
PROPOSED ILANGA LETHEMBA PV SOLAR ENERGY FACILITY, NEAR DE AAR, NORTHERN CAPE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

Submitted as part of the
Final Environmental Impact Assessment Report
October 2011

Prepared for

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PROJECT DETAILS

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Title : Environmental Impact Assessment process
Draft Environmental Management Programme:
Proposed Ilanga Lethemba PV Solar Energy Facility,
near De Aar, Northern Cape Province

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DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that is made up of:

- i. The land, water and atmosphere of the earth;
- ii. Micro-organisms, plant and animal life;
- iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Photovoltaic effect: Electricity can be generated using photovoltaic panels (semiconductors) which are comprised of individual photovoltaic cells that absorb solar energy to produce electricity. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as the Photovoltaic Effect.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South

African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

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PURPOSE AND OBJECTIVES OF THE EMP

CHAPTER 1

An Environmental Management Programme (EMP) is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced.”¹ The objective of this EMP is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMP is to ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMP provides specific environmental guidance for the construction and operation phases of a project, and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (i.e. site clearing and site establishment), during the construction activities themselves (i.e. erosion, noise, dust, and visual impacts), during site remediation (i.e. soil stabilisation, re-vegetation), during operation and decommissioning (i.e. similar to construction phase activities).

This EMP has been compiled in accordance with Section 33 of the EIA Regulations (GG No 33306 of 18 June 2010) and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. The EMP has been developed as a set of environmental specifications (i.e. principles of environmental management), which are appropriately contextualised to provide clear guidance in terms of the on-site implementation of these specifications (i.e. on-site contextualisation is provided through the inclusion of various monitoring and implementation tools).

This EMP has the following objectives:

- » Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction and rehabilitation, operation, and decommissioning phases of the project in order to manage and minimise the extent of potential environmental impacts associated with the facility

¹ Provincial Government Northern Cape, Department of Environmental Affairs and Development Planning: *Guideline for Environmental Management Plans*. 2005

- » Ensure that all the phases of the project do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced
- » Identify entities responsible for the implementation of the measures and outline functions and responsibilities
- » Propose mechanisms and frequency for monitoring compliance, and preventing long-term or permanent environmental degradation
- » Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that was not considered in the EIA process

The management and mitigation measures identified within the Environmental Impact Assessment (EIA) process are systematically addressed in this EMP, and ensure the minimisation of adverse environmental impacts to an acceptable level.

Solar Capital De Aar (Pty) Ltd (Solar Capital) must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMP and through its integration into the contract documentation. Since this EMP is part of the EIA process it is important that this document be read in conjunction with the final Scoping and EIA Reports. This will contextualise the EMP and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMP and the environmental authorisation, the stipulations in the environmental authorisation shall prevail over that of the EMP, unless otherwise agreed by the authorities in writing. Similarly, any provisions in current legislation overrule any provisions or interpretations within this EMP.

This EMP shall be binding on all the parties involved in the construction and operational phases and shall be enforceable at all levels of contract and operational management within the project.

PROJECT DETAILS

CHAPTER 2

Solar Capital De Aar (Pty) Ltd is proposing the establishment of a commercial solar energy facility and associated infrastructure for the purpose of electricity generation on a site northeast of De Aar in the Northern Cape Province. The facility will be referred to as the **Ilanga Lethemba PV Solar Energy Facility** and will have a generating capacity of up to **300 MW**, which will be developed in phases. It is envisaged that **75 MW** will be installed in a **first phase** and the remaining three phases will be developed at **75 MW** each. The facility is proposed on portion 3 of Farm Paarde Valley 145 (SG Code C05700000000014500003), which is located approximately 7 km northeast of De Aar within the jurisdiction of the Emthanjeni Local Municipality. The southern border of the study site is bordered by the Brak River, with the R48 to Philipstown traversing the western section of the site and the Hydra substation approximately 10 km from the site (refer to Figure 2.1).

The proposed solar energy facility is to make use of photovoltaic (PV) technology and will be comprised of the following infrastructure:

- » An array of **photovoltaic panels** with a generating capacity of up to **300 MW**, which will be developed in phases. The following phases are currently proposed:
 - * Phase 1: 75 MW over an area of approximately 220 ha
 - * Phase 2: 75 MW over an area of approximately 210 ha
 - * Phase 3: 75 MW over an area of approximately 195 ha
 - * Phase 4: 75 MW over an area of approximately 155 ha
- » **Support structures** to mount the photovoltaic panels. The angle of the panels will be tilted at 25° from the horizontal plane, facing north and may be adjusted to optimise for summer or winter solar radiation characteristics and for daily movement of the sun east to west. The maximum height of the PV panels once mounted will be approximately 2.8 m from ground level.
- » An on-site **substation** (within an area of 100m x 100m) and new short overhead **power lines** between each phase and the on-site substation. Four (4) new overhead **22kV** power lines connecting the four proposed phases to the proposed on-site substation will be required.
- » A **short power line** (few meters) from the on-site substation to turn into the existing Hydra MTS-Behrshoek 132kV power line that traverses the site, therefore connecting directly into the Eskom electricity network.
- » **Invertors** which are required to convert the electricity from direct current to alternating current.
- » **Cabling** between project components, to be laid underground where practical.
- » **Access roads** with a width of less than 5 m within the site (for the purposes of construction and limited maintenance during operation). The southern road

(existing) will be approximately 6 394 m in length, while the western road parallel to the R48 will be approximately 1 025 m in length.

- » Temporary **laydown** and **storage areas** in an area less than 1 hectare close to an existing house to be used as the site office

In terms of the findings of the EIA Report, various planning, construction, and operation-related environmental impacts were identified, including:

- » Disturbance of the ecological environment (i.e. flora and fauna)
- » Impacts on the visual aesthetics and sensitive receptors
- » Impacts on soils and agricultural potential
- » Impacts on heritage and palaeontological resources
- » Socio-economic impacts

The specialist studies undertaken in the EIA Phase did not identify any absolute "No-Go" areas for the proposed facility. However, the following potentially sensitive areas were identified:

- » *Non-perennial streams/ drainage lines within the site* - the site is in an arid area and although there are no permanent wetlands on site, there are a number of non-perennial streams / drainage lines that occur on the site
- » *Ecologically sensitive areas (terrestrial) that occur on the site* - ecologically sensitive areas that could support the occurrence of protected or threatened flora or fauna.
- » *Current irrigation areas* - areas of current irrigation were identified as having a potentially high agricultural potential.
- » *Areas of visual exposure* – receptors within a 4 km radius of the facility (i.e. users of national and secondary roads).
- » *Heritage/cultural features* - Only the following sites may be directly/indirectly impacted by the proposed development:
 - * Hill with Stone Age (including LSA) traces and stone circle feature as well as the rich spread of artefacts on the plain immediately to the south of it (30.60044° S, 24.10566° E). This area will have to be delineated as a no-go area.
 - * Later Stone Age site and other heritage traces as well as potential peat sequence at the spring (30.58073° S, 24.06585° E). This area will also need to be delineated as a no go area.
 - * Rich surface spread of mainly Pleistocene age artefacts (30.59695° S, 24.09501° E). This area will have to be sampled and documented for preservation at the museum.

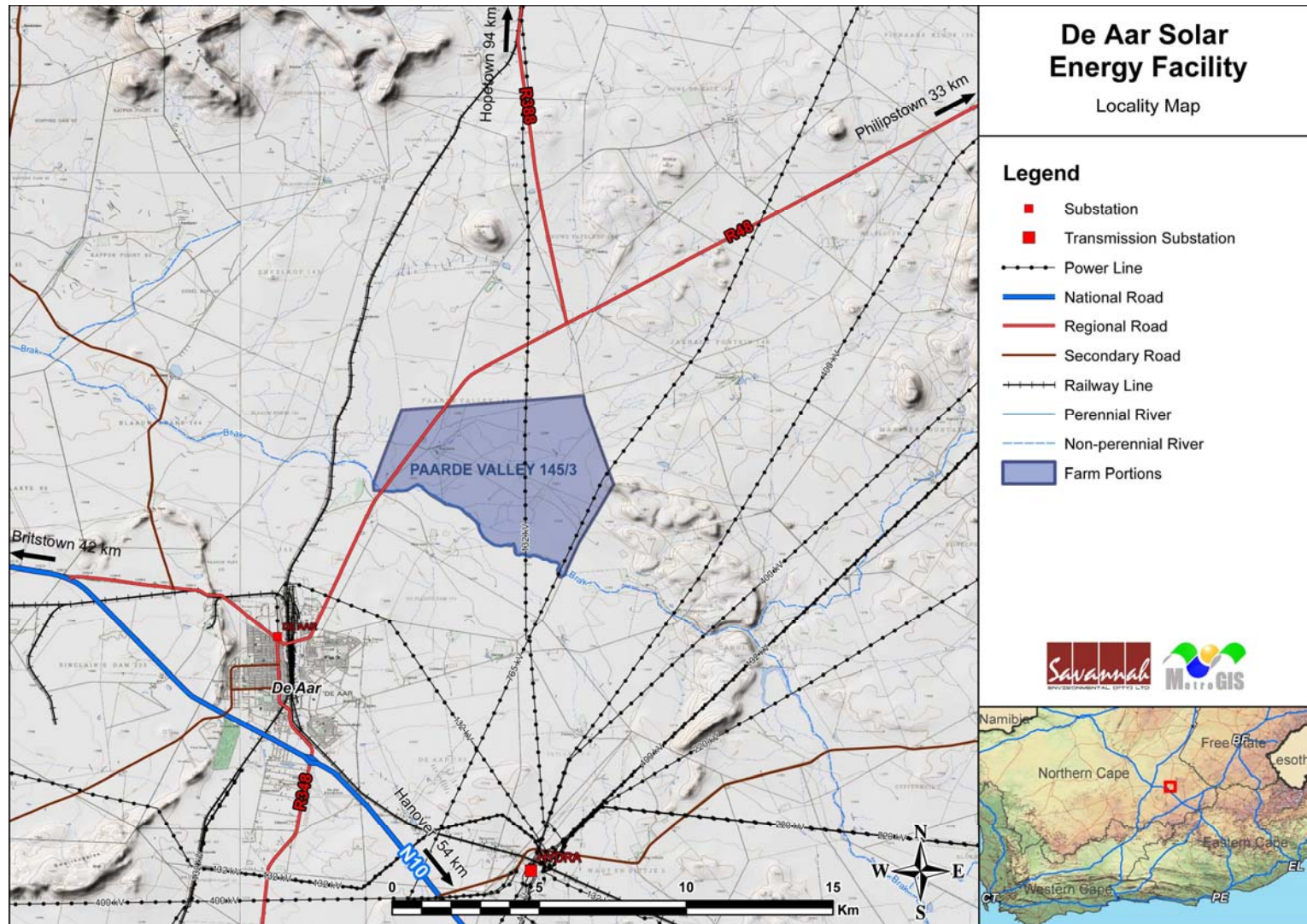


Figure 2.1: Locality map illustrating the location of the proposed development site for the Ilanga Lethemba PV Solar Energy Facility.

2.1 Activities and Components associated with the Solar Energy Facility

The main activities/components associated with the proposed facility are detailed in the tables which follow.

The construction of the facility will be phased. Approximately 75 MW would be installed in the first phase. The construction of the first phase is expected to extend over a period of 12 months. Approximately 800 employment opportunities will be created at peak of construction. It is anticipated that approximately 80% (640) of the employment opportunities will be available to low skilled (construction labourers, security staff etc.), 10% (80) to semi-skilled workers (drivers, equipment operators etc.) and 10% (80) to skilled personnel (engineers, land surveyors, project managers etc.). The low skilled personnel are likely to be sourced from the nearby town of De Aar and are likely to commute from their homes on a daily basis. Therefore any overnight on-site employees would be limited to security and skilled construction staff. Workers not living in the area, including those for skilled positions, will not be housed on site.

Activity	Description
Pre-construction surveys	<p>Prior to initiating construction, a number of detailed surveys will be required including, but not limited to:</p> <ul style="list-style-type: none"> » <i>Geotechnical survey</i> – the geology and topography of the study area will be confirmed. The geotechnical study will look at flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. This study will serve to inform the type of foundations required to be built and the extent of earthworks and compaction required in the establishment of any internal access roads. » <i>Site survey</i> – this will be required to finalise the design layout of the solar field and other associated infrastructure. The finalisation will need to be confirmed in line with the Environmental Authorisation issued for the facility. » <i>Powerline servitude survey</i> – once the placement of the towers for the powerline has been finalised, a walk through survey will be undertaken for ecological, archaeology and heritage resources which may necessitate certain towers to be moved to avoid sensitivities.
Establishment of access roads	<ul style="list-style-type: none"> » The identified farm portion for the proposed facility can be accessed via the R48 road to Philipstown. » Internal access roads will be established for construction and maintenance purposes. The extent of earthworks and compaction required in the establishment of the access roads will be established through the detailed geotechnical

	study which will be undertaken as part of the design phase.
Undertake site preparation	<ul style="list-style-type: none"> » Site preparation activities will include clearance of vegetation at the footprint of the area infrastructure (i.e. sub-station), and linear components (i.e. internal access roads, powerline towers). These activities will require the stripping of topsoil which will need to be stockpiled, backfilled and/or spread on site.
Transport of components and equipment to site	<ul style="list-style-type: none"> » The components for the proposed facility will be transported to site, in sections, by road. Some of the transformer may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989)² by virtue of the dimensional limitations (i.e. length and weight). The typical civil engineering construction equipment will need to be brought to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the establishment of the substation and powerline. .
Establishment of construction camps and laydown areas	<ul style="list-style-type: none"> » Once the required construction equipment has been transported to site, dedicated equipment camp(s) and laydown area(s) will be required. » The construction camp(s) serve to confine activities and storage of equipment to designated area(s) to limit the potential ecological impacts associated with this phase of the project. The laydown area(s) will be used for assembly purposes and the general placement/storage of construction equipment. » Fuel required for the on-site construction vehicles and equipment might need to be secured in a temporary bunded facility within the construction camp(s) to prevent leakages and soil contamination.
Establishment of the PV panels	<ul style="list-style-type: none"> » Foundation holes for the PV panels will be mechanically excavated to a depth of approximately 150 - 180 cm. The concrete foundation will be poured and will then be left for up to a week to cure. Ready mix concrete is to be transported from the closest centre to the development. » The installation of the underground cables between the PV panels and the inverters and between the inverters and the substation/transformer will require the excavation of trenches of approximately 40cm – 100cm deep within which they can then be laid.
Construction of the substation	<ul style="list-style-type: none"> » The substation will be constructed with footprint of up to 100m x 100m. The substation would be constructed in the following simplified sequence: <ul style="list-style-type: none"> » <u>Step 1</u>: Survey of the site

² A permit will be required for the transportation of these abnormal loads on public roads.

	<ul style="list-style-type: none"> » <u>Step 2:</u> Site clearing and levelling and construction of access road to substation site » <u>Step 3:</u> Construction of terraces and foundations » <u>Step 4:</u> Assembly, erection and installation of equipment (including transformers) » <u>Step 5:</u> Connection of conductors to equipment; and » <u>Step 6:</u> Rehabilitation of any disturbed areas and protection of erosion sensitive areas.
Undertake site rehabilitation	<ul style="list-style-type: none"> » Once construction is complete and all construction equipment is removed, the site must be rehabilitated where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operational phase must be closed and prepared for rehabilitation.

2.1.1. Operation and Maintenance Phase

Approximately to 275 staff members are expected to be required on-site. Of this total approximately 80% will be low skilled, 10% medium-skilled and 10% high skilled positions. The facility plant is expected to be operational for 25+ years.

The following operation and maintenance activities are expected to form part of the project scope of works.

Activity	Description
Operation of the photovoltaic panels and the associated electrical infrastructure	<ul style="list-style-type: none"> » Multiple PV panels will be linked to form numerous loops. The PV panels will convert the light energy from the incoming radiation into electrical energy (i.e. as direct current). An individual inverter which will service each loop to change the power to alternating current. Thereafter the electricity will be conveyed to the substation via the underground cabling, the powerline, and then to one of the proposed powerline alternatives.
Site operation and maintenance	<ul style="list-style-type: none"> » It is anticipated that full-time security, maintenance, and control room staff will be required on site. » Each component within the facility will be operational except under circumstances of mechanical breakdown, unfavourable weather conditions, or routine maintenance activities.

2.1.2. Decommissioning Phase

The facility is expected to have a lifespan of 25+ years (i.e. with maintenance). The facility infrastructure would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities would comprise the disassembly and replacement of the individual components with more

appropriate technology/infrastructure available at that time. The following decommissioning activities will form part of the project scope.

Activity	Description
Site preparation	Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas and decommissioning camp) and the mobilisation of decommissioning equipment.
Disassemble and replace existing components	The components would be disassembled, and reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

STRUCTURE OF THIS EMP

CHAPTER 3

The first two chapters provide background to the EMP and the proposed project, while the chapters which follow consider the following:

- » Key legislation applicable to the development
- » Planning and design activities
- » Construction activities
- » Operation activities
- » Decommissioning activities

These chapters set out the procedures necessary for Solar Capital, as the project developer, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the solar energy facility project, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management programme has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMP table has been established for each environmental objective. The information provided within the EMP table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project Component/s	» List of project components affecting the objective.
Potential Impact	» Description of potential environmental impact if objective is not met.
Activity/Risk Source	» Description of activities which could affect achieving objective.
Mitigation: Target/Objective	» Description of the target and/or desired outcomes of mitigation.

Mitigation: Action/Control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management programme.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods, and reporting.

The objectives and EMP tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the components and/or layout of the facility)
- » Modification to or addition to environmental objectives and targets
- » Relevant legal or other requirements are changed or introduced
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc

3.1. Project Team

This Draft EMP was compiled by:

Name	Company
EMP Compilers	
Bongani Khupe – Environmental Assessment Practitioner (EAP) Karen Jodas – Project Manager	Savannah Environmental
Specialists	
David Hoare – fauna, flora and ecology	David Hoare Consulting
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David Morris – heritage resources	McGregor Museum
Lourens du Plessis – visual aesthetics	MetroGIS
Tony Barbour - social	Tony Barbour
Bruce Rubidge - Palaeontology	Bruce Rubidge

The Savannah Environmental team have extensive knowledge and experience in EIA and environmental management, having been involved in EIA processes over the past ten years. They have managed and Drafted EMPs for other power generation projects throughout South Africa, including numerous wind and solar energy facilities.

KEY LEGISLATION APPLICABLE TO THE DEVELOPMENT CHAPTER 4

The following legislation and guidelines have informed the scope and content of this EMP Report:

- » National Environmental Management Act (Act No 107 of 1998)
- » EIA Regulations, published under Chapter 5 of the NEMA (GNR R545, GNR 546 in Government Gazette 33306 of 18 June 2010)
- » Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - * Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010)
 - * Public Participation in the EIA process (DEA, 2010)

Several other acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the EIA Report. A review of legislative requirements applicable to the proposed project is provided in the table that follows.

Table 4.1: Relevant legislative and permitting requirements

Legislation	Applicable Sections
<i>National Legislation</i>	
Constitution of the Republic of South Africa (Act No 108 of 1996)	<ul style="list-style-type: none"> » Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33)
National Environmental Management Act (Act No 107 of 1998)	<ul style="list-style-type: none"> » National environmental principles (S2), providing strategic environmental management goals, and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment. » NEMA EIA Regulations (GN R385, 386 & 387 of 21 April 2006) (published in

Legislation	Applicable Sections
	<p>terms of Chapter 5), with effect from 3 July 2006.</p> <ul style="list-style-type: none"> » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed, and reported on to the competent authority (S24 – Environmental Authorisations). » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment. » Procedures to be followed in the event of an emergency incident which may affect on the environment (S30).
<p>Environment Conservation Act (Act No 73 of 1989)</p>	<ul style="list-style-type: none"> » National Noise Control Regulations (GN R154 dated 10 January 1992).
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<ul style="list-style-type: none"> » Stipulates assessment criteria and categories of heritage resources according to their significance (S7). » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35). » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36). » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as

Legislation	Applicable Sections
	part of tourism attraction (S44).
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	<ul style="list-style-type: none"> » Provides for the MEC/Minister to list ecosystems which are threatened and in need of protection (S52) – none have yet been published. » Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) - none have yet been published. » A list of threatened & protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » This act also regulates alien and invader species. » Under this Act, a permit would be required for any activity which is of a nature that may negatively affect the survival of a listed protected species.
National Environmental Management: Air Quality Act (Act No 39 of 2004)	<ul style="list-style-type: none"> » Measures in respect of dust control (S32) – no regulations promulgated yet. » Measures to control noise (S34) - no regulations promulgated yet.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	<ul style="list-style-type: none"> » Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN

Legislation	Applicable Sections
	R1048).
National Water Act (Act No 36 of 1998)	<ul style="list-style-type: none"> » National Government is the public trustee of the Nation's water resources (S3). » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting, and recreational use, as set out in Schedule 1. General Authorisation Government Gazette No. 20526 8 October 1999 is of relevance. » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20). » Definition of water use and requirement for water use licenses for certain activities (S21) » Requirements for registration of water use (S26 and S34). » Definition of offences in terms of the Act (S151).
National Environmental Management: Waste Act (Act No 59 of 2008)	<ul style="list-style-type: none"> » The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities. » The Act provides listed activities requiring a waste license.
National Forests Act (Act No 84 of 1998)	<ul style="list-style-type: none"> » Protected trees: According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that 'no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove,

Legislation	Applicable Sections
	transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister'. » Forests: The Act prohibits the destruction of indigenous trees without a licence.
Guideline Documents	
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Outlines the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits.
Policies and White Papers	
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» Investment in renewable energy initiatives, such as the proposed solar energy facility, is supported by this white Paper.
The White Paper on Renewable Energy (November 2003)	» This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

MANAGEMENT PROGRAMME: PLANNING AND DESIGN

CHAPTER 5

Overall Goal: undertake the planning and design phase in a way that:

- » Ensures that the design of the facility responds to the identified environmental constraints and opportunities.
- » Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- » Ensures that the best environmental options are selected for the linear components (i.e. any access roads and the powerline).
- » Enables the solar energy facility construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

5.1 Objectives

OBJECTIVE 5.1.1: Ensure the facility design responds to identified environmental constraints and opportunities

No absolute '*no go*' areas were identified by the specialists during the EIA Phase. However, a number of potentially sensitive areas were identified to be associated with the proposed project, which included:

- » *Non-perennial streams/ drainage lines within the site* - the site is in an arid area and although there are no permanent wetlands on site, there are a number of non-perennial streams / drainage lines that occur on the site
- » *Ecologically sensitive areas (terrestrial) that occur on the site* - ecologically sensitive areas that could support the occurrence of protected or threatened flora or fauna.
- » *Current irrigation areas* - areas of current irrigation were identified as having a potentially high agricultural potential.
- » *Areas of visual exposure* – receptors within a 4 km radius of the facility (i.e. users of national and secondary roads as well as residents of adjacent homesteads).

- » *Heritage/cultural features* – Some objects of cultural and heritage significance were found on site. However, only the following sites may be directly/indirectly impacted by the proposed development:
 - * Hill with Stone Age (including LSA) traces and stone circle feature as well as the rich spread of artefacts on the plain immediately to the south of it (30.60044° S, 24.10566° E). This area will have to be delineated as a no-go area.
 - * Later Stone Age site and other heritage traces as well as potential peat sequence at the spring (30.58073° S, 24.06585° E). This area will also need to be delineated as a no go area.
 - * Rich surface spread of mainly Pleistocene age artefacts (30.59695° S, 24.09501° E). This area will have to be sampled and documented for preservation at the museum.

In order to minimise impacts associated with the construction and operation of the facility, the following surveys and associated activities are required to be undertaken during the final design phase:

- » Geotechnical survey – this will investigate flood potential, foundation conditions, potential for excavations, and the availability of natural construction materials. This study will serve to inform the type of foundations required to be constructed (i.e. for the substation), and the extent of earthworks and compaction required in the establishment of the internal access roads.
- » A storm-water management plan – this will detail how storm-water runoff (i.e. over engineered hard surfaces) can be managed to reduce velocities and volumes of water that could lead to erosion and potential sedimentation of drainage systems. Stormwater drains should be correctly located and designed with appropriate erosion-control features to ensure local stormwater run-off over the flood embankments and natural riverbanks do not cause erosion and subsequent bank slumping.
- » Heritage survey – sensitive heritage features identified as no go areas will need to be located and demarcated as recommended. In addition, the position of linear infrastructure will be surveyed prior to construction (i.e. the access road, and the towers for the powerline). If a heritage object is found, appropriate specialists must be brought in to assess the site, notify the administering authority of the item/site, and undertake due/required processes.

Project Component/s	<ul style="list-style-type: none"> » Solar field and associated infrastructure » Power generation components and associated infrastructure » Access roads. » Powerline.
Potential Impact	<ul style="list-style-type: none"> » Impact on identified sensitive areas.
Activities/Risk Sources	<ul style="list-style-type: none"> » Positioning of all the facilities components (i.e. including area infrastructure, the powerline and access roads).

Mitigation: Target/Objective	<ul style="list-style-type: none"> » The design of the facility responds to the identified environmental constraints and opportunities. » Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.
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Mitigation: Action/Control		Responsibility	Timeframe
a	Undertake a heritage pre-construction survey.	Heritage specialist	Design
b	Undertake a geotechnical pre-construction survey.	Geotechnical specialist	Design
c	Obtain any additional environmental permits required (e.g. water use license, permit to move heritage resources)	Solar Capital	Project planning
d	Consider and incorporate design level mitigation measures recommended by the specialists as detailed within the EIA Report and relevant appendices.	Engineering design consultant, solar component supplier, and Solar Capital	Design review
e	External access point and internal access road to be carefully planned to maximise road user safety.	Solar Capital	Design
f	Compile a comprehensive storm water management plan for hard surfaces as part of the final design of the project. This must include appropriate means for the handling of stormwater within the site, e.g. separate clean and dirty water streams around the plant, install stilling basins to capture large volumes of run-off, trapping sediments, and reduce flow velocities (i.e. water used when washing the mirrors).	Solar Capital	Design

Performance Indicator	<ul style="list-style-type: none"> » The design meets the objectives and does not degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the EIA Report.
Monitoring	<ul style="list-style-type: none"> » Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction.

OBJECTIVE 5.1.2: Ensure the selection of the best environmental option for the alignment of the powerline, and associated access roads

- » **Road** – the study site is accessible via the R48 road to Philipstown. It is not envisaged that any new access roads will be required to be constructed in order to access the site. However, internal access roads will be required to access the individual components within the facility during construction and operation. There is an **existing** internal access road to south of the site (approximately 6394 m) that is proposed to be used to access the first and second phases of the proposed development. Where necessary, it may be required, in some areas, to upgrade this road in order to suite bigger vehicle movement requirements. A new access road to the west of the site along the R48 approximately 1025 m long and 4.75 m in width will need to be constructed

- » **Powerline** – A short power line (less than 300 meters) will be needed from the on-site substation to turn into the existing Hydra MTS-Behrshoek 132kV power line that traverses the site, therefore connecting directly into the Eskom electricity network. In addition, Four (4) new overhead **22kV** power lines connecting the four proposed phases to the proposed on-site substation will be required. According to the engineers the 22kV lines do not require a dedicated servitude. Only the centre line may need to be cleared for stringing purposes. The remainder of the servitude will not be cleared, except where trees higher than 4 m exist which could interfere with the operation of the powerline.

Where new routes are required (i.e. from the existing access road, mitigation measures are required to be implemented to ensure impacts are minimised. The most sensitive landscape features for planning purposes in the study area will be the presence of drainage lines, and areas with heritage or cultural features.

Project Component/s	<ul style="list-style-type: none"> » Powerline. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Route that degrades the environment unnecessarily, particularly with respect to visual aesthetics, loss of indigenous flora, and erosion.
Activities/Risk Sources	<ul style="list-style-type: none"> » Alignment of powerline within corridor. » Alignment of access roads.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure selection of best environmental option for alignment for the linear infrastructure. » Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

Mitigation: Action/Control		Responsibility	Timeframe
a	Select an alignment that curtails environmental impacts and enhances environmental benefits.	Solar Capital	Prior to submission of the final construction layout plan
b	Consider design level mitigation measures recommended by the specialists as detailed within the EIA report and relevant appendices.	Solar Capital	Design
c	Plan new access roads according to contour lines to minimise cutting and filling operations.	Solar Capital	Design
d	Use bird-friendly powerline tower and conductor designs.	Solar Capital	Design
e	Install bird diverters/flappers on powerline sections across active agricultural land and drainage lines	Solar Capital	Design
f	Plan the access road, the power lines and ancillary infrastructure in such a way and in such a location that clearing of vegetation is minimised. Make use of already disturbed sites rather than pristine areas	Solar Capital	Design

Performance Indicator	<ul style="list-style-type: none"> » Powerline and road alignments meet environmental objectives. » Selected linear alignments that minimise any negative environmental impacts and maximise any benefits.
Monitoring	<ul style="list-style-type: none"> » Ensure that the design implemented meets the objectives and mitigation measures in the EIA Report through review of the design by the Project Manager, and the ECO prior to the commencement of construction.

OBJECTIVE 5.1.3: Minimise visual impacts

Project Component/s	<ul style="list-style-type: none"> » Night lighting on power block and substation.
Potential Impact	<ul style="list-style-type: none"> » Visual impacts on those receptors in close proximity to the facility.
Activities/Risk Sources	<ul style="list-style-type: none"> » Visual impact of the above mentioned by observers on or near the site as well as within the region.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Optimal planning of infrastructure to minimise visual impact.

Mitigation: Action/Control		Responsibility	Timeframe
a	Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light	Project proponent, or design	Planning.

Mitigation: Action/Control	Responsibility	Timeframe
fixtures for the solar energy facility and the ancillary infrastructure. The following is recommended: <ul style="list-style-type: none"> » Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself); » Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights; » Making use of minimum lumen or wattage in fixtures; » Making use of down-lighters, or shielded fixtures; » Making use of Low Pressure Sodium lighting or other types of low impact lighting. » Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes. 	consultant	
b Retain and maintain a natural vegetation buffer (approximately 100 m wide) around the perimeter of the development area. This buffer may be within or behind the security fence.	Project proponent, or design consultant	Planning
c Retain and maintain natural vegetation in all areas outside of the development footprint.	Project proponent, or design consultant	Planning

Performance Indicator	» Lighting impact is minimal and no complaints received from settlements or homesteads.
Monitoring	» Not applicable.

OBJECTIVE 5.1.4: Minimise stormwater runoff and subsequent alteration of the local hydrological regime

Project Component/s	» Stormwater management components » Any hard engineered surfaces (i.e. access roads, and building foundations).
Potential Impact	» Poor stormwater management and alteration of the hydrological regime. » Risk of river system erosion and downstream sedimentation.
Activities/Risk Sources	» Construction of the facility (i.e. placement of hard engineered surfaces). » Construction of water abstraction infrastructure.

Mitigation: Target/Objective	» Appropriate management of stormwater to minimise impacts on the environment.
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Mitigation: Action/Control		Responsibility	Timeframe
a	Reduce the potential increase in surface flow velocities and the resultant impact on the localised drainage system through increased sedimentation.	Solar Capital	Planning and design
b	Suitable handling of stormwater within the site (i.e. clean and dirty water streams around the plant and install stilling basins to capture large volumes of run-off, trapping sediments and reduce flow velocities).	Solar Capital	Construction and operation

Performance Indicator	» Sound water quality and quantity management
Monitoring	» Surface water quality monitoring plan.

MANAGEMENT PROGRAMME: CONSTRUCTION

CHAPTER 6

Overall Goal: Undertake the construction phase in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- » Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- » Minimises the impact on the indigenous natural vegetation and habitats of ecological value (i.e. drainage lines).
- » Minimises impacts on fauna using the site.
- » Minimises the impact on heritage resources
- » Establishes an environmental baseline during construction activities on the site, where possible.

6.1 Institutional Arrangements: Roles and Responsibilities for the Construction Phase

As the proponent, Solar Capital must ensure that the implementation of the facility complies with the requirements of all environmental authorisations and permits, and obligations emanating from other relevant environmental legislation. This obligation is partly met through the development of the EMP, and the implementation of the EMP through its integration into the contract documentation. Solar Capital will retain various key roles and responsibilities during the construction of the facility.

OBJECTIVE 6.1.1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of environmental management plan

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Project Manager; Site Manager; Safety, Health and Environment Representative; Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below.

Project Manager will:

- » Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these
- » Ensure that Solar Capital and its Contractor(s) are made aware of all stipulations within the EMP

- » Ensure that the EMP is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes
- » Be fully conversant with the EIA for the project, the EMP, the conditions of the Environmental Authorisation (once issued), and all relevant environmental legislation

Site Manager (Solar Capital's on-site Representative) will:

- » Be fully knowledgeable with the contents of the EIA and risk management
- » Be fully knowledgeable with the contents and conditions of the Environmental Authorisation (once issued)
- » Be fully knowledgeable with the contents of the EMP
- » Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these
- » Have overall responsibility of the EMP and its implementation
- » Conduct audits to ensure compliance to the EMP
- » Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- » Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site
- » Confine activities to the demarcated construction site

Environmental Control Officer (ECO) will be responsible for monitoring, reviewing, and verifying compliance by the Contractor with the environmental specification and accordingly will:

- » Be fully knowledgeable with the contents with the EIA.
- » Be fully knowledgeable with the contents with the conditions of the Environmental Authorisation (once issued).
- » Be fully knowledgeable with the contents with the EMP.
- » Be fully knowledgeable with the contents with all relevant environmental legislation, and ensure compliance with them.
- » Ensure that the contents of this document are communicated to the Contractor site staff and that the Site Manager and Contractor are constantly made aware of the contents through discussion.
- » Ensure that the compliance of the EMP is monitored through regular and comprehensive inspection of the site and surrounding areas.
- » Ensure that if the EMP conditions or specifications are not followed then appropriate measures are undertaken to address this.
- » Monitoring and verification must be implemented to ensure that environmental impacts are kept to a minimum, as far as possible.
- » Ensure that the Site Manager has input into the review and acceptance of construction methods and method statements.

- » Ensure that activities on site comply with all relevant environmental legislation.
- » Ensure that a removal is ordered of any person(s) and/or equipment responsible for any contravention of the specifications of the EMP.
- » Ensure that the compilation of progress reports for submission to the Project Manager, with input from the Site Manager, takes place on a regular basis, including a final post-construction audit.
- » Ensure that there is communication with the Site Manager regarding the monitoring of the site.
- » Ensure that any non-compliance or remedial measures that need to be applied are reported

Contractors and Service Providers: It is important that contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMP. The contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The contractor's obligations in this regard include the following:

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » A copy of the EMP must be easily accessible to all on-site staff members.
- » Employees must be familiar with the requirements of this EMP and the environmental specifications as they apply to the construction of the proposed facility.
- » Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Staff will be informed of environmental issues as deemed necessary by the ECO.

All contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- » Ensuring adherence to the environmental management specifications
- » Ensuring that Method Statements are submitted to the Site Manager (and ECO) for approval before any work is undertaken
- » Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMP
- » Ensuring that any instructions issued by the Site Manager on the advice of the ECO are adhered to
- » Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting

- » Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO
- » Ensuring that a register of all public complaints is maintained
- » Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMP (i.e. ensure their staff are appropriately trained as to the environmental obligations)

6.2 Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE 6.2.1: Minimise impacts related to inappropriate site establishment

The contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English, Afrikaans and any other relevant local languages, all to the approval of the Site Manager.

All unattended open excavations shall be adequately demarcated and/or fenced (fencing shall consist of a minimum of three strands of wire wrapped with danger tape). Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure (i.e. PV panels, etc). » Linear infrastructure (i.e. powerline, access road).
Potential Impact	<ul style="list-style-type: none"> » Hazards to landowners and public. » Damage to indigenous natural vegetation, due largely to ignorance of where such areas are located. » Loss of threatened animal species
Activities/Risk Sources	<ul style="list-style-type: none"> » Open excavations (foundations and cable trenches). » Movement of construction vehicles in the area and on-site.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To secure the site against unauthorised entry. » To protect members of the public/landowners/residents. » No loss of or damage to sensitive vegetation in areas outside the immediate development footprint.

Mitigation: Action/Control		Responsibility	Timeframe
a	Secure site, working areas and excavations in an appropriate manner, as agreed with the ECO.	Contractor	Site establishment, and duration of construction
b	Where necessary control access, fence, and secure area.	Contractor	Site establishment, and duration of construction
c	Fence and secure contractor's equipment camp.	Contractor	Site establishment
d	Establish appropriately bunded areas for storage of hazardous materials.	Contractor	Site establishment
e	All development footprints for the roads and powerline should be clearly demarcated.	Contractor	Site establishment, and duration of construction
f	Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations on site.	Contractor	Site establishment, and duration of construction
g	Ablution or sanitation facilities should not be located within 100 m from a 1:100 year flood line including water courses, wetlands.	Contractor	Site establishment, and duration of construction
h	Supply adequate waste collection bins at site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction

Performance Indicator	<ul style="list-style-type: none"> » Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	<ul style="list-style-type: none"> » An incident reporting system will be used to record non-conformances to the EMP. » ECO to monitor all construction areas on a continuous basis until all construction is completed. Non-conformances will be immediately reported to the site manager.

OBJECTIVE 6.2.2: Appropriate management of the construction site and construction workers

No construction workers will be accommodated on site. Construction workers are to be accommodated in the town of De Aar. Construction equipment will need to be stored at appropriate locations on site.

In order to minimise impacts on the surrounding environment, contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation (once issued), the EIA Report, and this EMP, as well as the requirements of all relevant environmental legislation.

Project Component/s	» Area and linear infrastructure.
Potential Impact	<ul style="list-style-type: none"> » Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	<ul style="list-style-type: none"> » Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Accommodation facilities. » Contractors not aware of the requirements of the EMP, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Limit equipment storage within demarcated designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control		Responsibility	Timeframe
a	The siting of the construction equipment camp/s will take cognisance of any sensitive areas identified by the EIA studies. The location of this construction equipment camp/s shall be approved by the project ECO.	Contractor	Pre-construction
b	As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction

Mitigation: Action/Control		Responsibility	Timeframe
c	Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract
d	Ensure ablution facilities are maintained.	Contractor	Site establishment, and duration of construction
e	Ensure waste removal facilities are maintained and emptied as and when required.	Contractor	Site establishment, and duration of construction
f	The terms of this EMP and the Environmental Authorisation (once issued) must be included in all tender documentation and Contractors contracts	Solar Capital	Tender process
g	Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Duration of construction
h	Contractors must use chemical toilets/ablution facilities situated at designated areas of the site; no ablution activities will be permitted outside the designated areas. These facilities must be regularly serviced by appropriate contractors. A minimum of one toilet shall be provided per 15 persons at each working area such as the Contractor's camp	Contractor and sub-contractor/s	Duration of contract
i	Cooking/meals must take place in a designated area. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract
j	All litter must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	Contractor and sub-contractor/s	Duration of contract
k	No one other than the ECO or personnel authorised by the ECO may disturb flora or fauna outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
l	Fire fighting equipment and training provided before the construction phase commences.	Contractor and sub-contractor/s	Duration of contract
m	Contractors appointed by Solar Capital must ensure that all workers are informed at the outset of the	Contractor and sub-	Construction

Mitigation: Action/Control		Responsibility	Timeframe
	construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	contractor/s	
n	Provide opportunities for workers to go home over weekends where required and practically possible.	Contractor and sub-contractor/s	Construction
o	On completion of the construction phase, all construction workers must leave the site within one week of their contract ending.	Contractor and sub-contractor/s	Construction

Performance Indicator	<ul style="list-style-type: none"> » The construction camps have avoided sensitive areas, as approved by the ECO. » Ablution and Waste removal facilities are in a good working order and do not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not reported by the ECO. » No complaints regarding contractor behaviour or habits. » Appropriate training of all staff is undertaken prior to them commencing work on the construction site. » Code of Conduct Drafted before commencement of construction phase.
Monitoring	<ul style="list-style-type: none"> » Regular audits of the construction camps and areas of construction on site by the ECO. » Proof of disposal of sewage at an appropriate waste water treatment works. » An incident reporting system should be used to record non-conformances to the EMP. » Observation and supervision of Contractor practices throughout construction phase by the ECO. » Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.3: Maximise local employment and business opportunities associated with the construction phase

Although limited, employment opportunities could be created during the construction phase, specifically for semi-skilled and unskilled workers. The unemployment rate in the study area is quite high and there are therefore various individuals in the area in search of employment. Employment of locals and the

involvement of local SMMEs would enhance the social benefits associated with the project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

Project Component/s	» Construction activities associated with the establishment of the facility, including the associated infrastructure.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business.
Activities/Risk Sources	<ul style="list-style-type: none"> » Contractors who make use of their own labour for unskilled tasks, thereby reducing the employment and business opportunities for locals. » The inflow of various specialists from outside the study area and even abroad. » Sourcing of individuals with skills similar to the local labour pool outside the municipal area.
Mitigation: Target/Objective	» Employment of a maximum number of low-skilled to semi-skilled workers for the project from the local area where possible.

Mitigation: Action/Control		Responsibility	Timeframe
a	Attempt to employ a minimum of 80% of the low-skilled workers are sourced from the local area.	Solar Capital, Local Municipality, and contractor	Duration of construction
b	A broad-based approach should be followed to identify and involve relevant organisations which could assist the main contractor and developer in identifying people whose skills may correspond with the required job specifications.	Solar Capital, Local Municipality, and contractor	Pre-construction
c	An equitable process should be promoted whereby locals and previously disadvantaged individuals (including women) are considered for employment opportunities.	Solar Capital, and Local Municipality	Duration of construction
d	Create conditions that are conducive for the involvement of entrepreneurs, small businesses, and SMMEs during the construction process.	Solar Capital, Local Municipality, and contractor	Pre-construction
e	Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses, and SMMEs from the local sector.	Solar Capital, and Contractor	Pre-construction
f	A local labour desk should be set-up (if not already established) in the beneficiary communities to co-ordinate the process of involving local labour.	Solar Capital, and Contractor	Pre-construction
g	Skills training and capacity building should be embarked upon from the onset of the construction phase and even prior to the construction phase if	Solar Capital, and Contractor	Pre-construction and

Mitigation: Action/Control		Responsibility	Timeframe
	possible.		construction
h	Communication efforts concerning job creation opportunities should refrain from creating unrealistic expectations.	Solar Capital	Pre-construction and construction

Performance Indicator	<ul style="list-style-type: none"> » Job opportunities, especially of low to semi-skilled positions, are primarily awarded to members of local communities as appropriate. » Locals and previously disadvantaged individuals (including women) are considered during the hiring process. » SMMEs are awarded contracts, where possible, during the construction phase. » Labour, entrepreneurs, businesses, and SMMEs from the local sector are awarded jobs, where possible, based on requirements in the tender documentation. » The involvement of local labour is promoted. » Reports are not made from members of the local communities regarding unrealistic employment opportunities or that only outsiders were employed.
Monitoring	<ul style="list-style-type: none"> » Developer and or appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 6.2.4: Maximise capacity building and skills training, and address economic inequities within the study area

The education levels among the population of the Emthanjeni local Municipality are low. As the construction phase would involve unskilled, semi-skilled, and skilled workers it is likely that locals could be sourced for the unskilled and semi-skilled positions, thereby there should be sufficient numbers of individuals to choose from. Due to the high unemployment figures, it is also clear that there would be various unemployed individuals in search of employment, even if they can only secure temporary positions. Even though all those that would be employed might not have the necessary applicable skills, this issue could be addressed through proper focussed skills training and capacity building initiatives after locals have been sourced, but prior to construction activities starting.

Project Component/s	<ul style="list-style-type: none"> » Availability of required skills in the local communities.
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Potential Impact	» The opportunities and benefits associated with the creation of local employment and business could be maximised.
Activities/Risk Sources	<ul style="list-style-type: none"> » Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Locals are unavailable to assist farmers during pruning and harvesting seasons. » Higher skilled positions might be sourced internationally.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Employment of a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible. » Appropriate skills training and capacity building

Mitigation: Action/Control		Responsibility	Timeframe
a	The developer, in discussions with the Local Municipality, should aim to employ a maximum number of the low-skilled and/or semi-skilled workers from the local area where possible.	Solar Capital, and Local Municipality	Duration of construction
b	A broad-based approach should be followed to identify and involve relevant organisations in identifying people whose skills may correspond with the job specifications.	Solar Capital, and Local Municipality	Pre-construction
c	In cases for the semi-skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions.	Solar Capital, and Local Municipality	Duration of construction
d	A proactive consultative skills-audit should be undertaken in the local communities where job creation is currently a significant need.	Solar Capital, and Local Municipality	Pre-construction, and construction
e	Appropriate training should be provided as per a skills development plan to narrow the gap between skills and demand. It is preferable that training be of such a nature that the skills thereby acquired are transferable and of real benefit in other employment contexts.	Solar Capital, and Local Municipality	Pre-construction, and construction
f	Consider establishing a Monitoring Forum (MF) consisting of representatives from the local community, local police, local farming community and the contractor prior to the commencement of the construction phase	Solar Capital	Pre-construction

Performance Indicator	<ul style="list-style-type: none"> » A skills development plan is developed. » Job opportunities, especially of lower skilled positions, are primarily awarded to members of local communities. » Skills training and capacity building initiatives are developed and implemented.
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	» Local SMMEs and/or entrepreneurs awarded the opportunity to become involved in the tender process.
Monitoring	» Developer and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 6.2.5: Minimise the impact of the inflow of an outside workforce and job seekers into the study area

Approximately 800 construction workers would be involved with the project at the peak of the construction period. The timeframe for the proposed construction period is approximately 12 months. Even though the inflow of jobseekers is likely to occur, the probability of this issue becoming problematic and resulting in severe negative social impacts is seen to be improbable.

Other possible negative impacts due to the workforce's presence in the area and especially when jobseekers come to the area would include misconduct of workers, trespassing of workers on privately owned farms, the possible increase in crime, littering, increase in traffic, increase in noise, the development of informal vending stations, and poaching of livestock.

Project Component/s	» Inflow of an outside workforce and jobseekers.
Potential Impact	» The inflow of outsiders and jobseekers could result in negative impacts on the surrounding property owners and local communities, and could even lead to conflict between the locals and these outsiders.
Activities/Risk Sources	<p>» Outside workforce and jobseekers come into conflict with locals, their presence leads to environmental pollution and possibility of them remaining in the area (without proper housing facilities) after construction has ceased. This would put additional pressure on the existing infrastructure and services.</p> <p>» Locals are not employed, which would increase the probability of the impacts occurring.</p>
Mitigation: Target/Objective	<p>» A limited number of outsiders employed.</p> <p>» Pro-active measures in place to deal with possible jobseekers.</p>

Mitigation: Action/Control		Responsibility	Timeframe
a	Implement a transparent approach and open consultation with adjacent property owners, prior and throughout the construction period in order to provide a platform where grievances or requests can be addressed before issues become contentious.	Contractor	Pre-construction and construction

Mitigation: Action/Control		Responsibility	Timeframe
b	Construction workers falling within the semi-skilled to unskilled category should be sourced from the local population where possible.	Contractor	Construction
c	Local labourers should remain at their existing residences.	Contractor	Construction
d	Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners (of the larger area), should be informed of the details of the contractors, size of the workforce and construction schedules.	Solar Capital	Pre-construction and construction
e	On-site security should be active prior to the construction phase.	Solar Capital	Pre-construction
f	Construction workers should be easily identifiable by wearing uniforms and even identity tags.	ECO	Construction
g	Sufficient water and sanitation facilities should be provided for the workers on site during the construction phase.	Contractor	Construction
h	The construction site and accommodation facility should be properly managed to avoid any environmental pollution (due to inadequate water, sanitation and waste infrastructure and services) and littering.	ECO and Contractor	Construction
i	The construction site should be appropriately fenced.	Contractors	Pre-construction
j	The applicant, local leaders, and the Emthanjeni Local Municipality should jointly develop a strategy to minimise the influx of jobseekers to the area.	Solar Capital, local leaders and Local Municipality	Pre-construction Construction
k	Information distributed as part of the existing HIV/Aids awareness campaigns should again be focused on and communicated to the local workforce.	Solar Capital and Contractors	Construction
l	Develop a transparent communication and recruitment process to minimise the influx of jobseekers to the area.	Solar Capital, local leaders and Local Municipality	Pre-construction
m	The recruitment process and the use of contractors should be clearly communicated to the local communities.	Solar Capital	Pre-construction
n	The communication strategy should ensure that unrealistic employment expectations are not created.	Solar Capital	Pre-construction and Construction

Performance Indicator	<ul style="list-style-type: none"> » Locals are employed where possible. » Reports are not made from members of the local communities regarding unrealistic employment opportunities and/or negative intrusions or even possible increase in crime. » Sound environmental management of the construction site. » No conflict between outsiders, jobseekers, and local community members.
Monitoring	<ul style="list-style-type: none"> » Solar Capital and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 6.2.6: Minimise impacts related to traffic management and transportation of equipment and materials to site

This would include heavy and light vehicles transporting goods and building materials (i.e. from De Aar). At this stage it is not clear how many vehicles would make use of this road on a daily basis but it is expected that it would increase the traffic volume on the N10 national road and the R48.

Project Component/s	<ul style="list-style-type: none"> » Delivery of any component required within the construction phase.
Potential Impact	<ul style="list-style-type: none"> » Impact of heavy construction vehicles on road surfaces, and possible increased risk in accidents involving people and animals. » Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted » Deterioration of road pavement conditions (both surfaced and gravel road) due to abnormal loads.
Activities/Risk Sources	<ul style="list-style-type: none"> » Construction vehicle movement. » Speeding on local roads. » Degradation of local road conditions. » Site preparation and earthworks. » Foundations or plant equipment installation. » Transportation of ready-mix cement from off-site batching plant to the site. » Mobile construction equipment movement on-site. » Powerline and substation construction activities.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimise impact of traffic associated with the construction of the facility on local traffic volume, existing infrastructure, property owners, animals, and road users. » To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the facility construction » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions

Mitigation: Action/Control		Responsibility	Timeframe
a	The contractor's plans, procedures and schedules, as well as the anticipated intrusion impacts should be clarified with affected parties prior to the commencement of construction activities on site.	Solar Capital and ECO	Pre-construction
b	Gravel roads should be sprayed with water to limit dust creation if economically feasible and reasonable from an environmental perspective (water scarce area), or an appropriate dust suppressant should be used.	Solar Capital and ECO	Construction
c	Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.	Solar Capital and ECO	Planning and design
d	Construction vehicles and those transporting materials and goods should be inspected by the contractor or a sub-contractor to ensure that these are in good working order and not overloaded.	Contractor	Construction
e	Strict vehicle safety standards should be implemented and monitored.	Solar Capital and ECO	Construction
f	All relevant permits for abnormal loads must be applied for from the relevant authority.	Contractor (or appointed transportation contractor)	Pre-construction
g	A designated access to the proposed site must be created to ensure safe entry and exit.	Contractor	Pre-construction
h	No deviation from approved transportation routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
i	Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures.	Contractor (or appointed transportation contractor)	Pre-construction
j	Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract
k	The movement of all vehicles within the site must be on designated roadways.	Contractor	Duration of contract
l	Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor	Duration of contract
m	Appropriate maintenance of all vehicles of the contractor must be ensured.	Contractor	Duration of contract
n	All vehicles of the contractor travelling on public	Contractor	Duration of

Mitigation: Action/Control		Responsibility	Timeframe
	roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.		contract
o	Keep hard road surfaces as narrow as possible.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Vehicles keeping to the speed limits. » Vehicles are in good working order and safety standards are implemented. » Local residents and road users are aware of vehicle movements and schedules. » No construction traffic related accidents are experienced. » Local road conditions and road surfaces are up to standard. » Complaints of residents are not received (e.g. concerning the speeding of heavy vehicles).
Monitoring	<ul style="list-style-type: none"> » Developer and or appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 6.2.7: Minimise the potential impact on health, safety and security

An inflow of workers could, as a worst case scenario and irrespective of the size of the workforce, pose some security risks. Criminals could also use the opportunity due to "outsiders" being in the area to undertake their criminal activities. The actual safety of construction workers is also of concern. Further health and safety issues associated with the actual construction site include unauthorised entry to the site and construction areas, the usage of large equipment on site, the risks associated with the storage of equipment and material on site, as well as the increased risk of accidents due to the increased movement of construction vehicles on the local roads.

Other concerns relate to littering, unwanted behaviour of construction workers, transmission of Sexually Transmitted Diseases (STDs), environmental pollution, an increase risk in fires and so forth. Although such perceptions cannot be substantiated or be changed it should be sensitively dealt with. It is thus clear that even though the construction phase when these impacts could occur is only of a short duration, the effects of the impacts could remain in the medium term.

Project Component/s	<ul style="list-style-type: none"> » Inflow of workers could result in increased safety and security risks.
Potential Impact	<ul style="list-style-type: none"> » Outside workers are involved in criminal activities and/or fires

	occur.
Activities/Risk Sources	<ul style="list-style-type: none"> » Safety of individuals and animals are at risk. » Theft of livestock. » Theft of construction material. » On-site accidents. » Spread of sexually transmitted diseases. » Littering and environmental pollution.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Employment of local labour should be maximised and strict security measures should be implemented at the construction site.

Mitigation: Action/Control		Responsibility	Timeframe
a	Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce.	Contractor	Pre-construction
b	Screening of applicants could lessen perceived negative perceptions about the outside workforce.	Contractor	Pre-construction
c	Construction workers should be easily identifiable by wearing uniforms and even identity tags.	Contractor	Construction
d	Local community members and property owners should be informed of the presence of the outside workforce, the construction schedule, and movement of workers.	Developer	Construction
e	Care should be taken to avoid conflict between the local communities and the "outside" workforce	Solar Capital and Contractor	Pre-construction and construction
f	Property owners, their workers, as well as local communities should be motivated to be involved in crime prevention and by reporting crimes.	Solar Capital and Local communities	All phases of project
g	The construction site should be fenced and access to the area controlled.	Solar Capital and Contractor	All phases of project
h	Security personnel should be aware of the possibility of animal theft and poaching and should be able to identify possible criminal elements and/or criminal activities in this regard.	Solar Capital and Contractor	Construction
i	Procedures and measures to prevent, and in worst cases, attend to fires should be developed in consultation with the surrounding property owners and the Local Municipality	Solar Capital, Local Municipality, and local communities	Pre-construction and when required
j	Contact details of emergency services should be prominently displayed on site.	Solar Capital and Contractor	Construction
k	Appropriate fire-fighting equipment must be present on site and members of the workforce should be	Solar Capital and Contractor	Construction

	appropriately trained in using this equipment in the fighting of veld fires		
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Performance Indicator	» No criminal activities and theft of livestock are reported. » No fires or on-site accidents occur.
Monitoring	» Solar Capital and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 6.2.8: Management of dust and air emissions

During the construction phase, limited gaseous or particulate emissions are anticipated from exhaust emissions from construction vehicles and equipment on-site, as well as vehicle entrained dust from the movement of vehicles on the main and internal access roads.

Project Component/s	» Construction activities associated with the area and linear infrastructure.
Potential Impact	» Dust and particulates from vehicle movement to and on-site, foundation excavation, road construction activities, road maintenance activities, temporary stockpiles, and vegetation clearing affecting the surrounding residents and visibility. » Release of minor amounts of air pollutants (for example NO ₂ , CO and SO ₂) from vehicles and construction equipment
Activities/Risk Sources	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling. » Transport of materials, equipment, and components on internal access roads. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» To ensure emissions from all vehicles and construction engines are minimised, where possible, for the duration of the construction phase » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase

	Mitigation: Action/Control	Responsibility	Timeframe
a	Roads must be maintained to a manner that will ensure that nuisance to the community from dust	Contractor	Site establishment

Mitigation: Action/Control		Responsibility	Timeframe
	emissions from road or vehicle sources is not visibly excessive Ensure that any damage to roads because of construction activities is repaired before completion of the construction phase.		and construction
b	Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust.	Contractor	Duration of contract
c	Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins if required by the wind conditions.	Contractor	Duration of contract
d	Speed of construction vehicles must be restricted, as defined by the ECO.	Contractor	Duration of contract
e	Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if visible dust is blowing toward nearby residences outside the site.	Contractor	Duration of contract
f	Strictly control vibration pollution from compaction plant or excavation plant.	Contractor	Duration of contract
g	Disturbed areas must be re-vegetated as soon as practicable once construction in an area is completed.	Contractor	Completion of construction
h	Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase commences. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed. » All heavy vehicles equipped with speed monitors before they are used in the construction phase in accordance with South African vehicle legislation. » Road worthy certificates in place for all heavy vehicles at outset of construction phase and up-dated on a monthly basis.
Monitoring	<p>Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods:</p> <ul style="list-style-type: none"> » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any

	<p>complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.</p> <ul style="list-style-type: none"> » An incident reporting system must be used to record non-conformances to the EMP.
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OBJECTIVE 6.2.9: Minimisation of development footprint and disturbance to topsoil

In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited.

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure. » Powerline. » Substation » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Impacts on natural vegetation. » Impacts on soil. » Loss of topsoil.
Activity/Risk Source	<ul style="list-style-type: none"> » Site preparation and earthworks. » Excavation of foundations. » Construction of site access road. » Site preparation (e.g. compaction). » Foundations or plant equipment installation. » Powerline construction activities. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To retain natural vegetation, where possible. » To minimise footprints of disturbance of vegetation/habitats on-site » Remove and store all topsoil on areas that are to be excavated; and use this topsoil in subsequent rehabilitation of disturbed areas. » Minimise spoil material.

Mitigation: Action/Control		Responsibility	Timeframe
a	Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
b	The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract

Mitigation: Action/Control		Responsibility	Timeframe
c	Construction activities must be restricted to demarcated areas so that impact on flora and fauna is restricted.	Contractor	Site establishment & duration of contract
d	All fill material must be sourced from a commercial off-site suitable/permitted source, quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site.	Contractor	Duration of contract
e	Excavated topsoil must be stockpiled in designated areas separate from base material and covered until replaced during rehabilitation. As far as possible, topsoil must not be stored for longer than 3 months.	Contractor	Site establishment & duration of contract
f	Topsoil must not be stripped or stockpiled when it is raining or when the soil is wet as compaction will occur.	Contractor	Site establishment Maintenance: for duration of contract
g	The maximum topsoil stockpile height must not exceed 2m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	Contractor	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Zero disturbance outside of designated work areas. » Minimise clearing of existing vegetation. » Topsoil appropriately stored.
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation clearing and soil management activities by ECO throughout construction phase. » Supervision of all clearing and earthworks. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.10: Minimise the impacts on and loss of indigenous vegetation

Project Component/s	» Any infrastructure or activity that will result in disturbance to natural areas.
Potential Impact	» Loss of indigenous natural vegetation due to construction activities, or poor behaviour on the part of the construction team.
Activity/Risk	» Vegetation clearing.

Source	<ul style="list-style-type: none"> » Construction of access roads. » Placement of powerline towers. » Chemical contamination of the soil by vehicles and machinery. » Operation of construction camps. » Storage of materials required for construction.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Retain natural vegetation in the highly sensitive areas of the site. » Minimise footprints of disturbance of vegetation/habitats on-site. » Minimise loss of indigenous vegetation. » Minimise loss of species of conservation concern.

Mitigation: Action/Control		Responsibility	Timeframe
a	Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing.	Contractor	Construction
b	Limit unnecessary impacts on surrounding natural vegetation, e.g. driving around in the veld, use access roads only.	Contractor	Construction
c	A site rehabilitation programme must be implemented (refer Chapter 6).	Contractor in consultation with Specialist	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » Zero disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation. » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation.
Monitoring	<ul style="list-style-type: none"> » Observation of vegetation clearing activities by ECO throughout construction phase. » Monitoring of vegetation clearing activities in terms of permit conditions. » Supervision of all clearing and earthworks. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.11: Minimise the establishment and spread of alien invasive plants

Project Component/s	» Any infrastructure or activity that will result in disturbance to natural areas.
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species.
Activities/Risk Sources	» Construction, environmental management.

Mitigation: Target/Objective	» There is a target of no alien plants within project control area during the construction and operation phases.
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Mitigation: Action/Control		Responsibility	Timeframe
a	Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible. » Do not import soil from areas with alien plants.	Contractor	Construction and operation
b	Establish an ongoing monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act).	Contractor	Construction and operation
c	Immediately control any alien plants that become established using registered control methods.	Contractor	Construction and operation

Performance Indicator	» For each alien species: number of plants and aerial cover of plants within project area and immediate surroundings.
Monitoring	» Ongoing monitoring of area by ECO during construction. » Ongoing monitoring of area by environmental manager during operation. » Annual audit of project area and immediate surroundings by qualified botanist. » If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of plants or concentrations of plants), number of individuals (whole site or per unit area), age and/or size classes of plants and aerial cover of plants. » The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. » The environmental manager should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 6.2.12: Minimise the impacts on fauna

Project Component/s	» Any infrastructure or activity that will result in disturbance to natural areas.
Potential Impact	» Vegetation clearance and associated impacts on faunal habitats. » Traffic to and from site.
Activity/Risk Source	» Site preparation and earthworks. » Construction-related traffic. » Foundations or plant equipment installation. » Mobile construction equipment. » Powerline construction activities.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction » To minimise disturbance to (and death of) resident and visitor faunal and avifaunal species

Mitigation: Action/Control		Responsibility	Timeframe
a	Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing/disturbance.	Contractor in consultation with Specialist	Pre-construction
b	The extent of clearing and disturbance to the native vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	Contractor	Site establishment & duration of contract
c	Animals that cannot flee from the affected areas by themselves (e.g. tortoises, amphibians, small mammals) must be removed from the affected areas before the start of site clearing/construction and relocated to safe areas.	Specialist	Pre-construction
d	A site rehabilitation programme should be implemented.	Contractor in consultation with Specialist	Duration of contract

Performance Indicator	» Zero disturbance outside of designated work areas » Minimised clearing of existing/natural vegetation and habitats for fauna » Limited impacts on faunal species (i.e. noted/recorded fatalities)
Monitoring	» Observation of vegetation clearing activities by ECO throughout construction phase » Supervision of all clearing and earthworks » Recording faunal fatalities to monitor success of relocation efforts » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.13: Minimise impacts on water resources

Project Component/s	<ul style="list-style-type: none"> » Construction activities, » Storage of chemicals and hazardous materials. » Ablution facilities.
Potential Impact	<ul style="list-style-type: none"> » Pollutants such as lime-containing (high pH) construction materials such as concrete, cement, grouts, etc could be harmful to aquatic biota, particularly during low flows when dilution is reduced. » Health risk to locals using the river water for domestic purposes.
Activity/Risk Source	<ul style="list-style-type: none"> » Fuelling, usage and maintenance of construction vehicles. » Cement batching and usage. » Labourer using ablution facilities. » Use of any chemicals or hazardous materials during construction.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water into the river and drainage lines » No misbehaviour of construction workers (i.e. ablution activities, washing).

Mitigation: Action/Control		Responsibility	Timeframe
a	Strict use and management of all hazardous materials used on site.	Contractor	Construction
b	Strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.).	Contractor	Construction
c	Strict control over the behaviour of construction workers.	Contractor	Construction
d	Ensure that powerline tower structures are placed outside watercourses (a minimum of 50 m away	Solar capital and Contractor	Construction

Performance Indicator	» Compliance with the terms and conditions of the water use license in terms of quality control.
Monitoring	» Surface water monitoring plan

OBJECTIVE 6.2.14: Minimise soil degradation and erosion

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure » Powerline. » Access roads.
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Potential Impact	<ul style="list-style-type: none"> » Soil and rock degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	<ul style="list-style-type: none"> » Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Minimise extent of disturbance areas. » Minimise soil degradation (mixing, wetting, compaction, etc). » Minimise soil erosion. » Minimise deposition of soil into drainage lines. » Minimise instability of embankments/excavations.

Mitigation: Action/Control		Responsibility	Timeframe
a	Identify disturbance areas and restrict construction activity to these areas.	Contractor	Before and during construction
b	Rehabilitate disturbance areas as soon as practicable when construction in an area is complete.	Contractor	During and after construction
c	Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	Engineer/ECO/ Contractor	Design and construction
d	Where access roads cross natural drainage lines, culverts must be designed to allow free flow and regular maintenance must be carried out.	Engineer/ECO/ Contractor	Design, before and during construction
e	Dust control on construction site: wetting of denuded areas.	Contractor	Construction
f	Minimise removal of vegetation which adds stability to soil.	ECO/Contractor	Construction
g	Soil conservation: Stockpile topsoil for re-use in rehabilitation phase, protect stockpile from erosion	Contractor	Before and during construction
h	Erosion control measures: Run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, or temporary mulching over denuded area as required.	Contractor/ECO	Erection: Before construction Maintenance: Duration of contract
i	Control depth of excavations and stability of cut faces/sidewalls.	Engineer/ECO/ Contractor	Before construction and

Mitigation: Action/Control	Responsibility	Timeframe
		Maintenance Duration of contract
Performance Indicator	<ul style="list-style-type: none"> » No activity outside demarcated disturbance areas. » Acceptable level of activity within disturbance areas, as determined by the ECO. » Acceptable level of soil erosion around site, as determined by the ECO. » Acceptable level of increased siltation in drainage lines, as determined by the ECO. » Acceptable state of excavations, as determined by the ECO. » No activity in restricted areas. 	
Monitoring	<ul style="list-style-type: none"> » Monthly inspections of the site by the ECO. » Monthly inspections of sediment control devices. » Monthly inspections of surroundings, including drainage lines. » Immediate reporting of ineffective sediment control systems. » An incident reporting system will record non-conformances. 	

OBJECTIVE 6.2.15: Protection of heritage resources

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large-scale excavations for foundations will damage archaeological sites, as will road construction activities.

Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with the development and hence to limit secondary impacts during the medium and longer term working life of the facility.

The study site exhibits a wealth of stone artefacts spread across its plains and probably below present sand surfaces where these mantle older surfaces. However, no definite Acheulean (Earlier Stone Age) artefacts were found. Stone Age industries present certainly include Middle and Later Stone Age assemblages

(referred to as MSA and LSA). Only the following sites may be directly/indirectly impacted by the proposed development:

- * Hill with Stone Age (including LSA) traces and stone circle feature as well as the rich spread of artefacts on the plain immediately to the south of it (30.60044° S, 24.10566° E). This area will have to be delineated as a no-go area.
- * Later Stone Age site and other heritage traces as well as potential peat sequence at the spring (30.58073° S, 24.06585° E). This area will also need to be delineated as a no go area.
- * Rich surface spread of mainly Pleistocene age artefacts (30.59695° S, 24.09501° E). This area will have to be sampled and documented for preservation at the museum.

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure » Powerline. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Heritage objects or artefacts found on site are inappropriately managed or destroyed.
Activity/Risk Source	<ul style="list-style-type: none"> » Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Powerline construction activities.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation

Mitigation: Action/control		Responsibility	Timeframe
a	Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas (which will not be surveyed in detail by a heritage specialist).	Contractor in consultation with Specialist	Pre-construction
b	Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	ECO/specialist	Pre-construction
c	Project employees and any contract staff will maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.	Solar Capital / Contractor	Duration of contract
d	If a heritage object is found, work in that area will be stopped immediately, and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Solar Capital/ Contractor in consultation with Specialist	Duration of contract
e	Apply for sampling permits from SAHRA for work on any archaeological sites identified as needing intervention.	Solar Capital in consultation with Specialist	Pre-construction

Performance Indicator	<ul style="list-style-type: none"> » Zero disturbance outside of designated work areas » All heritage items located are dealt with as per the legislative guidelines
Monitoring	<ul style="list-style-type: none"> » Observation of excavation activities by ECO throughout construction phase » Supervision of all clearing and earthworks » Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported. » Appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.16: Minimisation of visual impacts associated with construction

During the construction phase heavy vehicles, components, equipment and construction crews will frequent the area and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users. The placement of lay-down areas and temporary construction camps should be carefully considered in order to not negatively influence the future perception of the facility. Secondary visual impacts associated with the construction phase, such as the sight of construction vehicles, dust and construction litter must be managed to reduce visual impacts. The use of dust-suppression techniques on the access roads (where required), timely removal of rubble and litter, and the erection of temporary screening will assist in doing this.

The primary visual impact of the facility and ancillary infrastructure, including the powerline, is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts. Secondary impacts anticipated as a result of the proposed facility (i.e. visual character, sense of place and tourism potential) are not possible to mitigate.

Project Component/s	» Construction site.
Potential Impact	» Visual impact of general construction activities and the potential scarring of the landscape due to vegetation clearing.
Activity/Risk Source	» The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	» Minimal visual intrusion by construction activities and construction accommodation and intact vegetation cover outside of immediate

works areas.

Mitigation: Action/Control		Responsibility	Timeframe
a	Reduce the construction period through careful planning and productive implementation of resources.	Solar Capital or contractor	Planning
b	Plan the placement of lay-down areas and temporary construction accommodation in order to minimise vegetation clearing.	Solar Capital or contractor	Planning
c	Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Solar Capital or Contractor	Construction
d	Ensure that rubble, litter, and disused construction materials are managed and removed regularly.	Solar Capital or Contractor	Construction
e	Ensure that all infrastructure and the site and general surrounds are maintained in a neat a manner.	Solar Capital or Contractor	Construction
f	Reduce and control construction dust using approved dust suppression techniques.	Contractor	Construction
g	As far as possible, restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
h	Rehabilitate all disturbed areas, construction areas, roads, and servitudes to acceptable visual standards.	Contractor	Construction

Performance Indicator	<ul style="list-style-type: none"> » Vegetation cover on and near the site is intact with no evidence of degradation or erosion. » Construction site is kept in a neat and tidy state.
Monitoring	<ul style="list-style-type: none"> » Monitoring of vegetation clearing during construction. » Monitoring of rehabilitated areas post construction.

OBJECTIVE 6.2.17: Appropriate handling and management of waste

The construction of the solar energy facility will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification, and management of wastes, along with industry principles for minimising construction wastes must be implemented. The main wastes expected to be generated by the construction of the solar energy facility will include:

- » general solid waste
- » hazardous waste
- » liquid waste (including grey water and sewage)

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure » Powerline. » Offices and workshops. » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Inefficient use of resources resulting in excessive waste generation » Litter or contamination of the site or water through poor waste management practices
Activity/Risk Source	<ul style="list-style-type: none"> » Packaging » Other construction wastes » Hydrocarbon use and storage » Spoil material from excavation, earthworks and site preparation
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To comply with waste management legislation » To minimise production of waste » To ensure appropriate waste storage and disposal » To avoid environmental harm from waste disposal. » A waste manifests should be developed for the ablutions showing proof of disposal of sewage at appropriate water treatment works.

Mitigation: Action/Control		Responsibility	Timeframe
a	Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
b	Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
c	Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.	Contractor	Duration of contract
d	Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	Contractor	Duration of contract
e	Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract

Mitigation: Action/Control		Responsibility	Timeframe
f	Uncontaminated waste will be removed at least weekly for disposal; other wastes will be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
g	Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
h	Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area.	Contractor	Duration of contract
i	Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal.	Contractor	Duration of contract
j	Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	Contractor	Duration of contract
k	Regularly serviced chemical toilets facilities will be used to ensure appropriate control of sewage.	Contractor	Duration of contract
l	Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction
m	Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site.	Contractor	Duration of construction
n	Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Duration of construction

Performance Indicator	<ul style="list-style-type: none"> » No complaints received regarding waste on site or indiscriminate dumping. » Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EMP.

OBJECTIVE 6.2.18: Appropriate handling and storage of chemicals, hazardous substances

The construction phase will involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Storage and handling of chemicals, hazardous substances.
Potential Impact	» Release of contaminated water from contact with spilled chemicals » Generation of contaminated wastes from used chemical containers
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon use and storage.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons. » To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons.

Mitigation: Action/Control		Responsibility	Timeframe
a	Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
b	Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
c	In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	Contractor	Duration of contract
d	Spilled cement must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
e	Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
f	Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any	Contractor	Duration of contract

Mitigation: Action/Control		Responsibility	Timeframe
	fuel or oils.		
g	All stored fuels to be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
h	Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
i	Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
j	Oily water from bunds at the substations must be removed from site by licensed contractors.	Contractor	Duration of contract
k	The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately banded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
l	Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Contractor	Duration of contract
m	Transport of all hazardous substances must be in accordance with the relevant legislation and regulations	Contractor	Duration of contract
n	The sediment control and water quality structures used on-site must be monitored and maintained in an operational state at all times.	Contractor	Duration of contract
o	Upon the completion of construction, the area must be cleared of potentially polluting materials.	Contractor	Completion of construction

Performance Indicator	<ul style="list-style-type: none"> » No chemical spills outside of designated storage areas. » No unattended water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping.
Monitoring	<ul style="list-style-type: none"> » Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system will be used to record non-conformances to the EMP.

6.3 Detailing Method Statements

OBJECTIVE 6.3.1: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline how any identified environmental risks will practically be mitigated and managed for the duration of the contract, and how specifications within this EMP will be met. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager and ECO.

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

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

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

6.4 Awareness and Competence: Construction Phase of the Solar Energy Facility

OBJECTIVE 6.4.1: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

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

- » Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment.
- » Ensuring that a copy of the EMP is readily available on-site, and that all site staff are aware of the location and have access to the document.
- » Employees will be familiar with the requirements of the EMP and the environmental specifications as they apply to the construction of the facility.
- » Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended some form of Environmental Awareness Training (i.e. as part of induction)
- » The training should be sufficient to provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- » Awareness of any other environmental matters, which are deemed necessary by the ECO.
- » Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.
- » Ensure that construction workers have received basic training in environmental management, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution.
- » Records must be kept of those that have completed the relevant training.
- » Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
- » Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.

6.5 Monitoring Programme: Construction Phase of the Solar Energy Facility

OBJECTIVE 6.5.1: To monitor the performance of the control strategies employed against environmental objectives and standards.

A monitoring programme must be in place not only to ensure conformance with the EMP, but also to monitor any environmental issues and impacts which have not been accounted for in the EMP that are, or could result in significant environmental impacts for which corrective action is required. The period and frequency of monitoring will be stipulated by the Environmental Authorisation (once issued). Where this is not clearly dictated, Solar Capital will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Project Manager will ensure that the monitoring is conducted and reported.

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

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

The ECO will ensure compliance with the EMP, will conduct monitoring activities, and will report any non-compliance or where corrective action is necessary to the Site Manager and/or any other monitoring body stipulated by the regulating authorities. The ECO must have the appropriate experience and qualifications to undertake the necessary tasks.

MANAGEMENT PROGRAMME: REHABILITATION

CHAPTER 7

Overall Goal: Undertake the rehabilitation measures in a way that:

- » Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed

7.1. Objectives

In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

OBJECTIVE 7.1.1: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project Component/s	» Area and linear infrastructure.
Potential Impact	» Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	<ul style="list-style-type: none"> » Temporary construction areas. » Temporary access roads/tracks. » Powerline servitude » Other disturbed areas/footprints.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure and encourage site rehabilitation of disturbed areas. » Ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/Control		Responsibility	Timeframe
a	All temporary facilities, equipment, and waste materials must be removed from site.	Contractor	Following execution of the works
b	All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction

Mitigation: Action/Control		Responsibility	Timeframe
			activities in an area
c	The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Contractor	Following completion of construction activities in an area
d	All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Contractor	Following completion of construction activities in an area
e	Temporary roads must be closed and access across these blocked	Contractor	Following completion of construction activities in an area
f	Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
g	A rehabilitation plan should be drawn up that specifies the rehabilitation process and should be approved by the ECO.	Contractor, Solar Capital and ECO	Pre-construction
h	Disturbed areas must be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix. Re-use of native/indigenous plant species removed from disturbance areas in the rehabilitation phase to be determined by a botanist as applicable.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
i	Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Solar Capital in consultation with rehabilitation specialist	Post-rehabilitation
j	Erosion control measures should be used in sensitive areas such as steep slopes, hills, and drainage lines is necessary.	Solar Capital in consultation with rehabilitation specialist	Post-rehabilitation
k	On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Solar Capital in consultation with rehabilitation	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
	specialist	

Performance Indicator	<ul style="list-style-type: none"> » All portions of site, including construction equipment camp and working areas, cleared of equipment and temporary facilities. » Topsoil replaced on all areas and stabilised where practicable or required after construction and temporally utilised areas. » Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites. » Completed site free of erosion and alien invasive plants.
Monitoring	<ul style="list-style-type: none"> » On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented during the operational lifespan of the facility. » On-going alien plant monitoring and removal should be undertaken on an annual basis.

MANAGEMENT PROGRAMME: OPERATION

CHAPTER 8

Overall Goal: To ensure that the operation of the solar energy facility does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the solar energy facility in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts
- » Enables the solar energy facility operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents
- » Minimises impacts on fauna using the site
- » Establishes an environmental baseline for solar energy facility sites in South Africa

An environmental manager must be appointed during operation whose duty it will be to ensure the implementation of the operational EMP.

8.1. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 8.1.1: Protection of indigenous natural vegetation, fauna and maintenance of rehabilitation

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	<ul style="list-style-type: none"> » Areas requiring regular maintenance. » Route of the security team. » Areas disturbed during the construction phase and subsequently rehabilitation at its completion
Potential Impact	<ul style="list-style-type: none"> » Disturbance to or loss of vegetation and/or habitat. » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the

	requirement for on-going management intervention.
Activity/Risk Source	» Movement of employee vehicles within and around site.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control		Responsibility	Timeframe
a	Vehicle movements must be restricted to designated roadways.	Solar Capital	Operation
b	Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Solar Capital	Operation
c	An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Solar Capital	Operation
d	A botanist familiar with the vegetation of the area should monitor the rehabilitation success and alien plant removal on an annual basis.	Solar Capital or Specialist	Annual monitoring until successful re-establishment of vegetation in an area

Performance Indicator	» No further disturbance to vegetation or terrestrial faunal habitats. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by the Manager and environmental manager. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas.

OBJECTIVE 8.1.2: Protection of avifauna

During the operation of the facility, the threat of collision with the powerline is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. This is of particular concern where the powerline crosses active agricultural land and the drainage line. The threat of electrocution while perching on the powerline and associated infrastructure serves as a threat to certain sensitive species.

Project Component/s	» Powerline.
Potential Impact	» Collision and electrocution events with the overhead powerline.
Activities/Risk Sources	» Operation of the powerline without mitigation measures.
Mitigation: Target/Objective	» Maintain a low number of collision, electrocution, and drowning events.

Mitigation: Action/Control		Responsibility	Timeframe
a	Install bird flappers where necessary	Solar Capital	Construction
b	Ensure bird-friendly tower designs are implemented to minimize the risk of electrocutions	Solar Capital	Construction

Performance Indicator	» Zero collision, drowning, or electrocution events
Monitoring	» Observation of electrocution or collision events with the powerline » Monitor powerline servitude and reservoirs for mortalities.

OBJECTIVE 8.1.3: Minimisation of visual impacts

The primary visual impact of the facility and its ancillary infrastructure, including the powerline, is not possible to mitigate. The functional design of the structures cannot be changed in order to reduce visual impacts.

Project Component/s	» Area infrastructure. » Powerline. » Access roads.
Potential Impact	» Visual impact of facility degradation and vegetation rehabilitation failure. » Lighting influences from the facility on surrounding areas.
Activity/Risk Source	» The proposed facility. » Powerline.
Mitigation: Target/Objective	» To minimise potential for visual impact. » To ensure a well maintained and neat facility.

Mitigation: Action/Control		Responsibility	Timeframe
a	Maintain the general appearance of the facility in an aesthetically pleasing way.	Solar Capital	Operation.
b	Monitor rehabilitated areas, and implement remedial action as and when required.	Solar Capital	Operation.

c	Use of light fixtures and the fitment of covers and shields will be designed to contain rather than spread light.	Solar Capital	Operation and maintenance
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Performance Indicator	<ul style="list-style-type: none"> » Well maintained and neat facility with intact vegetation on and near the facility. » Lighting impact and visual intrusion is minimal and no complaints received from settlements or homesteads.
Monitoring	<ul style="list-style-type: none"> » Monitoring of rehabilitated areas.

OBJECTIVE 8.1.4: Minimise soil degradation and erosion

Project Component/s	<ul style="list-style-type: none"> » Area infrastructure » Powerline » Access roads.
Potential Impact	<ul style="list-style-type: none"> » Soil degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.
Activities/Risk Sources	<ul style="list-style-type: none"> » Poor rehabilitation of cleared areas. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » Concentrated discharge of water from construction activity.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion and deposition of soil into drainage lines. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control		Responsibility	Timeframe
a	Rehabilitate disturbance areas should the previous attempt be unsuccessful.	Solar Capital	Operation
b	Ensure dust control on site: wetting of denuded areas or the use of an appropriate dust suppression measure.	Solar Capital	Operation
c	Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, and shade nets).	Solar Capital	Operation
d	Control depth of excavations and stability of cut faces/sidewalls.	Solar Capital	Operation

Performance Indicator	<ul style="list-style-type: none"> » Acceptable level of soil erosion around site, as determined by the site manager. » Acceptable level of increased siltation in drainage lines, as determined by the site manager.
Monitoring	<ul style="list-style-type: none"> » Inspections of site on a bi-annual basis. » Water management plan

OBJECTIVE 8.1.5: Minimise dust and air emissions

During the operational phase, limited gaseous or particulate emissions are anticipated from exhaust emissions (i.e. from operational vehicles).

Windy conditions and the movement of vehicles on site may lead to dust creation.

Project Component/s	<ul style="list-style-type: none"> » Hard engineered surfaces » On-site vehicles
Potential Impact	<ul style="list-style-type: none"> » Dust and particulates from vehicle movement to and on-site. » Release of minor amounts of air pollutants (for example NO₂, CO and SO₂) from vehicles and the augmentation plant.
Activities/Risk Sources	<ul style="list-style-type: none"> » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » To ensure emissions from all vehicles are minimised, where possible. » To minimise nuisance to the community from dust emissions and to comply with workplace health and safety requirements.

Mitigation: Action/Control		Responsibility	Timeframe
a	Roads must be maintained to a manner that will ensure that nuisance to the community from dust is not visibly excessive.	Solar Capital	Site establishment and construction
b	Appropriate dust suppressant must be applied to the roads as required to minimise/control airborne dust.	Solar Capital	Duration of contract
c	Speed of vehicles must be restricted, as defined by the ECO.	Solar Capital	Duration of contract
d	Vehicles and equipment must be maintained in a road-worthy condition at all times.	Solar Capital	Duration of contract

Performance Indicator	<ul style="list-style-type: none"> » No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented for where required. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.
Monitoring	<ul style="list-style-type: none"> » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager. » A complaints register must be maintained, in which any complaints from residents/the community will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon. » An incident reporting system must be used to record non-conformances to the EMP.

OBJECTIVE 8.1.6: Ensure the implementation of an appropriate fire management plan during the operation phase

Project Component/s	» Operation and maintenance of the solar energy facility and associated infrastructure.
Potential Impact	» Veld fires can pose a personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. In addition, fire can pose a risk to the solar energy facility infrastructure.
Activities/Risk Sources	» The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control		Responsibility	Timeframe
a	Provide adequate fire fighting equipment on site.	Solar Capital	Operation
b	Provide fire-fighting training to selected operation and maintenance staff.	Solar Capital	
c	Ensure that appropriate communication channels are established to be implemented in the event of a fire.	Solar Capital	Operation
d	Fire breaks should be established where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.).	Solar Capital	Operation
e	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.	Solar Capital	Operation

Mitigation: Action/Control		Responsibility	Timeframe
f	Contact details of emergency services should be prominently displayed on site.	Solar Capital	Operation

Performance Indicator	<ul style="list-style-type: none"> » Fire fighting equipment and training provided before the construction phase commences. » Appropriate fire breaks in place.
Monitoring	<ul style="list-style-type: none"> » Solar Capital must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 8.1.7: Maximise local employment and business opportunities

The proposed facility is expected to require approximately 275 permanent employees including security personnel who would be on site on a permanent basis.

Therefore, long-term direct job opportunities for locals could exist, although limited. However, in an area with such high unemployment figures, these limited opportunities should still be seen as a positive impact on the quality of life of those benefiting from the employment.

Some local procurement of goods, materials and services could occur which would result in positive economic spin-offs. These opportunities for local service providers to render services to the proposed facility could include maintenance of the guardhouse, gardening at the guardhouse, cleaning services, security services and maintenance or replacement of general equipment

Project Component/s	<ul style="list-style-type: none"> » Operation and maintenance of the facility.
Potential Impact	<ul style="list-style-type: none"> » The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	<ul style="list-style-type: none"> » Locals are not employed where the skills exist. » Local procurement is not undertaken if possible. » Local businesses are not supported.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Maximise the appointment of local employees.

Mitigation: Action/Control		Responsibility	Timeframe
a	A skills development plan should be developed which should concentrate on the transfer of skills to	Solar Capital	Operation

Mitigation: Action/Control	Responsibility	Timeframe
employees to increase their capacity and to equip them with alternative skills should they wish to be employed elsewhere.		
b The developer should capacitate locals where practical.	Solar Capital	Operation
c The developer should consider training and capacity building programmes to lessen the skills disparity.	Solar Capital	Operation
d The skill requirements should be communicated to the local community leaders and community based organisations.	Solar Capital	Operation
e Make use of local recruitment agencies or other relevant community based organisations to obtain a list of jobseekers.	Solar Capital	Operation
f An equitable process whereby minorities and previously disadvantaged individuals (including women) are taken into account should be implemented.	Solar Capital	Operation
g Local sourcing of materials, general services to assist in providing economic, and employment opportunities for the local people.	Solar Capital	Operation

Performance Indicator	<ul style="list-style-type: none"> » An employee list drawn up indicating the percentage of locals employed. » Local procurement is undertaken.
Monitoring	<ul style="list-style-type: none"> » Solar Capital should be able to demonstrate that the above indicators are implemented.

OBJECTIVE 8.1.8: Assist with social development and enhance capacity building and skills development within the local communities

An important positive role that Solar Capital could fulfil as part of their social responsibility towards the local communities is to assist in addressing community development needs during the operational phase.

The project applicant is therefore accountable to optimise the productive potential of those employed at the proposed facility's operation through capacity building and skills training, whether these individuals are temporary or permanent employees.

One of the aims of the project could be to revitalise the area in terms of job creation and infrastructure development, in other words it would focus on broad based empowerment.

Project Component/s	» Capacity building and skills training undertaken during the operational phase.
Potential Impact	» Positive contribution to the capacity of individuals involved with the project, and equipping them with transferable skills. » Contribution towards local development initiatives.
Activities/Risk Sources	» No social responsibility from developer. » No contribution towards local development initiatives. » Inefficient training or lack of capacity building and skills training.
Mitigation: Target/Objective	» Capacity building and skills training continuously undertaken during the operational phase of the project. » Positive social responsibility initiatives.

Mitigation: Action/Control		Responsibility	Timeframe
a	Involvement in upliftment programmes could be done according to the needs identified as part of the IDP of the Emthanjeni Local Municipality.	Solar Capital and Local Municipality	Operation
b	Capacity building and skills training should form part of the social development support provided to local communities.	Solar Capital and Local Municipality	Operation
c	In cases for the middle to lower skilled jobs, where the relevant skills do not exist, training should be provided to willing local community members to enable them to fill the positions.	Solar Capital and Local Municipality	Operation
d	The project applicant should create conditions that are conducive for the involvement of entrepreneurs, small businesses, and SMMEs during the operational phase for rendering ancillary services to the proposed facility.	Solar Capital	Operation

Performance Indicator	» The skills development plan concentrates on the transfer of skills to employees to increase their capacity and to equip them with alternative skills should they wish to be employed elsewhere. » Local development initiatives should be supported
Monitoring	» Developer should be able to demonstrate that the above indicators are implemented.

OBJECTIVE 8.1.9: Minimise the potential impact on farming activities and on the surrounding landowners

Once operational, the impact on the daily living and movement patterns of neighbouring residents is expected to be minimal and intermittent (i.e. the increase in traffic to and from site, possible dust creation of vehicle movement on gravel roads on site and possible increase in criminal activities). The number of workers on site on a daily basis is anticipated to have minimal negative social impacts in this regard.

Individuals leaving their existing full time employment positions at farms in the area to obtain work at the facility could result in possible negative impacts on the farming community. Employing outsiders on the other hand and accommodating them at the planned accommodation facility on site could also affect the community's social dealings with each other as well as the traditional character of the area. In worst cases it could result in social conflict between the various groupings. The recruitment and employment process would thus have to be sensitively dealt with to limit any possible negative impacts on the daily living patterns of the existing farming community and other community members.

The operations at the facility, however is not anticipated to have severe negative impacts on the neighbouring farmers' living and movement patterns, apart from a limited increase in the movement of people to and from the site, as well as the presence of these employees on-site on a permanent basis. Concerns about rental agreements should be considered.

Vehicle movement to and from the site (e.g. transportation of workers and goods) could influence road users' daily movement patterns, although it is anticipated that this impact would only materialise intermittently.

Project Component/s	<ul style="list-style-type: none"> » Possible negative impacts of activities undertaken on site on the activities of surrounding property owners. » Impact on farming activities on site.
Potential Impact	<ul style="list-style-type: none"> » Possible limited intrusion impact on surrounding land owners. » Possible phasing out of cattle farming.
Activities/Risk Sources	<ul style="list-style-type: none"> » Increase in traffic to and from site could affect daily living and movement patterns of surrounding residents.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Effective management of the facility. » Mitigation of intrusion impacts on property owners. » Mitigation of impact on farming activities.

Mitigation: Action/Control		Responsibility	Timeframe
a	Effective management of the facility and accommodation facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services.	Solar Capital	Operation
b	Vehicle movement to and from the site should be minimised as far as possible.	Solar Capital and Employees	Operation
c	Limit the development of new access roads on site as far as possible.	Solar Capital and Contractors	Operation

Performance Indicator	<ul style="list-style-type: none"> » No environmental pollution occurs (i.e. waste, water, and sanitation). » No intrusion on private properties and on the activities undertaken on the surrounding properties. » Continuation of farming activities.
Monitoring	<ul style="list-style-type: none"> » Developer should be able to demonstrate that facility is well managed without environmental pollution and that the above requirements have been met.

OBJECTIVE 8.1.10: Appropriate handling and management of hazardous substances and waste

The operation of the solar energy facility will involve the storage of chemicals and hazardous substances, as well as the generation of limited waste products. The main wastes expected to be generated by the operation activities includes general solid waste, hazardous waste and liquid waste.

Project Component/s	<ul style="list-style-type: none"> » Substation. » Operation and maintenance staff.
Potential Impact	<ul style="list-style-type: none"> » Inefficient use of resources resulting in excessive waste generation. » Litter or contamination of the site or water through poor waste management practices. » Contamination of water or soil because of poor materials management.
Activity/Risk Source	<ul style="list-style-type: none"> » Transformers and switchgear – substation.
Mitigation: Target/Objective	<ul style="list-style-type: none"> » Comply with waste management legislation. » Minimise production of waste. » Ensure appropriate waste disposal. » Avoid environmental harm from waste disposal. » Ensure appropriate storage of chemicals and hazardous substances.

Mitigation: Action/Control		Responsibility	Timeframe
a	Hazardous substances (such as used/new transformer oils, etc) must be stored in sealed containers within a clearly demarcated designated area.	Solar Capital	Operation
b	Storage areas for hazardous substances must be appropriately sealed and banded.	Solar Capital	Operation
c	All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Solar Capital	Operation
d	Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and banded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	Solar Capital	Operation and maintenance
e	Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Solar Capital	Operation and maintenance
f	Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Solar Capital / waste management contractor	Operation
g	Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor.	Solar Capital / waste management contractor	Operation
h	Used oils and chemicals: » Appropriate disposal must be arranged with a licensed facility in consultation with the administering authority » Waste must be stored and handled according to the relevant legislation and regulations	Solar Capital	Operation
i	General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	Solar Capital	Operation
j	Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	Solar Capital	Operation
k	Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Solar Capital	Operation

Performance Indicator	<ul style="list-style-type: none">» No complaints received regarding waste on site or indiscriminate dumping.» Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately.» Provision of all appropriate waste manifests.» No contamination of soil or water.
Monitoring	<ul style="list-style-type: none">» Waste collection must be monitored on a regular basis.» Waste documentation must be completed and available for inspection» An incidents/complaints register must be maintained, in which any complaints from the community must be logged.» Complaints must be investigated and, if appropriate, acted upon.» All appropriate waste disposal certificates accompany the monthly reports.

MANAGEMENT PROGRAMME: DECOMMISSIONING

CHAPTER 9

The solar infrastructure which will be utilised for the proposed solar energy facility is expected to have a lifespan of 20 - 30 years and eventual extensions (i.e. with maintenance). Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility would comprise the disassembly and replacement of the solar infrastructure with more appropriate technology/infrastructure available at that time.

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

9.1. Site Preparation

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

9.2 Disassemble and Replace Infrastructure

Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.

OBJECTIVE 9.2.1: To avoid and or minimise the potential impacts associated with the decommissioning phase

Project Component/s	» Decommissioning phase of the solar energy facility.
Potential Impact	» Decommissioning will result in job losses, which in turn can result in a number of social impacts, such as reduced quality of life. » Decommissioning is similar to the construction phase in that it will also create temporary employment opportunities.
Activity/Risk Source	» Decommissioning of the solar energy facility.
Mitigation: Target/Objective	» To avoid and or minimise the potential social impacts associated with decommissioning phase of the solar energy facility.

Mitigation: Action/control		Responsibility	Timeframe
a	Retrenchments should comply with current South African Labour Legislation.	Solar Capital	At decommissioning

Performance Indicator	Relevant South African Labour Legislation.
Monitoring	No occurrences of dismissals not in-line with South African Labour Legislation.

FINALISATION OF THE EMP

CHAPTER 10

The EMP is a dynamic document, which must be updated to include any additional specifications as and when required. It is considered critical that this Draft EMP be updated to include site-specific information and specifications following the final walk-through survey by specialists of the powerline and development site. This will ensure that the construction and operation activities are planned and implemented considering sensitive environmental features.