and minimise waste.</li> </ol>	

	<ol style="list-style-type: none"> <li>5. Erosion risks should be assessed and minimised as erosion scarring can create areas of strong visual contrast with the surrounding vegetation, which can often be seen from long distances.</li> <li>6. Mitigation of lighting impacts includes the pro-active design, planning and specification lighting for the facility by a lighting engineer. The correct specification and placement of lighting and light fixtures for the PV plant and the ancillary infrastructure will go far to contain rather than spread the light.</li> <li>7. Fires and fire hazards need to be managed appropriately.</li> </ol>	
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### 2.6.10 Employment

**Table 48:** Employment

<b>IMPACT</b>	<b>EMPLOYMENT</b> This section deals with employment and actions that need to be implemented during decommissioning	<b>RESPON- SIBILITY</b>
<b>PHASE</b>	<b>DECOMMISSIONING</b>	<b>Sonneblom Solar Power Plant</b>
<b>ENVIRONMENTAL MANAGEMENT PROGRAMME</b>		
<b>MITIGATION / METHOD STATEMENT</b>	<ol style="list-style-type: none"> <li>1. Sonneblom Solar Power Plant should ensure that retrenchment packages are provided for all staff retrenched when the facility is decommissioned.</li> <li>2. All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning;</li> <li>3. Sonneblom Solar Power Plant should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure.</li> </ol>	

## **CHAPTER 3: CONCLUSION**

The environmental and social impacts of the project were spread through the four project phases. There were both positive and some minor negative project impacts. The following section briefly summarise some of the significant impacts within each of the project phases.

### **4.1 Pre-Construction Phase**

The first site activities before mobilization of equipment will be a survey, required for final design of plant foundations. There will be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials, and foundations for the buildings (permanent loss).

Expectations of improvement in livelihood among locals should be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

### **4.2 Construction Phase**

This phase of the activity will have both positive and negative impacts. The positive impacts are employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts would include impacts on the soils, geology, existing services infrastructure, the availability and quality of the groundwater, socio-economic impacts such as theft, and the impacts on heritage resources. Most of the negative impacts are minor and temporary. However, on mitigating negative impacts, the Contractor shall ensure that all staff have adequate protective clothing and are adequately trained. The whole range of mitigation measures are however, outlined in the EMPR in this regard.

### **4.3 Operational Phase**

This phase of the activity will also have both positive and negative impacts. The positive impacts are permanent employment opportunities offered during the operation phase, the development of infrastructure for the generation of clean, renewable energy and the establishment of a community trust. The negative effects mainly relates to impacts on the soils, geology, the increased consumption of water, the quality of the water, visual impacts, and socio-economic impacts such as theft.

### **4.4 Decommissioning Phase**

As with any project, the facilities used in this project will have a lifetime after which they may no longer be cost effective to continue with operation. At that time, the project would be decommissioned, and the existing equipment removed. Potential environmental impacts caused during decommissioning are those, which will be mitigated as provided by the Environmental Management Programme. These include: the generation of waste and the loss of employment.

The disposal of materials from the decommissioned plants is not viewed as high risk. Much of the material would be recyclable (steel structures, PV panels) or inert (concrete foundations, etc.). These materials would however, need to be disposed of at a registered waste disposal or recycling centre.

Based on the above information, it is unlikely that the proposed development will have unacceptable social and environmental impacts. Most impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the Project such that the overall benefits from the Project will greatly outweigh the negative impacts. All the negative impacts will either be moderate or lesser in rating and could be easily mitigated (refer to EIR for impact assessment). Generally, the proposed Project will result in appreciable benefits to the people in the project area of influence and bring opportunities for development to the country.

**Appendix A**

<b>ENVIRONMENTAL INCIDENTS LOG</b>				
<b>Date</b>	<b>Environmental Condition</b>	<b>Comments</b> (Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)	<b>Corrective Action Taken</b> (Give details and attach documentation as far as possible)	<b>Signature</b>



## **Management of Soils: Guidelines**

### Source of topsoil

1. Topsoil shall be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required.
2. These areas will include temporary and permanent access roads, construction camps, borrow pits and lay down areas. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences.
3. The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

### Topsoil stripping

4. Soil shall be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm.
5. Herbaceous vegetation, overlying grass and other fine organic matter shall not be removed from the stripped soil.
6. No topsoil which has been stripped shall be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
7. Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.

### Topsoil stockpiling

11. The Consulting Engineer or Environmental Control Officer shall stockpile stripped topsoil in areas, which have been approved.
12. To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area.
13. Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
14. Topsoil stripped from different soil zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.
15. Soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
16. No vehicles shall be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.
17. Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.
  - After topsoil removal has been completed, the Contractor shall apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This may include the use of erosion control fabric or grass seeding.



### Topsoil replacement

18. Topsoil shall be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement shall follow as soon as construction in an area has ceased.
19. All areas onto which topsoil is to be spread shall be graded to the approximate original landform with maximum slopes of 1:25 and shall be ripped prior to topsoil placement. The entire area shall be ripped parallel to the contours to a minimum depth of 300mm.
20. Topsoil shall be placed in the same soil zone from which it had been stripped.
  - However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil may be brought from other soil zones at the approval of the Consulting Engineer or Environmental Control Officer.
  - Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor shall obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material shall be determined by means of soil analyses, which are acceptable to the Consulting Engineer or Environmental Control Officer.
  - No vehicles shall be allowed access onto or through topsoil after it has been reinstated.
  - After topsoil reinstatement is complete, cleared and stockpiled vegetative matter shall be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

**Appendix C**

**ENVIRONMENTAL AWARENESS AND FIRE MANAGEMENT PLAN**

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<b>A. DESIGN PHASE</b>					
1. Potential impacts resulting from the lack of overall compliance with the conditions of the EA (issued by the DEA).	Prevent non-compliance with the conditions of the EA.	1.1. Audit the implementation of the EMPr requirements.	Audit report on compliance with actions and monitoring requirements.	• Weekly	• Project Developer
		1.2. Establish clear and transparent reporting of the activities undertaken with regard to all recommendations included in the EMPr.	Audit report on compliance with actions and monitoring requirements.	• Weekly	• Project Developer
<b>B. CONSTRUCTION PHASE</b>					
2. Potential risk of fire due to construction activities or behaviour of staff on site during the construction phase.	Prevent fire on site resulting of workers smoking or starting fires (i.e. cooking, heating purposes).	1.1. Designate smoking areas, as well as areas for cooking, where the fire hazard could be regarded as insignificant.	Ad-hoc checks to ensure workers are smoking or cooking in designated areas only.	• Daily	• ECO & Contractor
		1.2. Educate workers on the dangers of open and/or unattended fires.	Ensure fire safety requirements are well understood and respected by construction personnel. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	• On-going • Once-off training and ensure that all new staff are inducted • Monthly	• ECO & Contractor • ECO/ Contractor • ECO
		1.3. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the construction phase.	Ensure fire safety requirements are well understood and respected by construction personnel. Provide basic fire safety training.	• On-going	• ECO & Contractor
		1.4. Ensure that cooking takes place in a designated area shown on the site map. Ensure that no firewood or kindling may be gathered from the site or surrounds.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	• On-going	• ECO & Contractor
		1.5. Fire-fighting equipment must be made available at various appropriate locations on the construction site.	Ensure fire safety requirements are well understood and respected by workers.	• On-going • Bi-annually	• ECO & Contractors

					• Contractor
Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.		
3. Inappropriate behaviour of civil contractors and sub-contractors during the construction phase.	Prevent unnecessary impacts on the surrounding environment by ensuring that contractors are aware of the requirements of the EMPr.  Ensure that contractors and sub-contractors do not induce impacts on the surrounding environment as a result of unplanned pollution on site.  Ensure that actions by on-site contractors and sub-contractors and workers are properly managed in order to minimise impacts to	3.1. Ensure that the EMPr and the EA (should it be granted by the DEA), are included in all tender documentation and contractors and sub-contractor's contracts.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	On-going	ECO & Contractor
		3.2. Contractors and sub-contractors must use the ablution facilities situated in a designated area within the site; and no bathing/washing should be permitted outside the designated area.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	On-going	ECO & Contractor
		3.3. All litter will be deposited in a clearly labelled, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	On-going	ECO & Contractor
		3.4. No person other than a qualified specialist or personnel authorised by the Project Developer, will disturb or remove plants outside the demarcated construction area.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	On-going	ECO & Contractor
		3.5. No person other than a qualified specialist or personnel authorised by the Project Developer, will disturb animals on the site.	Check compliance with specified conditions using a report card, and allocate fines when necessary.	On-going	ECO & Contractor

	surrounding environment.	3.6. Educate workers on site about suitable behaviour on site and initiate environmental awareness. Staff must be informed that no trapping, snaring or feeding of any animal will be allowed.	Carry out Environmental Awareness Training.  Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted.  Monthly	Contractor/ ECO ECO
Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
4. Inappropriate planning and of site camp establishment.	Ensure that environmental issues are taken into consideration in the planning for site establishment.	4.1. All construction activities, materials, equipment and personnel must be restricted to the actual construction area specified (as required to undertake the construction work). The construction area must be demarcated by the Contractor.	Monitor compliance and record non-compliance and incidents.	Before construction	ECO
		4.2. The Contractor should install and maintain Construction Site Information Boards in the position, quantity, design and dimensions specified by the Project Developer.	Monitor compliance and record non-compliance and incidents.	Before construction	ECO
		4.3. General building materials should be stored in appropriate designated areas on site such that there will be no runoff from these areas towards sensitive systems. The site camp must be removed after construction.	Monitor compliance and record non-compliance and incidents.	Before construction	ECO
5. Increased animal road mortality.	Reduction in animal mortality.	5.1. The construction staff should be made aware of the presence of fauna and within the proposed project area. The construction personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings, and should be trained on how to react in these situations.	Carry out Environmental Awareness Training.  Conduct audits of the signed attendance registers.	Once-off training and ensure that all new staff are inducted.  Monthly	Contractor/ ECO ECO

		5.2. To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.	Monitor the activities via visual inspections, and record and report any non-compliance.	Daily	Contractor & ECO
		5.3. Establish a monitoring programme to record the number of faunal road mortalities and collisions. If it is established that the number of collisions and faunal fatalities increase within an area, particularly with regards to smaller species (reptiles), then measures such as exclusion fences within these areas only should be installed.	Appropriate monitoring and recording should be undertaken.  Exclusion fences should be installed, if needed to direct animals to safe road crossings.	Weekly  As required	ECO  ECO & Contractor
Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
6. Increased energy consumption during the construction phase.	Reduce energy consumption where possible.	6.1. Encourage the use of energy saving equipment at the site camp site (such as low voltage lights and low pressure taps) and promote recycling. Construction personnel must be made aware of energy conservation practices as part of the Environmental Awareness Training programme.	Contractor to monitor energy usage via audits. Carry out Environmental Awareness Training. Conduct audits of the signed attendance registers.	Monthly  Once-off training and ensure that all new staff are inducted.  Monthly	Contractor  Contractor/ ECO ECO
7. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during the construction phase.	7.1. Water conservation should be practiced as follows: <ul style="list-style-type: none"> <li>Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g. sweep before wash-down).</li> <li>Ensure that regular audits of water systems are conducted to identify possible water leakages.</li> </ul>	Monitor via site audits and record non-compliance and incidents.	Monthly	ECO
		7.2. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible.  7.3. Make construction personnel aware of the importance of limiting water wastage, as well as reducing water use.			

			Conduct audits of the signed attendance registers.	Monthly	
Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. OPERATIONAL PHASE					
8. Potential risk of fire due to behaviour of staff on site during the operational phase.	Ensure appropriate and efficient fire prevention during the operational phase.	8.1. Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant.	Random inspections during a month to ensure workers are smoking or starting fires in designated areas only.	Monthly	Facility Manager
		8.2. Educate workers on the dangers of open and/or unattended fires.	Ensure fire safety requirements are well understood and respected by operational personnel.	On-going	Facility Manager
			Carry out Environmental Awareness Training.	Once-off training and ensure that all new staff are inducted.	Facility Manager
			Conduct audits of the signed attendance registers.	Monthly	Facility Manager
8.3. Open fires must be prohibited. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the operational phase.	Ensure fire safety requirements are well understood and respected by operational personnel. Provide basic fire safety training.	On-going	Project Developer		
8.4. Ensure that adequate fire-fighting equipment is available and easily accessible on site.	Ensure fire safety requirements are well understood and respected by workers.	On-going	Facility Manager		
	Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company.	Bi-annually	Project Developer		
9. Increased energy consumption during the operational phase.	Reduce energy consumption where possible.	9.1. Encourage the use of energy saving equipment at the PV facility (such as low voltage lights and low pressure taps) and promote recycling. Operational personnel must be made aware of energy conservation practices as part of the environmental awareness training programme.	Monitor energy usage via site investigations.  Conduct training for all operational personnel.	Monthly  As and when required and ensure that all new staff are inducted.	Facility Manager  Project Developer

10. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during operations.	10.1 Water conservation to be practiced in line with Energy Saving Policies as follows: 10.2 Cleaning methods utilised for cleaning vehicles, floors, the offices etc. should aim to minimise water use (e.g. sweep before wash-down). <ul style="list-style-type: none"> <li>• Where possible, encourage the re-use of water.</li> <li>• Ensure that regular audits of water systems are conducted to identify possible water leakages.</li> </ul> 10.3 Consider installing water saving devices (e.g. dual flush toilets, automatic shut-off taps, etc.).	Record water usage during the operational phase, conduct audits and record non-compliance and incidents.	Monthly	Facility Manager
		10.4 Carry out environmental awareness training with a discussion on water usage and conservation, and make operational personnel aware of the importance of limiting water wastage.	Conduct training for all operational personnel.	As and when required during operations and ensure that all new staff are inducted.	Facility Manager
11. Non respect of waste management practices.	Minimise the production of general waste.  Ensure compliance with relevant waste management legislation.  Minimise pollution of the environment.	11.1 Control and implement waste management plans. Ensure that relevant legislative requirements are respected. 11.2 Determine specific areas on site for temporary management of waste.	Control of waste management practices throughout operation phase.	Monthly	Facility Manager
		11.3 Promote waste reduction, re-use, and recycling opportunities on site during the operation phase. 11.4 Ensure an adequate and sustainable use of resources.	Monitor waste generation and collection throughout operation.	Monthly	Facility Manager
		12.1 Waste water 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.	Waste water generation to be monitored throughout the operational phase.  Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents.	Quarterly	Facility Manager
<b>D. DECOMMISSIONING PHASE</b>					
13. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

## Appendix D - SITE SENSITIVITY MAP





