MOEDING SOLAR PV FACILITY, NORTH WEST PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME:

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Prepared for
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PROJECT DETAILS

Title	:	Environmental Impact Assessment Process Environmental Management Programme: Moeding Solar PV Facility, North West Province
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Applicant	:	Moeding Solar (Pty) Ltd
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When used as a reference this report should be cited as: Savannah Environmental (2019). Environmental Management Programme: Moeding Solar PV Facility, North West Province

DEFINITIONS AND TERMINOLOGY

The following definitions and terminology may be applicable to this project and may occur in the report below:

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

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.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

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.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

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.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'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.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

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 Authorisation (EA): means the authorisation issued by a competent authority (Department of Environmental Affairs) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

Environmental assessment practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

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: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a project or facility and its ongoing maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

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

Incident: An unplanned occurrence that has caused, or has the potential to cause, environmental damage.

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.

Method Statement: 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.

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.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

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.

Vulnerable species: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the *Gazette*.

ABBREVIATIONS

The following abbreviations may be applicable to this project and may occur in the report below:

AIA	Archaeological Impact Assessment
BGIS	Biodiversity Geographic Information System
CDSM	Chief Directorate Surveys and Mapping
CEMP	Construction Environmental Management Plan
DBAR	Draft Basic Assessment Report
DEA	Department of Environmental Affairs
DME	Department of Minerals and Energy
EAP	Environmental Impact Practitioner
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
GPS	Global Positioning System
GWh	Giga Watt hour
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
KNP	Karoo National Park
KOP	Key Observation Point
kV	Kilo Volt
LAeq,T	Time interval to which an equivalent continuous A-weighted sound level
LLRC	Low Level River Crossing
LUDS	Land Use Decision Support
LUPO	Land Use Planning Ordinance
MW	Mega Watt
NEMA	National Environmental Management Act
NEMAA	National Environmental Management Amendment Act
NEMBA	National Environmental Management: Biodiversity Act
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NID	Notice of Intent to Develop
NSBA	National Spatial Biodiversity Assessment
NWA	National Water Act
PIA	Paleontological Impact Assessment
PM	Post Meridiem; "Afternoon"
SACAA	South African Civil Aviation Authority
SAHRA	South African National Heritage Resources Agency
SANBI	South Africa National Biodiversity Institute
SANS	South Africa National Standards
SDF	Spatial Development Framework

SMME	Small, Medium and Micro Enterprise
SAPD	South Africa Police Department

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APPENDICES

CHAPTER 1: INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled for the Moeding Solar PV Facility. The project site identified for the facility is located within Portion 1 of the Farm Champions Kloof 731, Portion 4 and the Remaining Extent of Portion 3 of the Farm Waterloo 730. The project site is located approximately 8km south of the town of Vryburg, and falls within Ward 5 and 9 of the Naledi Local Municipality (LM), and within Dr Ruth Segomotsi Mompati District Municipality (DM), in the North West Province. The Moeding Solar PV Facility will be designed to have a contracted capacity of up to 100MW, and will make use of photovoltaic (PV) solar technology.

This EMPr has been developed on the basis of the findings of the Environmental Impact Assessment (EIA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Moeding Solar (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Moeding Solar PV Facility. The document must be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the BA Report of the project.

In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, halted or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts. While no permitting or licensing requirements arise directly by virtue of the Moeding Solar PV Facility, this section will be applicable throughout the life cycle of the project.

CHAPTER 2: PROJECT DETAILS

Moeding Solar (Pty) Ltd proposes the construction of a photovoltaic (PV) solar energy facility, known as the Moeding Solar PV Facility, near Vryburg in the North West Province. The Moeding Solar PV Facility comprises a solar energy facility and is intended to form part of the Department of Energy's (DoE's) Renewable Energy Independent Power Producer Procurement (REIPPP) Programme. The REIPPP Programme aims to secure 14 725MW[1] of new generation capacity from Renewable Energy (RE) sources (in accordance with South Africa's Integrated Resource Plan for Electricity (IRP) 2010 – 2030), while simultaneously diversifying South Africa's electricity mix, and positively contributing towards socio-economic, and environmentally sustainable growth. The Moeding Solar PV Facility will be designed to have a contracted capacity of up to 100MW, and will make use of photovoltaic (PV) solar technology.

2.1 Project Site

The Moeding Solar PV Facility is proposed on Portion 1 of the Farm Champions Kloof 731, Portion 4 and the Remaining Extent of Portion 3 of the Farm Waterloo 730, which is located approximately 8km south of Vryburg and 7.5km, hereafter referred to as the affected properties (refer to **Error! Reference source not found.**). Within the affected properties, the applicant identified a project site (~642ha) which was assessed for the placement of the solar energy facility.
The project site identified for the Moeding Solar PV Facility falls within Ward 5 and 9 of the Naledi Local Municipality (LM), and within Dr Ruth Segomotsi Mompati District Municipality (DM), in the North West Province. Access to the site is obtained directly via the N18 National Road, which is situated along the eastern boundary of the project site.

Table 2.1 provides information regarding the proposed project site identified for the Moeding Solar PV Facility and the associated infrastructure.

Table 2.1: A description of the project site identified for the Moeding Solar PV Facility and associated infrastructure

Province	**North West Province**
District Municipality	Dr Ruth Segomotsi Mompati District Municipality
Local Municipality	Naledi Local Municipality
Ward Number(s)	Ward 5 and 9
Nearest Town(s)	» Vryburg (approximately 8km north of the project site), » Huhudi (approximately 5.7km north of the project site); » Amalia (approximately 38km south east of the project site); » Pudimoe (approximately 40km south of the project site); » Stella (approximately 56km north of the project site); and » Schweizer-Reneke (approximately 58km east of the project site)
Farm Portion(s), Name(s) and Number(s)	**Moeding Solar PV Facility:** » Portion 1 of the Farm Champions Kloof 731 » Portion 4 of the Farm Waterloo 730 » Remaining Extent of Portion 3 of the Farm Waterloo 730 **Preferred Power Line Corridor:**

[1] Source: https://www.ipp-renewables.co.za/

	» Remaining Extent of the Farm Rosendal 673 » Remaining Extent of Portion 3 of the Farm Waterloo 730
SG 21 Digit Code (s)	**Moeding Solar PV Facility:** » T0HN00000000073100001 » T0IN00000000073000004 » T0IN00000000073000003 **Preferred Power Line Corridor:** » T0IN00000000067300000 » T0IN00000000073000003
Current Zoning	Agriculture
Current land use	Agriculture (grazing)
Extent of the project site	~642ha (placed within the affected properties).
Extent of the facility development area	~436,6ha
Extent of the facility development footprint	~300ha

2.2 Project Description

The proposed project will have a contracted capacity of up to 100MW, and will make use of PV solar technology for the generation of electricity. The project will comprise the following key infrastructure and components:

- Arrays of PV solar panels with a contracted capacity of up to 100MW.
- Mounting structures to support the PV panels (utilising either fixed-tilt / static, single-axis tracking, or double-axis tracking systems).
- On-site inverters to convert power from Direct Current (DC) to Alternating Current (AC), and a 132kV on-site substation to facilitate the connection between the solar energy facility and the Eskom grid connection point.
- A new 132kV power line between the on-site substation and the Eskom grid connection point. A turn-in turn-out connection into the proposed Mookodi - Magopela 132kV power line (to be constructed along the eastern boundary of the project site) is preferred from an environmental perspective. The other alternative power line corridor assessed is considered less preferred from an environmental perspective, but is still considered to be acceptable and could be implemented if the nominated preferred alternative is not technically acceptable to Eskom.
- Cabling between the project's components, to be laid underground where practical.
- Battery storage with up to 6 hours of storage capacity.
- Offices and workshop areas for maintenance and storage.
- Laydown areas.
- Internal access roads and fencing around the development area.

A summary of the associated infrastructure proposed as part of the Moeding Solar PV Facility is provided in **Table 2.2**, and described in more detail under the sub-headings below.

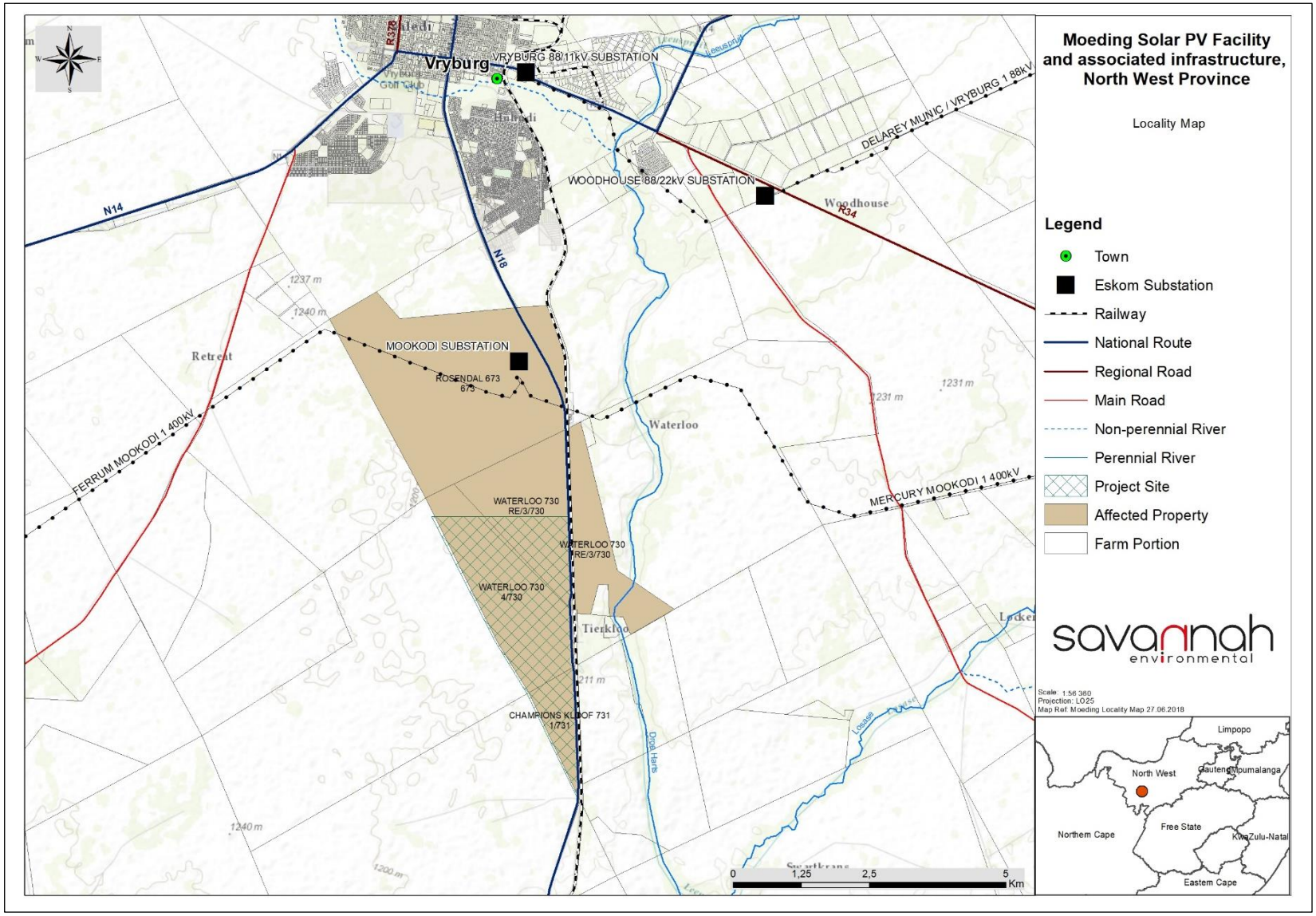

Figure 2.1: Locality map illustrating the location of the project site (hatched area) proposed for the establishment of the Moeding Solar PV Facility.

Table 2.2: Planned infrastructure proposed as part of the Moeding Solar PV Facility

Component	Description / Dimensions
Contracted capacity of facility	Up to 100MW
Technology	Static or tracking photovoltaic system.
Internal access	Internal access road of a gravel nature with a width of 6m will be constructed within the development footprint. The total length of the internal roads will be ~11km.
Site access	Direct access via the N18 national route which is situated along the eastern boundary of the project site.
Details of the PV panels	» Height: ~5m from ground level (installed). » Up to 370 960 panels required (1956mm x 992mm x 40mm for each panel). » Fixed-tilt, single-axis tracking, and/or double-axis tracking systems.
On-site substation	» Located within the development area and in close proximity to the site access point. » 132kV in capacity » 120m x 80m = 9 600m^2
Distribution transformers	» 2,8m in height
Capacity of main transformer	» 22kV (120MVA)
Grid connection alternatives	» A new 132kV power line will be required to be established within a 31m wide servitude. Two grid connection alternatives are being considered: * *Alternative 1* – Direct connection to the existing Mookodi Main Transmission Substation located on the Remaining Extent of the Farm Rosendal 473. * *Alternative 2* – A turn-in turn-out connection to the Mookodi - Magopela 132kV power line proposed to be constructed along the eastern boundary of the project site).
Number of inverters required	Up to 100 inverters (2,8m in height)
Battery storage	The footprint of the battery will be less than 1ha.
Laydown areas	~10ha (temporary laydown area) ~2ha (permanent laydown area)
Temporary infrastructure required during the construction phase (which is estimated to be ~12 months)	» Construction equipment camps; » Construction yard; and » Storage areas. » Total area to be occupied: up to ~400m² within the development area.
Other infrastructure	» Gate house and security building. » Office building. » Batching plant. » Maintenance building (2.5m in height) and Warehousing (4m in height) will be up to ~952m². » Perimeter fence (2.5min height).
Services required	» Refuse material disposal - all refuse material generated from the proposed development will be collected by a contractor and will be disposed of at a licensed waste disposal site off site. This service will be arranged with the municipality when required.

Component	Description / Dimensions
	» Sanitation – all sewage waste will be stored on site within a septic tank which will be emptied by the municipality for disposal. » Water supply – water will be sourced from the existing borehole located on the property. The project will require 600m³ during the 18 month construction period and 2800 m³ per annum for the 20 year operational phase. » Electricity supply – agreements with the Naledi Local Municipality will be established for the supply of electricity to the solar energy facility.

2.3 Activities and Components Associated with the PV Facility

A series of activities are proposed as part of the design, pre-construction, construction, operation, and decommissioning phases associated with the development of the Moeding Solar PV Facility. These are discussed in more detail under the respective sub-headings below.

2.3.1 Design and Pre-Construction Phase

Pre-planning
Several post-authorisation factors are expected to influence the final design of the facility and could result in small-scale modifications of the PV array and/or associated infrastructure. While an objective of the Engineering, Procurement and Construction (EPC) Contractor, who will be responsible for the overall construction phase of the project, will be to comply with the approved facility design as far as possible, it should be understood that the construction process is dynamic and that unforeseen changes to the project specifications will take place. This EMPr therefore describes the project in terms of the best available knowledge at the time. The final facility design is required to be approved by the DEA. Importantly, should there be any substantive changes or deviations from the original scope or layout of the project, the DEA will need to be notified and where relevant, approval obtained.

Conduct Surveys
Prior to initiating construction, a number of surveys will be required including, but not limited to confirmation of the micro-siting footprint (i.e. the precise location of the PV panels, substation and the plant's associated infrastructure) and a geotechnical survey. Geotechnical surveys are executed by geotechnical engineers and geologists to acquire information regarding the physical characteristics of soil and rocks underlying a proposed project site. The purpose is to design earthworks and foundations for structures and to execute earthwork repairs necessitated due to changes in the subsurface environment.

2.3.2 Construction Phase

The construction phase will take approximately 12 - 18 months to complete, and will entail a series of activities including:

Procurement and employment
At the peak of construction the proposed project is likely to create a maximum of 800 employment opportunities. These employment opportunities will be temporary, and will last for a period of approximately 18 months (i.e. the length of construction). Employment opportunities generated during the construction phase will include low skilled, semi-skilled, and skilled opportunities. Solar PV projects make use of large

numbers of unskilled and semi-skilled labour so there will be good opportunity to use local labour. Employment opportunities for the proposed solar energy facility will peak during the construction phase and significantly decline at the commencement of the operation phase. The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area.

The majority of the labour force is expected to be sourced from the surrounding towns, and no labour will be accommodated on-site during the construction period.

Establishment of an Access Road to the Site

Access to the project site will be established for the construction of the facility. The project site proposed for the development is accessible via the N18 which traverses the eastern section of the project site. Within the site itself, access will be required from new/existing roads for construction purposes (and limited access for maintenance during operation). Within the facility development footprint itself, access will be required from new / existing roads for construction purposes (and limited access for maintenance during operation). The final layout will be determined following the identification of site related sensitivities.

Undertake Site Preparation

Site preparation activities will include clearance of vegetation. 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

The national, regional, secondary and proposed internal access roads will be used to transport all components and equipment required during the construction phase of the solar energy facility. Some of the components (i.e. substation transformer) may be defined as abnormal loads in terms of the National Road Traffic Act (No. 93 of 1996) (NRTA) [2] by virtue of the dimensional limitations. 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 mounting of the PV support structures, construction of the substation and site preparation.

Establishment of Laydown Areas on Site

Laydown and storage areas will be required for typical construction equipment. Once the required equipment has been transported to site, a dedicated equipment construction camp and laydown area will need to be established adjacent to the workshop area. The equipment construction camp serves to confine activities and storage of equipment to one designated area to limit the potential ecological impacts associated with this phase of the development. The laydown area will be used for the general placement / storage of construction equipment, PV panels, inverters and mounting infrastructure. A temporary laydown area approximately 8ha in extent is required during construction. The temporary laydown area will be included within the development footprint of the facility.

Erect PV Cells and Construct Substation and Invertors

The construction phase involves installation of the PV solar panels and structural and electrical infrastructure required for the operation of the facility. In addition, preparation of the soil and improvement of the access roads is likely to continue for most of the construction phase. For array installations, vertical support posts are driven into the ground. Depending on the results of the geotechnical report, a different foundation method,

[2] A permit will be required in accordance with Section 81 of the NRTA which pertains to vehicles and loads which may be exempted from provisions of the Act.

such as screw pile, helical pile, micropile or drilled post / pile could be used. The posts will hold the support structures (tables) on which the PV modules would be mounted. Brackets attach the PV modules to the tables. Trenches are dug for the underground AC and DC cabling and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. Wire harnesses connect the PV modules to the electrical collection systems. Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the on-site AC electrical infrastructure and ultimately the solar facility's on-site substation.

The construction of the substation will require a survey of the site, site clearing and levelling and construction of access road(s) (where applicable), construction of a level terrace and foundations, assembly, erection, installation and connection of equipment, and rehabilitation of any disturbed areas, and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure
Ancillary infrastructure will include a power line for connection to the Eskom national grid, workshop, storage and laydown areas, gatehouse and security complex, as well as a temporary contractor's equipment camp.

The establishment of the ancillary infrastructure and support buildings will require the clearing of vegetation and levelling of the development site, and the excavation of foundations prior to construction. Laydown areas for building materials and equipment associated with these buildings will also be required.

Construction of the power line
A power line is constructed by surveying the power line route, constructing foundations for the towers, installing the towers, stringing the conductors, and finally rehabilitating disturbed areas and protecting erosion sensitive areas.

Undertake Site Rehabilitation
Once construction is completed and all construction equipment has been removed, the site will be rehabilitated where practical and reasonable. In addition, on full commissioning of the solar energy facility, any access points which are not required during operation must be closed and rehabilitated accordingly.

2.3.3 Operation Phase

The proposed solar facility is expected to operate for a minimum of 20 years. The facility will operate continuously, 7 days a week, and will include the capacity of battery storage of up to 6 hours. While the solar facility will be largely self-sufficient, monitoring and periodic maintenance activities will be required. Key elements of the Operation and Maintenance (O&M) plan include monitoring and reporting the performance of the solar facility, conducting preventative and corrective maintenance, receiving visitors, and maintaining security.

2.3.4 Decommissioning Phase

Depending on the continued economic viability of the solar farm following the initial 20-year operational lifespan, the operation phase will be extended or the facility will either be decommissioned. If it is deemed financially viable to extend the operation phase, existing components would either continue to operate, or be dissembled and replaced with new, more efficient technology / infrastructure available at the time. If the decision is made to decommission the solar facility, the following decommissioning activities will take place:

Site Preparation
Site preparation activities include confirming the integrity of the access to the site to accommodate the required decommissioning equipment.

Disassembly and Removal of Existing Components
When the solar facility is ultimately decommissioned, the equipment to be removed will depend on the land use proposed for the site at the time. All above ground facilities that are not intended for future use at the site will be removed. Much of the above ground wire, steel, and PV panels of which the system is comprised, are recyclable materials and would be recycled to the extent feasible. The components of the solar facility would be deconstructed and recycled, or disposed of in accordance with applicable regulatory requirements. The site will be rehabilitated and can be returned to agriculture or another beneficial land-use.

Future plans for the site and infrastructure after decommissioning
The generation capacity of the facility would have degraded by approximately 15% over the 20-year operations lifespan. The solar facility will potentially have the opportunity to generate power for a Merchant Market operation (i.e. the client would sell power on a bid basis to the market). Another option for the site after decommissioning is for agricultural activities to resume.

2.4 Findings of the Environmental Impact Assessment (EIA)

No environmental fatal flaws were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. These measures include, amongst others, the avoidance of sensitive features within the development footprint and the undertaking of monitoring, as specified by the specialists.

The potential environmental impacts associated with the Moeding Solar PV Facility that were identified and assessed through the BA process include:

- Impacts on ecology, flora, fauna and hydrological features.
- Impacts on avifauna.
- Impacts to soils, land-use and agricultural potential.
- Impacts on heritage resources, including archaeology and palaeontology.
- Visual impacts on the area imposed by the components of the facility.
- Positive and negative socio- economic impacts.

2.4.1 Impacts on Ecology and Hydrology

The Ecological and Hydrological Impact Assessment assessed the impact of the Moeding Solar PV Facility on the sensitive ecological and hydrological[3] features present within the project site and 300m power line corridor for the life-cycle of the project. The assessment identified impacts within the construction and operation phases of the project.

[3] It must be noted that no sensitive hydrological features have been identified and confirmed within the development footprint of the Moeding Solar PV Facility by the specialist.

During the construction phase, the impacts expected to occur include impacts on vegetation and listed protected plant species, faunal impacts, an increased erosion risk and increased alien plant invasion. The significance of the construction phase impacts ranges from medium to low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified prior to the implementation of mitigation.

During the operation phase, the anticipated impacts include altered runoff patterns due to rainfall interception by the PV panel infrastructure and compacted areas resulting in high levels of erosion, increased alien plant invasion, an increased erosion risk and faunal impacts. The significance of the impacts for the operation phase ranges from medium to low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project.

From the findings of the Ecological and Hydrological Impact Assessment (**Appendix D** of the BA Report) it can be concluded that no impacts of high ecological or hydrological significance were identified which would hinder the development of the Moeding Solar PV Facility and its associated infrastructure within the project site and power line corridor. The proposed development is considered to be appropriate and acceptable from an ecological and surface hydrological perspective and will not result in detrimental impacts to ecosystems and habitat features present within the project site and within the surrounding properties. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.2 Impacts on Avifauna

The Avifauna Impact Assessment (**Appendix E** of the BA Report) identified that although the proposed Moeding Solar PV Facility will have an impact on avifauna due to the extensive spatial requirements of the development, the project site is not considered unique (also classified as low sensitive REDZ within the Strategic Environmental Assessment) and is furthermore not considered critical for the conservation of Red Data species. The project site is also located within a Low Risk Site (Regime 1) and it can be concluded that the implementation of Stage 3 and 4 assessments and monitoring, according to the Best Practice Guidelines: Birds & Solar Energy, will not be necessary.

The avifauna impacts identified as associated with the Moeding Solar PV Facility are unlikely to have long-term significant impacts. During the construction phase of the facility a loss of habitat and disturbance due to clearance of vegetation is expected to occur. The significance of this impact can be reduced to low with the implementation of the recommended mitigation measures provided by the specialist.

During the operation phase, the anticipated impacts include disturbance, collisions with solar panels and power line infrastructure and electrocution. The significance of the impacts for the operation phase can be reduced to low, following the implementation of the recommended mitigation measures by the specialist. No impacts of a high significance were identified for the project.

From the results of the avifauna assessment, it can be concluded that no fatal-flaws will be associated with the development of the Moeding Solar PV Facility from an avifaunal perspective. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.3 Impacts on Land Use, Soil and Agricultural Potential

The proposed Moeding Solar PV Facility infrastructure is located on shallow, rocky soils with low to moderate-low land capability. The construction and operation of a PV facility on the project site is considered acceptable from a soils perspective as it will supplement and stabilise the landowner's income in an area where farming is susceptible to periodic droughts. The construction and operation of a PV facility on the project site is therefore considered acceptable from a soils perspective.

Impacts have been identified for both the construction and operation phases for the Moeding Solar PV Facility (**Appendix F** of the BA Report). The impacts associated with land use, soil and agricultural potential include an increased risk of soil erosion, potential chemical pollution and loss of land capability. The significance of the impacts ranges from low to medium with the implementation of the mitigation measures recommended by the specialist. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.4 Impacts on Heritage Resources

Through a field survey, archival research and evaluation of aerial photography of the sites, several heritage resources have been identified within the project site and the 300m power line corridor (Alternative 1). These sites have a site significance of GP.B.

The Heritage Impact Assessment (**Appendix H** of the BA Report) identified impacts associated with the construction and operation of the Moeding Solar PV Facility and associated infrastructure. These include impacts on burial grounds, impacts on historical structures and impacts on archaeological sites. With the implementation of mitigation measures, the potential impacts on heritage resources will be low. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

Considering the palaeontology of the project site, it was identified that the area in question is underlain by a small portion of the Vryburg Formation of the Transvaal Supergroup (geologically older than 2.6 billion year-old) and the Schmidtsdrift Subgroup, Ghaap Group of the Transvaal Supergroup. Stromatolite assemblages are recorded within both the Schmidtsdrift Subgroup and Vryburg Formation. Poorly- to fairly well-preserved, stromatolite assemblages were recorded within the project site.

Impacts on palaeontological resources are expected to occur during the construction phase of the Moeding Solar PV Facility (refer to **Appendix I** of the BA Report for the Palaeontological Impact Assessment). The impacts relate to the excavations required for the construction of the facility and will occur only in the event that a palaeontological resource is present. The significance of the impact will be low with the implementation of mitigation measures proposed by the specialist. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.5 Visual Impacts

The Visual Impact Assessment (**Appendix G** of the BA Report) identified negative impacts on visual receptors during the undertaking of construction activities and the operation phase of the Moeding Solar PV Facility.

The area that is likely to be affected by the visual impact associated with the solar energy facility will be limited to the area immediately to the south of the urban area of Vryburg. This area is largely impacted by urban and urban fringe development. Due to the ridgeline located to the south of the solar energy facility, the development will not impact on areas to the south that have a more cohesive rural in character and where the landscape character is not influenced by development. The Moeding Solar PV Facility will mainly impact visually on an area where there currently is a strong visual influence from urban and urban fringe development, changes to the landscape quality are unlikely to be problematic.

The construction and operation phase of the Moeding Solar PV Facility will impact on the general landscape character of the area, on small holdings north east (Huhudi), travellers on the N18 and R34, homesteads, the Tiger Kloof Educational Institution and the Vryburg airstrip. The significance of the visual impacts will be low with the implementation of the recommended mitigation measures. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.4.6 Social Impacts

Traditionally, the majority of social impacts are associated with the construction phase of a PV solar development. Many of the social impacts are unavoidable and will take place to some extent, but can be managed through the careful planning and implementation of appropriate mitigation measures. A number of potential positive and negative social impacts have been identified for the project, however an assessment of the potential social impacts indicated that there are no perceived negative impacts that are sufficiently significant to allow them to be classified as fatal flaws.

The Social Impact Assessment (**Appendix J** of the BA Report) identified positive and negative impacts which are expected to occur during the construction and operation phases of the Moeding Solar PV Facility. The assessment identified that the expected benefits associated with the project, which include generation of electricity from renewable sources and local economic and social development, outweigh the perceived impacts associated with the project.

During the construction phase the positive impacts expected to occur includes direct and indirect employment opportunities and skills development and economic multiplier effects. The significance of these impacts are medium with the implementation of the recommended enhancement measures. The negative social impacts expected to occur during the construction phase includes an influx of jobseekers and change in population, safety and security impacts, impacts on daily living and moving patterns, nuisance impacts (i.e. noise and dust) and visual impacts. The significance of the negative construction phase impacts will be low to medium with the implementation of the recommended mitigation measures.

During the operation phase the positive impacts expected to occur includes direct and indirect employment opportunities and skills development, development of non-polluting, renewable energy infrastructure and a contribution to Local Economic Development (LED) and social upliftment. The significance of the positive operation impacts will be medium to high with the implementation of the recommended enhancement measures. The negative impacts expected during the operation phase includes a visual and sense of place impact and impacts associated with the loss of agricultural land. The significance of the negative operation impacts will be low to medium with the implementation of the recommended mitigation measures. The specialist has therefore indicated that the development may be authorised, constructed and operated, subject to the implementation of the recommended mitigation measures.

2.5 Environmental Sensitivity

From the specialist investigations undertaken for the Moeding Solar PV Facility, the following sensitive areas/environmental features have been identified and demarcated within the project site and avoided by the development footprint (where necessary):

» **Ecology and Hydrology** – The majority of the project site and power line corridor has been identified as being of a medium to low ecological sensitivity based on the presence of Open Vaalbos Shrubland, Tall Vaalbos Shrubland, Short Griekwa Karee Shrubland and Tall Karee Woodland. Areas of medium ecological sensitivity include a Palaeo-Drainages, Tall Mixed Woodland Patch and Tall Woodland Fringe *A. erioloba* (Declining) was occasionally observed. The development footprint and power line alternatives avoids all areas considered to be Tall Woodland Fringe vegetation. Areas of very high ecological sensitivity includes depression wetlands (pans) situated directly north and south of the development area. These areas and the 35m associated buffer zones are avoided by the development footprint and power line alternatives.

» **Bird Habitat and Sensitive Areas** – The majority of the project site (including the power line corridor) has been assessed as a medium to low sensitivity from an avifaunal perspective. The sensitive areas include the Savannah Grassland, Savannah Shrubland and the Tree Savannah Habitat occurring on historically cultivated areas (Secondary Savannah). The relatively small natural Tree Savannah and Savannah Woodland are considered to be of medium sensitivity. Both of these habitat units are fairly limited in extent with the Savannah Woodland forming a small isolated patch within the project site. A portion of the solar field will expand into this habitat type as well as the compound area. These activities and the extent of their impacts within the medium sensitive habitat types are regarded as acceptable.

  The ephemeral pans with the woody peripheries are considered to be of high avifauna sensitivity. These habitats provide a source of surface water in the area and support a number of large trees, which could potentially be important for roosting and nesting. The development footprint and power line alternatives avoids all ephemeral pans.

» **Heritage:** Four sites of heritage significance were identified within the 300m corridor and none within the development footprint of the solar energy facility. These sites have a site significance of GP.B and a 20m no-go buffer area has been established around these sites by the specialist. The project site also consists of characteristic flat-lying terrain and vegetation cover of grassy thornveld and poorly- to fairly well-preserved stromatolite assemblages were recorded within the project site. The specialist recommended that the collection and recording of fossils as well as obtaining data of the surrounding sedimentary matrix within the proposed development footprint must be undertaken by a palaeontologist after the preliminary vegetation removal but before the ground is levelled for construction.

A comparative assessment of the power line alternatives was undertaken from an environmental perspective and both alternatives were assessed at the same level by all specialists. The layout and preferred power line alternative from an environmental perspective has been nominated and included in **Figure 2.2**. An environmental sensitivity map overlain with the preferred layout map is included as **Figure 2.3**.

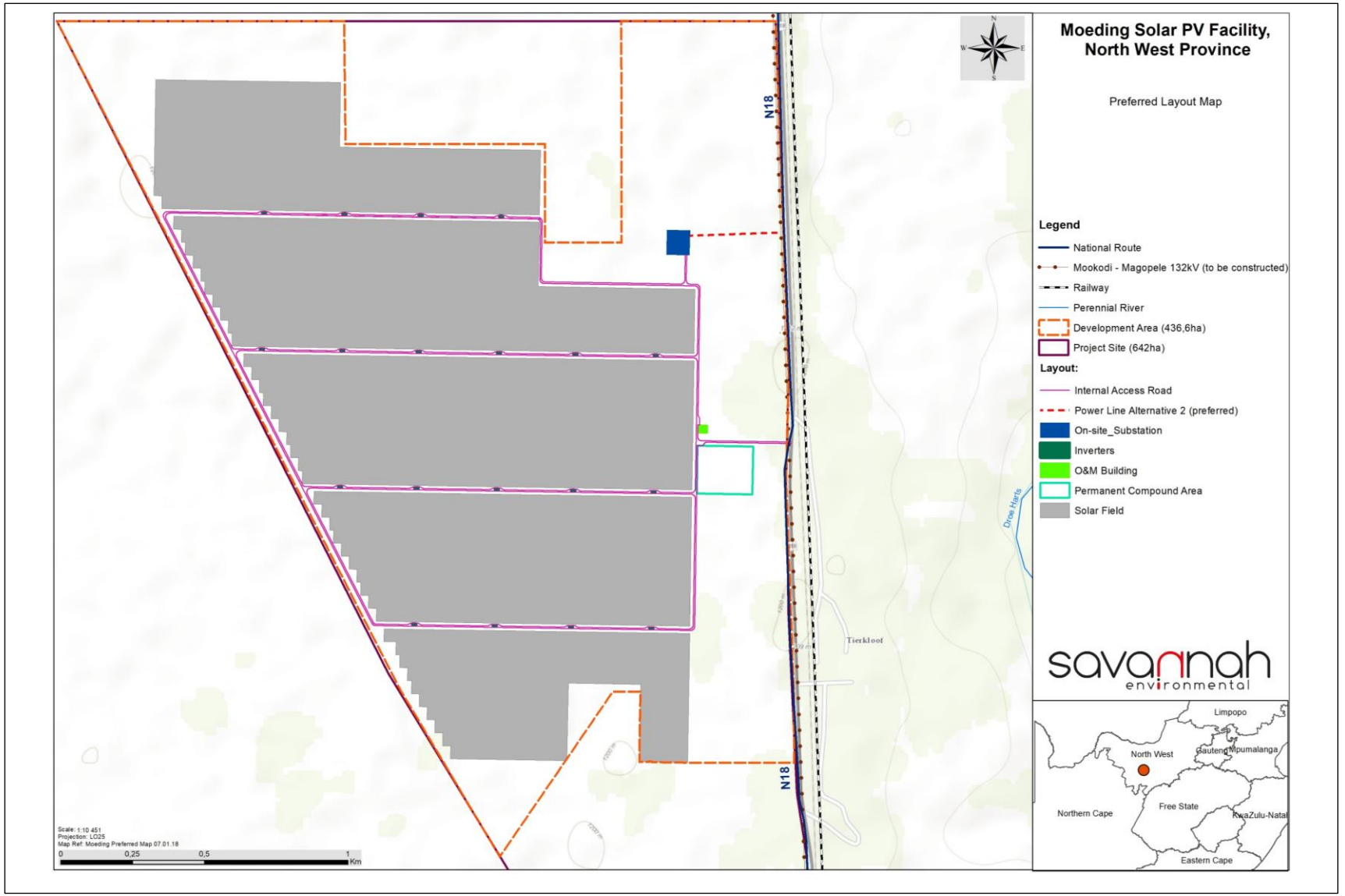

Figure 2.2: Final preferred layout map of the preferred development footprint for the Moeding Solar PV Facility, as was assessed as part of the BA process

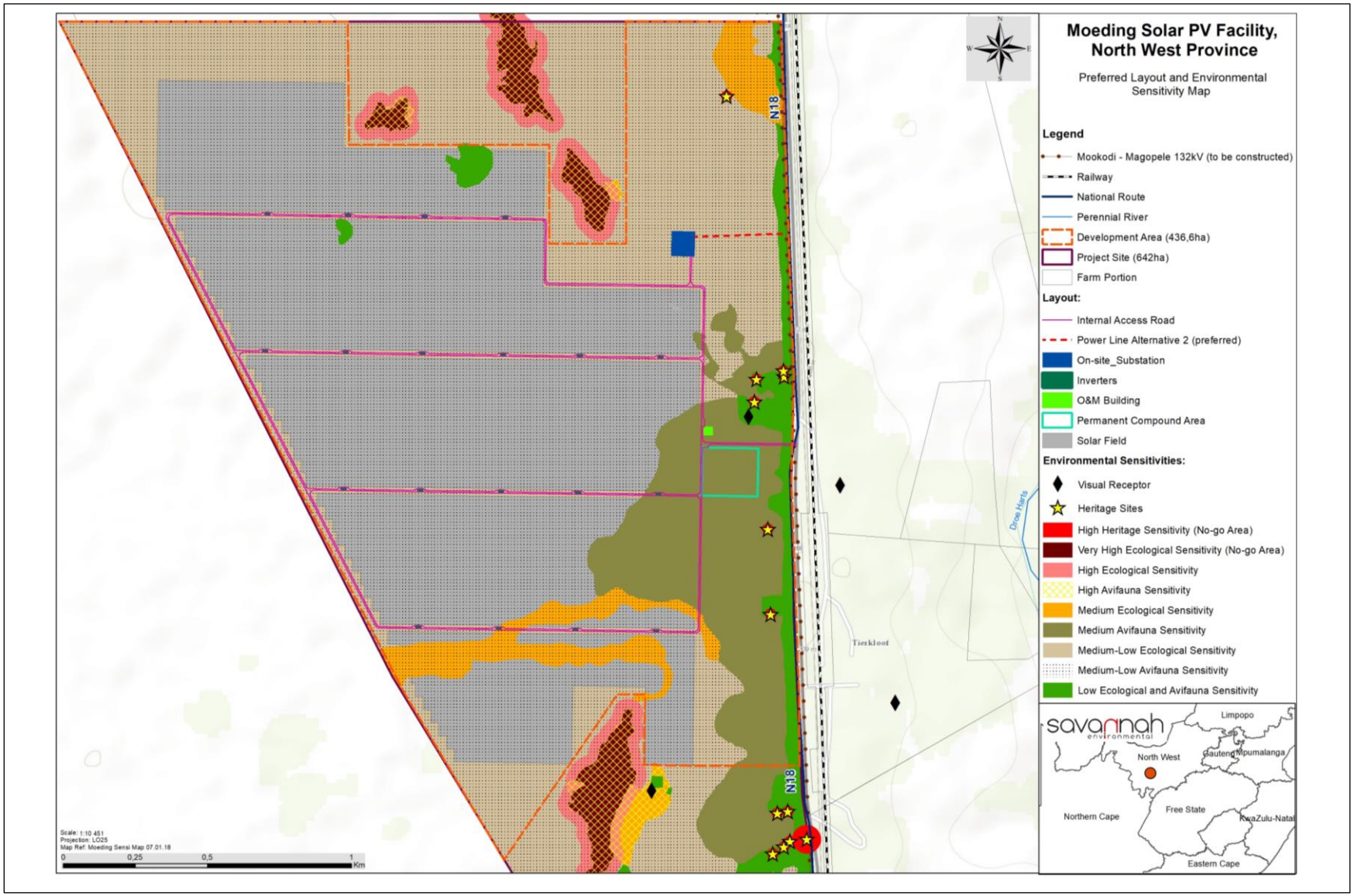

Figure 2.3: Final preferred layout map overlain by the environmental sensitivities for the Moeding Solar PV Facility.

2.6 Contents of this Environmental Management Programme (EMPr)

This Environmental Management Programme (EMPr) has been prepared as part of the BA process being conducted in support of the application for Environmental Authorisation (EA) for the Moeding Solar PV Facility. This EMPr has been prepared in accordance with DEA's requirements as contained in Appendix 4 of the 2014 EIA Regulations (GNR 326). It provides recommended management and mitigation measures with which to minimise impacts and enhance benefits associated with the project.

An overview of the contents of this EMPr, as prescribed by Appendix 4 of the 2014 EIA Regulations (GNR 326), and where the corresponding information can be found within this EMPr is provided in **Table 2.3**.

Table 2.3: Summary of where the requirements of Appendix 4 of the 2014 NEMA EIA Regulations (GNR 326) are provided in this EMPr.

Requirement	Location in this EMPr
(1) An EMPr must comply with section 24N of the Act and include – (a) Details of – (i) The EAP who prepared the EMPr. (ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.	Chapter 2 Appendix L
(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Chapter 2
(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Chapter 2 Figure 2.3 Appendix A
(d) A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including –	
(i) Planning and design.	Chapter 5
(ii) Pre-construction activities.	Chapter 5
(iii) Construction activities.	Chapter 6
(iv) Rehabilitation of the environment after construction and where applicable post closure.	Chapter 7
(v) Where relevant, operation activities.	Chapter 8
(f) A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to – (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation. (ii) Comply with any prescribed environmental management standards or practices. (iii) Comply with any applicable provisions of the Act regarding closure, where applicable. (iv) Comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable.	Chapters 5 - 8
(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).	Chapters 5 - 8

Requirement	Location in this EMPr
(i) An indication of the persons who will be responsible for the implementation of the impact management actions.	Chapters 5 - 8
(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.	Chapters 5 - 8
(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).	Chapters 5 - 8
(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Chapters 6
(m) An environmental awareness plan describing the manner in which – (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work. (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 6
(n) Any specific information that may be required by the competent authority.	None have been received to date
(2) Where a government notice gazetted by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	N/A

2.7 Project Team

In accordance with Regulation 12 of the 2014 EIA Regulations (GNR 326) the applicant appointed Savannah Environmental (Pty) Ltd as the independent environmental consultants responsible for managing the application for EA and the supporting BA process. The application for EA and the BA process, is being managed in accordance with the requirements of NEMA, the 2014 EIA Regulations (GNR 326), and all other relevant applicable legislation.

2.7.1 Details and Expertise of the Environmental Assessment Practitioner (EAP)

Savannah Environmental is a leading provider of integrated environmental and social consulting, advisory and management services with considerable experience in the fields of environmental assessment and management. The company is wholly woman-owned (51% black woman-owned), and is rated as a Level 2 Broad-based Black Economic Empowerment (B-BBEE) Contributor. Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 12 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development.

Jo-Anne Thomas and Thalita Botha are the EAPs responsible for preparing this EMPr. An overview of their expertise to prepare the EMPr is provided below, and copies of their Curricula Vitae (CVs) detailing the Savannah Environmental team's expertise and relevant experience are provided in **Appendix L** to this EMPr.

» **Jo-Anne Thomas** is a Director at Savannah Environmental (Pty) Ltd and the registered EAP for the EIA for this project. Jo-Anne holds a Master of Science Degree in Botany (M.Sc. Botany) from the University of the Witwatersrand, and is registered as a Professional Natural Scientist (400024/2000) with the South African Council for Natural Scientific Professions (SACNASP). She has over 20 years of experience in the field of environmental assessment and management, and the management of large environmental assessment and management projects. During this time she has managed and coordinated a multitude of large-scale infrastructure EIAs, and is also well versed in the management and leadership of teams of specialist

consultants, and dynamic stakeholders. Jo-Anne has been responsible for providing technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, EIA studies, environmental permitting, public participation, EMPs and EMPrs, environmental policy, strategy and guideline formulation, and integrated environmental management (IEM). Her responsibilities for environmental studies include project management, review and integration of specialist studies, identification and assessment of potential negative environmental impacts and benefits, and the identification of mitigation measures, and compilation of reports in accordance with applicable environmental legislation.

» **Thalita Botha** is an Environmental and GIS Consultant at Savannah Environmental. Thalita has a Bachelor of Science Honours Degree in Environmental Management (B.Sc. Honours) and 3 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects. She is currently involved in several EIAs for energy generation projects across South Africa.

Savannah Environmental's team have been actively involved in undertaking environmental studies over the past 13 years, for a wide variety of projects throughout South Africa, including those associated with electricity generation and infrastructure development, and therefore have extensive knowledge and experience in EIAs and environmental management, having managed and drafted EMPrs for numerous other power generation projects throughout South Africa.

2.7.2 Details of the Specialist Consultants

A team of specialist consultants have been appointed as part of the BA project team in order to adequately identify and assess potential impacts associated with the project, and have also provided input into this EMPr (refer to **Table 2.4**).

Table2.4: Specialist Consultants which provided input into this EMPr.

Specialist Study	Specialist Company	Specialist Name
Nkurenkuru Ecology and Biodiversity	Ecology and Wetland Impact Assessment	Gerhard Botha
Nkurenkuru Ecology and Biodiversity	Avifauna Impact Assessment	Gerhard Botha
TerraAfrica	Soils and Agricultural Potential Impact Assessment	Mariné Pienaar
Environmental Planning and Design	Visual Impact Assessment	Jon Marshall
PGS Heritage	Heritage Impact Assessment	Wouter Fourie
Banzai Environmental	Palaeontological Impact Assessment	Elize Butler
Savannah Environmental	Social Impact Assessment	Sarah Watson
Social (External peer review)	Dr. Neville Bews and Associates	Dr. Neville Bews

CHAPTER 3 : PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) 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". The objective of this EMPr 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 EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the project.

The EMPr 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 (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Moeding Solar PV Facility. The document will be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended) (refer to **Table 2.3**). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the Moeding Solar PV Facility and/or as the project develops. The EMPr 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).

The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Moeding Solar PV Facility.
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance, and prevent long-term or permanent environmental degradation.
- Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the BA process.

The mitigation measures identified within the BA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Moeding Solar (Pty) Ltd 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 EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the BA process for the Moeding Solar PV Facility, it is important that this document be read in conjunction with the BA Report compiled for this project. This will contextualise the EMPr 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 EMPr and the Environmental Authorisation, the stipulations in the Environmental Authorisation shall prevail over that of the EMPr, unless otherwise agreed by the authorities in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the project, and shall be enforceable at all levels of contract and operational management within the project. The document must be adhered to and updated as relevant throughout the project life cycle.

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CHAPTER 4: STRUCTURE OF THIS EMPR

The preceding chapters provide background to the EMPr and the proposed project, while the chapters which follow consider the following:

» Planning and design activities;
» Construction activities;
» Operation activities; and
» Decommissioning activities.

These chapters set out the procedures necessary for the project owner to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation for the PV facility project, an overarching 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 EMPr table has been established for each environmental objective. The information provided within the EMPr 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 BA specialist studies

Project Component/s	List of project components affecting the objective, i.e.: » PV Panels » Access roads; and » Associated infrastructure.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/Risk Source	Description of activities which could affect achieving the 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 EMPr 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;
- Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- Relevant legal or other requirements are changed or introduced; and
- 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.

CHAPTER 5: PLANNING AND DESIGN MANAGEMENT PROGRAMME

Overall Goal: undertake the pre-construction activities (planning and design phase) in a way that:

- Ensures that the preferred design and layout of the PV panels, on-site substation and associated infrastructure responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- 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 (underground cable network, short distribution powerline), including the access roads.
- Enables the 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 1: Ensure the facility design responds to identified environmental constraints and opportunities

Several depression wetlands (pans) have been identified within the project site and are considered to be no-go areas. A 35m buffer has been established around these wetlands which is considered to be a no-go area except for linear development components. This habitat provides several ecosystem functions including seasonal preferential grazing, a corridor for faunal movement between habitat types and a niche habitat which ensures persistence of organisms and provides seasonal water and food to migrating fauna. Larger shrubs and small trees on the periphery provide (Tall Woodland Fringe) nesting space for birds and shelter/breeding areas for fauna. One Red Data species have occasionally been observed within the outer boundary of the wetlands and include *Acacia erioloba* (Declining). These wetlands are situated outside of the development footprint assessed within the BA process, and subsequently can be maintained intact. A natural vegetation cover should be maintained within these buffer areas to allow these areas to fulfill its function.

Project Component/s	» PV panels » Access roads » Power line » On-site substation » Inverter stations » Transformer » Underground cabling » Associated buildings (i.e. workshop, ablution facilities, control room, storage).
Potential Impact	» Impact on identified sensitive areas. » Negative visual impact associated with the planning of the PV facility.

	» Increased risk of veld fire and damage to property as a result.
Activities/Risk Sources	» Positioning of all the facilities components and the viewing of the project components by observers » Planning of the underground cabling » Planning for the connection to the on-site substation » Access road planning
Mitigation: Target/Objective	» The design of the PV facility, power line responds to the identified environmental constraints and opportunities. » Optimal planning of infrastructure to minimise visual impact. » Site sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

Mitigation: Action/Control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally acceptable manner.	Developer Contractor	Pre-construction
Undertake a detailed geotechnical pre-construction survey.	Developer Geotechnical specialist	Pre-construction
Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.	Developer	Pre-construction
The construction equipment camps must be planned as close to the site as possible to minimise impacts on the environment.	Developer	Pre-construction
Following the final design of the Moeding Solar PV Facility, a final layout must be submitted to DEA for review and approval prior to commencing with construction. No development is permitted within the identified no-go areas	Developer	Pre-construction
An ecological pre-construction walkthrough of the final development footprint (including the final power line alignment) for species of conservation concern that would be affected and that can be translocated must be undertaken prior to the commencement of the construction phase.	Developer Specialist	Pre-construction
Since most of the identified conservation worthy species within the project site are geophytes and succulents with relative shallow rooting systems (i.e. *Boophone disticha, Babiana hypogea, Ammocharis coranica, Nerine laticoma* and *Aloe greatheadii*), the potential for successful translocation is high. Before construction commences individuals of listed species within the development footprint that would be affected, should be counted and marked and translocated, where deemed necessary by the ecologist conducting the pre-construction walk-through survey, and according to the recommended rations. Permits from the relevant provincial authorities, i.e. the North West Department of Rural, Environment and Agricultural Development (READ) before the individuals are disturbed.	Developer Specialist	Pre-construction
Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity and are properly fenced or demarcated as appropriate and practically possible.	Developer	Project planning
Obtain any additional environmental permits required (e.g. water use license, and protected plant permits, etc.) prior to the	Developer	Project planning

Mitigation: Action/Control	Responsibility	Timeframe
commencement of construction. Copies of permits/licenses must be submitted to the Director: Environmental Impact Evaluation at the DEA.		
Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.	Developer	Planning and design
Ensure that the face of panels have the most effective non reflective surface possible at the time of ordering.	Developer	Project planning
Plan all roads, ancillary buildings and ancillary infrastructure in such a way that clearing of vegetation is minimised. Consolidate infrastructure and make use of already disturbed sites rather than undisturbed areas.	Developer	Project planning
A designated access to the site must be created and clearly marked to ensure safe entry and exit.	Developer Contractor	Design
Internal access roads must be carefully planned to maximise road user safety and limit any intrusion on the neighbouring property owners and road users.	Developer Contractor	Design
Roads must be designed so that changes to surface water runoff are avoided and erosion is not initiated.	Developer Contractor	Design
Make use of existing roads wherever possible and plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements.	Developer Contractor	Design
The road network to access the panel arrays should be established first and then all vehicular movement must be restricted to within this road network. This will minimise the impact of construction traffic.	Developer Contractor	Design and Planning
Construction vehicles carrying materials to the site must avoid using roads through densely populated built-up areas so as to not disturb existing retail and commercial operations.	Developer Contractor	Design and Planning
Contractors and construction workers must be clearly informed of the no-go areas.	Developer Contractor	Prior to the commencement of construction
Demarcation of no-go areas must reflect the exact footprint of the construction area, including panel foundations and all roads and infrastructure which are to be surveyed and pegged before any physical construction commences on site.	Developer Contractor	Prior to the commencement of construction
Develop and implement a detailed Invasive Plant Management Plan prior to commencement of activity. This plan must be diligently followed and updated throughout the project cycle up to the decommissioning phase.	Developer Contractor	Pre-construction
A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found.	Developer Contractor	Pre-construction
Search and Rescue (S&R) of all protected plants that will be affected by the development (**Appendix E**), especially species occurring in long term and permanent, hard surface development footprints (i.e. all buildings, new roads and tracks,	Contractor	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
laydown areas, and panel positions), should take place. The necessary permits must be in place.		
Plan and placement of light fixtures for the plant and the ancillary infrastructure in such a manner so as to minimise glare and impacts on the surrounding area.	Developer Contractor	Planning.
Reduce the construction period as far as possible through careful planning and productive implementation of resources.	Developer Contractor	Pre-construction
Plan the placement of laydown areas and construction equipment camps in order to minimise vegetation clearing and impacts on identified sensitive areas.	Developer	Pre-construction
No temporary site camps must be allowed outside the development footprint of the project.	Developer	Design and planning
An experienced independent Environmental Control Officer (ECO) must be appointed for the construction phase.	Developer	Pre-construction
Pre-construction environmental induction for all construction staff on site must be provided to ensure that basic environmental principles are adhered to. This includes awareness of no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimising wildlife interactions, remaining within demarcated construction areas etc.	EO	Pre-construction
The terms of this EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts.	Developer Contractor	Pre-construction
All areas to be cleared should be clearly demarcated. Highly sensitive areas as demarcated on the sensitivity map should be avoided, and where such areas occur within or near the development area, they should be clearly demarcated as no-go areas. Only those individuals of protected plant species directly within the development footprint should be cleared.	Developer	Design review phase
Demarcate all areas to be cleared with construction tape or similar material where practical. However, caution should be exercised to avoid using material that might entangle fauna.	Developer	Pre-construction
Areas outside of the footprint, including sensitive areas, must be clearly demarcated (using fencing and appropriate signage) before construction commences and must be regarded as no-go areas.	Developer Contractor	Pre-construction
Underground cables and internal access roads must be aligned as much as possible along existing infrastructure to limit damage to vegetation.	Developer Contractor	Design Pre-construction
Training and skills development programmes to be initiated prior to the commencement of the construction phase.	Developer Contractor	Pre-construction
A local procurement policy must be adopted to maximise the benefit to the local economy.	Developer	Pre-construction
Develop a database of local companies, specifically Historically Disadvantaged (HD) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation	Developer	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
companies etc.) prior to the tender process and invite them to bid for project-related work where applicable.		
Where applicable, any tender documentation which may be prepared for the project is to stipulate the use of local labour as far as possible.	Developer Contractor	Pre-Construction
Inform local community members of the construction schedule and exact size of workforce (e.g. Ward Councillor, surrounding landowners).	Developer Contractor	Pre-Construction
Recruitment of temporary workers onsite is not to be permitted. A recruitment office with a Community Liaison Officer should be established to deal with jobseekers.	Developer Contractor	Pre-Construction
Set up a labour desk in a secure and suitable area to discourage the gathering of people at the construction site.	Developer Contractor	Pre-Construction
Have clear rules and regulations for access to the proposed site.	Developer Contractor	Pre-Construction
Local community organisations and policing forums must be informed of construction times and the duration of the construction phase. Also procedures for the control and removal of loiters at the construction site should be established.	Developer Contractor	Pre-Construction
Security company to be appointed and appropriate security procedures to be implemented.	Developer Contractor	Pre-Construction
No unauthorised entry to the site is to be allowed. Access control is to be implemented.	Developer Contractor	Pre-construction Construction
A comprehensive employee induction programme must be developed and utilised to cover land access protocols, fire management and road safety.	Contractor	Pre-construction
Prepare a Fire Management Plan (FMP) (**Appendix J**) in collaboration with surrounding landowners.	Developer	Pre-construction
Communicate the FMP to surrounding landowners and maintain records thereof.	Developer	Pre-construction Construction

Performance Indicator	» The design meets the objectives and does not degrade the environment. » Demarcated sensitive areas are avoided at all times. » Design and layouts respond to the mitigation measures and recommendations in the BA Report. » Minimal exposure of ancillary infrastructure and lighting at night to observers on or near the site and within the region. » Employment and business policy document that sets out local employment and targets completed before the construction phase commences. » Training and skills development programme undertaken prior to the commencement of construction phase. » Employee induction programme, covering land access protocols, fire management and road safety. » Ensure a security company is appointed and appropriate security procedures and measures are implemented. » A local procurement policy is adopted.

Monitoring	» Review of the design by the Project Manager and the Environmental Control Officer (ECO) prior to the commencement of construction. » Monitor ongoing compliance with the FMP and method statements.

OBJECTIVE 2: Ensure the selection of the best environmental option for the alignment of the power line and underground cabling

Underground cables will be laid between the PV panels, the transformers and the switchgear. This will require the excavation of trenches within which they can then be laid. A new 132kV power line linking the proposed on-site substation to the national grid via a turn-in / turn-out connection to the Mookodi/ Magopela 132kV power line to be constructed along the eastern boundary of the project site is preferred. Existing access roads will be used for the facility where possible.

Four sites of heritage significance fall within the 300m power line corridor (Alternative 1). No sites fall within the development footprint of the solar energy facility or Power Line Alternative 2. These sites have a site significance of GP.B and a 20m no-go area has been established around each site.

Project Component/s	» Underground cabling. » Power line. » Temporary internal access roads.
Potential Impact	» Routes that degrade the environment unnecessarily, particularly with respect to loss of indigenous flora, and erosion. » Impact on the power line on sensitive features.
Activities/Risk Sources	» Alignment of underground cabling. » Alignment of power line. » Alignment of new access roads.
Mitigation: Target/Objective	» Ensure selection of best environmental option for alignment of the linear infrastructure. » Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

Mitigation: Action/Control	Responsibility	Timeframe
Select an alignment for the underground cabling, power line and any new access roads that minimises environmental impacts and enhances environmental benefits.	Developer Contractor	Prior to submission of the final construction layout plan
Consider design level mitigation measures recommended by the specialists as detailed within the BA Report and relevant appendices regarding the associated infrastructure.	Developer Contractor	Design

Performance Indicator	» Underground cabling, power line and new access road alignments meet environmental objectives. » Selected linear alignments that minimise any negative environmental impacts and maximise any benefits.
Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the BA Report through review of the design by the Project Manager, and the ECO prior to the commencement of construction.

OBJECTIVE 3: Minimise storm water runoff

Project Component/s	» Storm water management components. » All hard engineered surfaces (i.e. new access roads).
Potential Impact	» Poor storm water management and alteration of the hydrological regime outside of the project site.
Activities/Risk Sources	» Construction of the facility (i.e. placement of hard engineered surfaces).
Mitigation: Target/Objective	» Appropriate management of storm water to minimise impacts on the environment.

Mitigation: Action/Control	Responsibility	Timeframe
Appropriately plan hard-engineered erosion protection structures.	Developer Contractor	Planning and design
Design an appropriate storm water management plan for implementation during construction and operation (**Appendix G**). This plan must ensure the suitable handling of storm water within the site.	Developer Contractor	Planning and design
Construction must include appropriate design measures that allow surface and sub-surface movement of water. Drainage measures must promote the dissipation of storm water runoff.	Developer Contractor	Planning and design

Performance Indicator	» Appropriate storm water management plan developed for implementation prior to commencement of construction.
Monitoring	» Minimal erosion.

OBJECTIVE 4: To ensure effective communication mechanisms

On-going communication with affected and surrounding landowners is important to maintain during the construction and operation phases of the development. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» PV panels » Access roads » Power line » Underground cabling » Laydown area » Associated buildings and associated infrastructure (workshop, storage facility, ablution facility, substation, inverters, transformers etc.).
Potential Impact	» Impacts on affected and surrounding landowners and land uses
Activity/risk source	» Activities associated with the PV facility construction » Activities associated with the PV facility operation

Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners » Addressing of any issues and concerns raised as far as possible in as short a timeframe as possible

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement a grievance mechanism procedure for the public (following the guidelines of the grievance mechanism in **Appendix B**) to be implemented during both the construction and operation phases of the facility. This procedure should include details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues.	Developer Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement a grievance mechanism for the construction, operation and closure phases of the project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Developer Contractor O&M Contractor	Pre-construction (construction procedure) Pre-operation (operation procedure)
Liaison with landowners must be undertaken prior to the commencement of construction in order to provide sufficient time for them to plan agricultural activities.	Developer Contractor	Pre-construction
Before construction commences, representatives from the local municipality, community leaders, community-based organisations and the surrounding property owners (of the larger area), must be informed of the details of the contractors, size of the workforce and construction schedules.	Developer Contractor	Pre-construction and construction

Performance Indicator	» Effective communication procedures in place.
Monitoring	» A Public Complaints register must be maintained, by the Contractor to record all complaints and queries relating to the project and the action taken to resolve the issue. » All correspondence should be in writing. » The developer and contractor must keep a record of local recruitments and information on local labour; to be shared with the ECO for reporting purposes during construction.

OBJECTIVE 5: Ensure that all relevant personnel and staff are familiar with the provisions of the EMPr, as well as the conditions of the Environmental Authorisation and requirement for environmental preservation

It is recommended that a pre-construction environmental compliance workshop be undertaken before any construction commences on site. This workshop can be combined with a site handover meeting, but must take place before any activities take place on site and before any equipment is moved onto site. Furthermore, all construction workers should receive an induction presentation, as well as on-going environmental education, awareness and training on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation must be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

Project Component/s	» All components and activity impacts mentioned in the EMPr » All components and activity impacts mentioned in the BA Report
Potential Impact	» Positive impact on creating project awareness » Skills improvement » Project compliance
Activities/Risk Sources	» Compliance workshop » Slide presentations » On-going environmental education and awareness training
Mitigation: Target/Objective	» Environmental sensitivities are taken into consideration and avoided as far as possible, thereby mitigating potential impacts.

Mitigation: Action/Control	Responsibility	Timeframe
Provision should be made in contract and tender documentation to attend a workshop.	» The Main Civil Contractor (including contract manager, site agent and foreman) » The Electrical Contractor (including contract manager, site agent and foreman) » The Consulting Engineers (electrical, civil and structural, whichever applicable) » Project Management	Pre-construction
Induction training must ensure that construction workers/staff understand that no form of wildlife poaching, collecting or other form of disturbance will be permitted on the construction site or the adjacent areas.	EO	Pre-construction
As a minimum, ongoing training should include: » Explanation of the importance of complying with the EMPr; » Explanation of the importance of complying with the Environmental Authorisation; » Discussion of the potential environmental impacts of construction activities; » Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractors Health and Safety Representative); » Explanation of the mitigation measures that must be implemented when carrying out activities; and » Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).	Contractor EO	Pre-construction Construction Operation

Performance Indicator	» Staff Performance » Staff adherence » Staff attendance » The contractor must keep records of all environmental training sessions, including names, dates and the information presented. Details of the environmental induction must be included in the environmental control reports.
Monitoring	» Records of training are kept on site.

CHAPTER 6: MANAGEMENT PROGRAMME: CONSTRUCTION

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

- Ensures that construction activities are appropriately 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.
- Minimises impacts on fauna (including birds) in the study area.
- Minimises the impact on heritage sites should they be uncovered.
- Establish 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, the Developer must ensure that the project 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 EMPr, and the implementation of the EMPr through its integration into the contract documentation. The Developer will retain various key roles and responsibilities during the construction phase.

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to the overall implementation of the EMPr

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Technical Director/Manager, Site Manager, Internal Environmental Officer, Safety and Health Representative, Independent Environmental Control Officer (ECO) and Contractor for the construction phase of this project are as detailed below. Formal responsibilities are necessary to ensure that key procedures are executed. **Figure 6.1** provides an organogram indicating the organisational structure for the implementation of the EMPr.

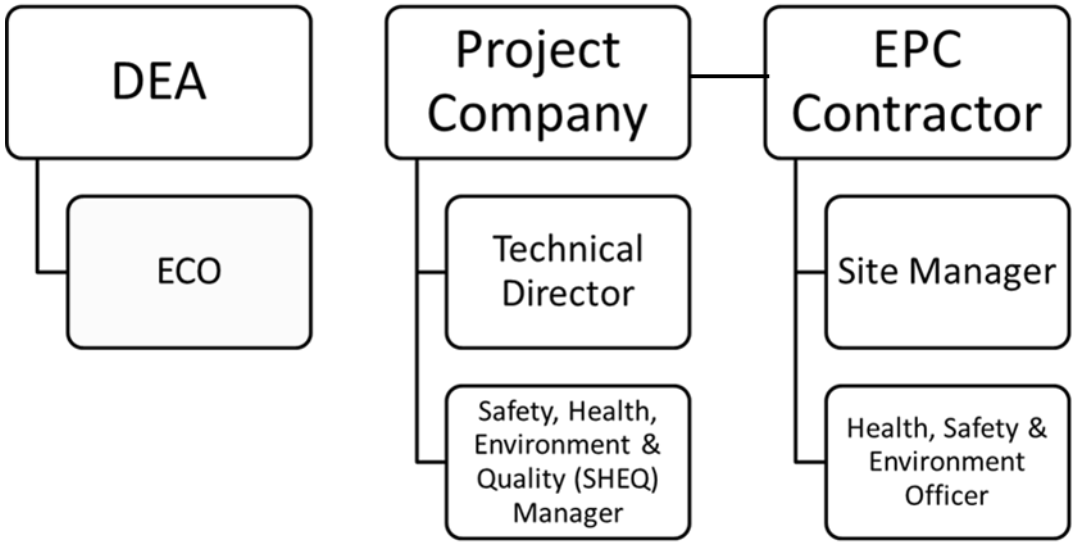


Figure 6.4: Organisational structure for the implementation of the EMPr

Construction 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 the Developer and its Contractor(s) are made aware of all stipulations within the EMPr.
- Ensure that the EMPr is correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes through input from the independent ECO.
- Be fully conversant with the BA for the project, the EMPr, the conditions of the Environmental Authorisation, and all relevant environmental legislation.
- Be fully knowledgeable with the contents of all relevant licences and permits.

Site Manager (The Contractors' on-site Representative) will:

- Be fully knowledgeable with the contents of the BA.
- Be fully knowledgeable with the contents and conditions of the Environmental Authorisation.
- Be fully knowledgeable with the contents of the EMPr.
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with these.
- Have overall responsibility of the EMPr and its implementation.
- Conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Technical Director, the ECO, the Internal Environmental Officer and relevant discipline engineers on matters concerning the environment.
- Be fully knowledgeable with the contents of all relevant licences and permits.
- 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.

An independent **Environmental Control Officer (ECO)** must be appointed by the project proponent prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation. Accordingly, the ECO will:

- Be fully knowledgeable with the contents of the BA.
- Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation.
- Be fully knowledgeable, maintain, update and review the EMPr.
- Be fully knowledgeable of all the licences and permits issued for the site.
- Be fully knowledgeable with the contents of all relevant environmental legislation, and ensure compliance with them.
- Provide environmental induction training to contractors on site prior to commencing of construction activities (this can also be undertaken by the EO).
- 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 EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the site and surrounding areas.
- Compilation of the Environmental Audit Report or Environmental Completion Statement, six months after completion of construction or at a frequency in compliance with the Environmental Authorisation. Reports should be submitted to the relevant authority and the Project Proponent.
- 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.
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO. Reports should be submitted to the relevant authority on a monthly basis.
- Ensure that the compilation of progress reports for submission to the Technical Director, 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.
- Attendance of contractors site meetings.
- ECO site inspections to be undertaken once a month to ensure compliance with the EMPr. The duration of these visits may be increased or decreased at the discretion of the ECO in consultation with the Engineers Representative.
- Submit independent reports to the DEA and other regulating authorities regarding compliance with the requirements of the EMPr, EA and other environmental permits.
- The ECO must keep record of all activities on site, problems identified, transgressions noted and a schedule of tasks undertaken by the ECO (daily diary).

As a general mitigation strategy, the Environmental Control Officer (ECO) should be present for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, facilitate environmental induction with construction staff and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations). Thereafter, weekly site compliance inspections would probably be sufficient, which must be increased if required. However, in the absence of the ECO there should be a designated owner's environmental officer present to deal with any environmental issues that may arise such as fuel or oil spills. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

Contractor's Safety, Health and Environment Representative: The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor. **In some instances, a separate EO may be appointed to support this function.**

The Contractor's Safety, Health and Environment Representative and/or Environmental Officer should:

» Be well versed in environmental matters.
» Understand the relevant environmental legislation and processes and the implementation thereof.
» Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
» Know the background of the project and understand the implementation programme.
» Be able to resolve conflicts and make recommendations on site in terms of the requirements of this Specification.
» Keep accurate and detailed records of all EMPr-related activities on site. The EO shall keep a daily diary for monitoring the site specific activities as per project schedule.
» As a general mitigation strategy, the EO should supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing (i.e. during site establishment, and excavation of foundations) and therefore needs the relevant training/ experience. The EO will have overall responsibility for day-to day environmental management and implementation of mitigations.
» The EO is responsible for reporting to the ECO on the day-to-day on-site implementation of this EMPr and other Project Permits/Authorisations.
» Ensure or otherwise train and induct all contractor's employees prior to commencement of any works.
» Ensure that there is daily communication with the Site Manager regarding the monitoring of the site.
» Compilation of Weekly and Monthly Monitoring Reports to be submitted to the ECO and Site Manager.
» In addition, the EO/ Environmental Representative must act as project liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager, ECO and Contractor(s).

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 EMPr. The Contractor must appoint an **Internal Environmental Officer (EO)** who will be responsible for informing contractor 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 Internal Environmental Officer and Contractor's obligations in this regard include the following:

» Must be fully knowledgeable on all environmental features of the construction site and the surrounding environment.
» Be fully knowledgeable with the contents and the conditions of the Environmental Authorisation.
» Be fully knowledgeable with the contents with the EMPr.
» Be fully knowledgeable of all the licences and permits issued for the site.
» Ensure a copy of the Environmental Authorisation and EMPr is easily accessible to all on-site staff members.
» Ensure contractor employees are familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the proposed facility.

- Ensure that prior to commencing any site works, all contractor employees and sub-contractors must have attended environmental awareness training included in the induction training which must provide staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.
- Manage the day-to-day on-site implementation of this EMPr, and the compilation of regular (usually weekly) Monitoring Reports.
- Keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken, including those of the Independent ECO.
- Inform staff of the environmental issues as deemed necessary by the Independent 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.
- 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 for the sub-contractors to constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained on 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 2: Minimise impacts related to inappropriate site establishment

Project Component/s	» Area infrastructure (i.e. PV panels, substation, inverters, transformers, switchgear and ancillary buildings). » Linear infrastructure (i.e. underground cabling, power line, main access road and internal access roads and fencing).
Potential Impact	» Hazards to landowners and the public. » Damage to indigenous natural vegetation. » Loss of threatened plant species. » Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.
Activities/Risk Sources	» Any unintended or intended open excavations (foundations and cable trenches). » Movement of construction vehicles in the area and on-site. » The viewing of the construction of the PV facilities by visually sensitive observers.

Mitigation: Target/Objective	» 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. » Minimal visual intrusion by construction activities and intact vegetation cover outside of the immediate construction work areas.

Mitigation: Action/Control	Responsibility	Timeframe
Secure site, working areas and excavations in an appropriate manner.	Contractor	Site establishment, and duration of construction
Ensure that vegetation is not unnecessarily cleared or removed during the construction phase.	Contractor	Site establishment, and duration of construction
Any individuals of protected species affected by and observed within the development footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).	EO Specialist	Construction
Contractor's EO must provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the project, when the majority of vegetation clearing is taking place.	EO	Site establishment
Reduce the construction phase through careful logistical planning and productive implementation of resources.	Contractor	Construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	Contractor	Construction
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	Contractor	Construction
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.	Contractor	Construction
Rehabilitate all disturbed areas, construction areas, servitudes, etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.	Contractor	Construction
Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access routes. The development (including the development footprint and contractor's equipment camp) must also be secured and fenced and clearly demarcated.	Contractor	Site establishment, and duration of construction
The construction camp used to house equipment must be located in a disturbed area and must be screened off as far as practical during the entire construction phase.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
The Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
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. Adequate protective measures must be implemented to prevent unauthorised access to the working area and the internal access/haul routes.	Contractor	Construction
Establish appropriately bunded areas for storage of hazardous materials (i.e. fuel to be required during construction).	Contractor	Site establishment
Visual impacts must be reduced during construction through minimising areas of surface disturbance, controlling erosion, using dust suppression techniques, and restoring exposed soil as closely as possible to their original contour and vegetation.	Contractor	Site establishment, and duration of construction
Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing but must be temporarily stored in a demarcated area.	Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers so that the surrounding environment is not polluted (at least one sanitary facility for each sex and for every 30 workers as per the 2014 Construction Regulations; Section 30(1)(b)) at appropriate locations on site). The facilities must be placed within the construction area and along the road.	Contractor	Site establishment, and duration of construction
Ablution or sanitation facilities must not be located within 100m from a watercourse or within the 1:100 year flood.	Contractor	Site establishment, and duration of construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shade cloth) at the site where construction is being undertaken. Separate bins should be provided for general and hazardous waste. Provision should be made for separation of waste for recycling.	Contractor	Site establishment, and duration of construction
Foundations and trenches must be backfilled to originally excavated materials as much as possible. Excess excavation materials must be disposed of only in approved areas, or, if suitable, stockpiled for use in reclamation activities.	Contractor	Site establishment, and duration of construction and rehabilitation

Performance Indicator	» 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. » Vegetation cover on and in the vicinity of the site is intact (i.e. full cover as per natural vegetation within the environment) with no evidence of degradation or erosion.
Monitoring	» An incident reporting system is used to record non-conformances to the EMPr. » 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.

	» Monitoring of vegetation clearing during construction (by contractor as part of construction contract). » Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 3: Appropriate management of the construction site and construction workers

At the peak of construction the proposed project is likely to create a maximum of 800 employment opportunities. These employment opportunities will be temporary, and will last for a period of approximately 12-18 months (i.e. the length of construction). Employment opportunities generated during the construction phase will include low skilled, semi-skilled, and skilled opportunities. Solar PV projects make use of large numbers of unskilled and semi-skilled labour so there will be good opportunity to use local labour from the surrounding towns.

Security personnel will be deployed on a shift basis. Contractors and their employees are expected to be accommodated at existing accommodation facilities in the study area and surrounding towns. 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, the BA Report, and this EMPr, as well as the requirements of all relevant environmental legislation.

Project Component/s	» PV facility. » Contractors' camp. » Laydown areas. » Access roads » Power line. » On-site substation. » Ancillary buildings.
Potential Impact	» 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	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EMPr, leading to unnecessary impacts on the surrounding environment.
Mitigation: Target/Objective	» 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
All construction vehicles must adhere to clearly defined and demarcated roads. No driving outside of the development boundary must be permitted.	Contractor	Construction
The siting of the construction equipment camp/s must take cognisance of any sensitive areas identified in the BA Report. The location of this construction equipment camp/s must be approved by the project EO.	Contractor	Pre-construction
As far as possible, minimise vegetation clearing and levelling for equipment storage areas.	Contractor	Site establishment, and during construction
Open fires on the site for heating, smoking or cooking are not allowed, except in designated areas.	Contractor	Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	Contractor	Construction
Personnel trained in first aid should be on site to deal with smaller incidents that require medical attention.	Contractor	Construction
Practical phased development and vegetation clearing must be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	Contractor	Site establishment, and during construction
Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak. An emergency fire plan (refer to **Appendix J**) must be developed with emergency procedures in the event of a fire.	Contractor	Erection: during site establishment Maintenance: duration of contract
Rehabilitate all disturbed areas at the construction equipment camp as soon as construction is complete within an area.	Contractor	Duration of Contract
Ensure waste storage facilities are maintained and emptied on a regular basis.	Contractor	Site establishment, and duration of construction
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
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
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	Contractor	During construction.
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and associated waste disposed of at a registered/permitted waste disposal site. Ablutions must be removed from site when construction is completed.	Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. No firewood or kindling may be gathered from the site or surrounds.	Contractor and sub-contractor/s	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
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
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	Contractor	Duration of contract
A Method Statement should be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	Contractor	Construction
No disturbance of flora or fauna must be undertaken outside of the demarcated construction area/s.	Contractor and sub-contractor/s	Duration of contract
Fire-fighting equipment and training must be provided before the construction phase commences.	Contractor and sub-contractor/s	Duration of contract
Workers must be aware of the importance of not polluting rivers or wetlands (especially those located within and surrounding the project site) and the significance of not undertaking activities that could result in such pollution, and this awareness must be promoted throughout the construction phase.	Contractor and EO	Pre-construction Construction
Contractors must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor and sub-contractor/s	Pre-construction
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
When possible, no activity should be undertaken at the site between sunset and sunrise, except for security personnel guarding the development.	Contractor and sub-contractor/s	Construction
Prepare a Method Statement pertaining to the clearance of vegetation under solar panels in accordance with the Fire Management Plan (FMP).	Contractor	Construction

Performance Indicator	» The construction camps have avoided highly sensitive areas. » 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 undertaken. » 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 the construction phase.
Monitoring	» Regular audits of the construction camps and areas of construction on site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system should be used to record non-conformances to the EMPr. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » Complaints will be investigated and, if appropriate, acted upon.

OBJECTIVE 4: Maximise local employment and business opportunities associated with the construction phase

Limited employment opportunities will be created during the construction phase, specifically for semi-skilled and unskilled workers. 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 PV facility.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/Risk Sources	» 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.
Enhancement: Target/Objective	» The developer should aim to employ as many low-skilled and semi-skilled workers from the local area as possible. This should also be made a requirement for all contractors.

Mitigation: Action/Control	Responsibility	Timeframe
Employment of local community members (i.e. source labour from within the municipal area focused on the communities in closest proximity to the site) should be undertaken where possible.	Developer, Local Municipality, and Contractor	Duration of construction
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.	Developer, Local Municipality, and Contractor	Pre-construction
An equitable process should be promoted whereby locals and previously disadvantaged individuals (including women) are considered for employment opportunities.	Developer, and Local Municipality	Duration of construction
Create conditions that are conducive for the involvement of entrepreneurs, small businesses, and SMMEs during the construction process.	Developer, Local Municipality, and Contractor	Pre-construction
Identify potential opportunities for local businesses.	Developer	Pre-construction
Tender documentation (if any are required) should contain guidelines for the involvement of labour, entrepreneurs, businesses, and SMMEs from the local sector.	Developer Contractor	Pre-construction
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.	Developer Contractor	Pre-construction
Skills training and capacity building should be embarked upon from the onset of the construction phase and even prior to the construction phase if possible (as mentioned above).	Developer Contractor	Pre-construction and construction
Communication efforts concerning job creation opportunities should refrain from creating unrealistic expectations.	Developer	Pre-construction and construction

Performance Indicator	» 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. » 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. » Employment and business policy document that sets out local employment and targets is completed before the construction phase commences.
Monitoring	» Monitor indicators listed above to ensure that they have been met for the construction phase. » The developer and EPC contractor must keep a record of local recruitments and information on local labour to be shared with the ECO for reporting purposes.

OBJECTIVE 5: Maximise capacity building and skills training, and address economic inequities within the study area

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. Due to the unemployment figures in the study area, it is clear that there would be various unemployed persons in search of employment, even if they can only secure temporary positions. For the lower level skilled positions, outsiders would therefore not have to be externally sourced. Even though all 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 the commencement of construction activities.

Project Component/s	» Availability of required skills in the local communities for the undertaking of the construction activities.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business could be maximised.
Activities/Risk Sources	» Unavailability of locals with the required skills resulting in locals not being employed and labour being sourced from outside the municipal area. » Higher skilled positions might be sourced internationally, where required.
Mitigation: Target/Objective	» 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
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.	The developer, Contractor, and Local Municipality	Duration of construction
A broad-based approach should be followed to identify and involve relevant organisations in identifying people whose skills may correspond with the job specifications.	Contractor, and Local Municipality	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
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.	The developer, Contractor, and Local Municipality	Duration of construction
A proactive consultative skills-audit should be undertaken in the local communities where job creation is currently a significant need.	The developer, and Local Municipality	Pre-construction, and construction
Appropriate training should be provided as per a decided upon 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.	The developer, and Local Municipality	Pre-construction, and construction

Performance Indicator	» 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. » Local SMMEs and/or entrepreneurs awarded the opportunity to become involved in the tender process.
Monitoring	» Developer and or appointed ECO must monitor the indicators listed above to ensure that they have been implemented.

OBJECTIVE 6: Minimise the impact of the inflow of an outside workforce and job seekers into the study area

The inflow of jobseekers to the proposed site would be the greatest during the peak construction period of the PV facility, but also when the construction activities of the other large construction projects are becoming less intensive. 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 lead to conflict between the locals and these outsiders.
Activities/Risk Sources	» Outside workforce and jobseekers come into conflict with the locals, and their presence leads to environmental pollution and the 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. » Locals are not employed, which would increase the probability of conflict occurring.
Mitigation: Target/Objective	» A limited number of outsiders employed. » Pro-active measures in place to deal with possible jobseekers.

Mitigation: Action/Control	Responsibility	Timeframe
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, construction
Local labourers should remain at their existing residences.	Contractor	Construction
On-site security should be active prior to the construction phase.	The developer	Pre- construction
Construction workers should be easily identifiable by wearing uniforms and even identity tags.	Contractor	Construction
Sufficient water and sanitation facilities should be provided for the workers on site during the construction phase.	Contractor	Construction
The construction site should be properly managed to avoid any environmental pollution (due to inadequate water, sanitation and waste infrastructure and services) and littering.	Contractor	Construction
The applicant, local leaders, and the Local Municipality should jointly develop a strategy to minimise the influx of jobseekers to the area.	The developer, local leaders and Local Municipality	Pre-construction, construction
Informal vending stations should not be allowed on or near the construction site.	Contractor	Construction
Develop a transparent communication and recruitment process to minimise the influx of jobseekers to the area.	The developer, and Contractor	Pre-construction
The recruitment process and the use of contractors should be clearly communicated to the local communities.	The developer	Pre-construction

Performance Indicator	» 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	» Appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 7: Minimise impacts related to traffic management and transportation of equipment and materials to site

Increased traffic would include heavy and light vehicles transporting goods and building materials. 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 N18 national road aligned along the eastern boundary of the project site. An increased risk of accidents is a concern, especially if vehicles overtake on the sections of the road where passing is not allowed. Additional pressure on the capacity and road surface of the N18 is also foreseen.

Project Component/s	» Delivery of any component required for the construction phase of the PV facility.
Potential Impact	» 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	» 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 concrete to the site. » Mobile construction equipment movement on-site.
Mitigation: Target/Objective	» Minimise impact of traffic associated with the construction of the facility on local traffic volumes, 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**
Compile and implement a construction period traffic management plan for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted (refer to **Appendix F**).	Contractor	Pre-construction
Gravel roads should be sprayed with water to limit dust creation if feasible and reasonable from an environmental perspective (water scarce area), or an appropriate dust suppressant should be used.	Contractor	Construction
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
Strict vehicle safety standards should be implemented and monitored.	Contractor	Construction
A designated access to the proposed site must be used to ensure safe entry and exit.	Contractor	Pre-construction
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
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
Any traffic delays because of construction traffic must be co-ordinated with the appropriate authorities.	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
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
Appropriate maintenance of all vehicles of the contractor must be ensured.	Contractor	Duration of contract
All vehicles of the contractor travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.	Contractor	Duration of contract
Keep any new hard road surfaces as narrow as possible.	Contractor	Duration of contract
All construction vehicles must remain on properly demarcated roads.	Contractor	Duration of contract
Stagger infrastructure delivery to the site.	Contractor	Duration of contract
Staff and general trips must occur outside of peak traffic periods.	Contractor	Duration of contract
Construction materials to be sourced from local suppliers as much as possible to limit the impact on the regional road network	Contractor	Duration of contract

Performance Indicator	» 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	» Developer and or appointed EO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 8: 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. 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.

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 increased risk etc. Although such perceptions cannot be substantiated or be changed it should be sensitively dealt with. It is therefore 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.

Project Component/s	» PV panels. » Contractors' camps. » Access roads. » Laydown areas. » Power line.
Potential Impact	» Workers not from the local areas are involved in criminal activities and/or fires occur. » Inflow of workers could result in increased safety and security risks.
Activities/Risk Sources	» Theft of construction material. » On-site accidents. » Spread of sexually transmitted diseases. » Littering and environmental pollution.
Mitigation: Target/Objective	» Employment of local labour should be maximised and strict security measures should be implemented at the construction site.

Mitigation: Action/Control	Responsibility	Timeframe
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
Screening of applicants could lessen perceived negative perceptions about the outside workforce.	Contractor	Pre- construction
All staff should undergo a general Health and Safety induction and simplified environmental awareness training session.	Contractor (and sub-contractor/s)	Duration of contract
Safety representatives, managers and workers must be trained in workplace safety. The construction process must be compliant with all safety and health measures as prescribed by the relevant act.	Contractor (and sub-contractor/s)	Duration of contract
Local community members and property owners should be informed of the presence of the outside workforce, the construction schedule, and movement of workers.	Developer and Contractor	Construction
Procedures and measures to prevent, and in worst cases, attend to fires, must be developed in consultation with the surrounding property owners and the Local Municipality.	Developer, Local Municipality, and local communities	Pre- construction and when required
Contact details of emergency services should be prominently displayed on site.	Contractor	Construction
Appropriate fire-fighting equipment must be present on site and members of the workforce should be appropriately trained in using this equipment in the fighting of veld fires.	Contractor	Construction
The construction site should be properly managed to avoid any environmental pollution (due to inadequate water, sanitation and waste infrastructure and services) and littering.	Contractor	Construction
Construction activities should not interfere with the activities on surrounding properties.	Contractor	Construction

Performance Indicator	» No criminal activities and theft of livestock attributable to the construction workforce are reported. » Limited intrusions on surrounding property owners. » No reports from property owners regarding problems with construction activities and workforce.

	» No fires or on-site accidents occur.
Monitoring	» The Developer and appointed ECO must monitor indicators listed above to ensure that they have been implemented.

OBJECTIVE 9: Minimise the potential impact on the daily living and movement patterns

Changes or disruptions in the daily living and working activities of residents, especially the landowner, are most likely to occur during the construction phase and are likely to include the following:

» *Noise and dust pollution* - 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 site as well as main and internal access roads. The intensity of the negative impacts, would, however depend on the wind direction and timing of construction activities.

» *Transportation routes* - The number of vehicles resulting from the proposed project.

Project Component/s	» Construction activities associated with the PV facility and linear infrastructure. » Vegetation clearing. » Delivery of any component required within the construction phase.
Potential Impact	» 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. » Possible increase in dust, noise, and general intrusion.
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	» Limit any negative impacts on the surrounding property owners' daily living and movement patterns. » Minimise impact of traffic associated with the construction of the facility on local traffic volume, existing infrastructure, property owners, animals, and road users. » 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
Adequate parking for all employees, contractors and sub-contractors must be made available and should not impact negatively on neighbouring farmers.	Contractor	Pre-construction and construction
Local labourers should be used during the construction phase to limit the inflow of outsiders to the area.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Compile and implement a traffic management plan (Refer to **Appendix F**) for the site access roads to ensure that no hazards would result from the increased truck traffic and that traffic flow would not be adversely impacted.	Contractor	Pre-construction
Strict vehicle safety standards should be implemented and monitored.	Developer	Construction
Should abnormal loads have to be transported by road to the site, a permit must be obtained from the relevant Provincial Government.	Contractor (or appointed transportation contractor)	Pre-construction
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
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
Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimise impacts on local commuters consideration must be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.	Contractor	Duration of contract
Ensure that any damage to internal roads because of construction activities is repaired before completion of the construction phase.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with suitable material.	Contractor	Duration of contract
Speed of construction vehicles must be restricted, as defined by the contractor.	Contractor	Duration of contract
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 within and outside of the project site.	Contractor	Duration of contract
Dust suppression techniques must be implemented on all exposed surfaces during periods of high wind. Such measures may include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas.	Contractor	Duration of contract

Performance Indicator	» No complaints from affected residents or the community regarding dust or vehicle emissions. » Dust does not cause health (inhaling, eye irritation) and safety risks (low visibility). » Dust suppression measures implemented for all areas 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 the outset of construction phase and up-dated on a monthly basis. » A complaints register must be maintained, in which any complaints from neighbouring farmers will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.
Monitoring	Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods: » Immediate reporting to the Site Manager by personnel of any potential or actual issues with nuisance, dust or emissions. » 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 and non-conformance register must be used to record incidents and non-conformances to the EMPr.

OBJECTIVE 10: Minimisation of the development footprint and disturbance of topsoil

Project Component/s	» PV panels » Underground cabling » Ancillary buildings » Access roads » On-site substation » Power line
Potential Impact	» Impacts on natural vegetation. » Loss of indigenous natural vegetation due to construction activities. » Impacts on soil. » Loss of topsoil
Activity/Risk Source	» Vegetation clearing. » Site preparation and earthworks. » Excavation of foundations. » Construction of the internal access road. » Construction of underground cabling. » Construction of power line and on-site substation. » Site preparation (e.g. compaction). » Foundations or PV panel equipment installation. » Stockpiling of topsoil, subsoil and spoil material.
Mitigation: Target/Objective	» To retain natural vegetation, where possible. » To retain full biological activity and functionality of topsoil. » 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 loss of topsoil. » Minimise spoil material.

Mitigation: Action/Control	Responsibility	Timeframe
In order to minimise impacts on flora, fauna, and ecological processes, the development footprint should be limited.	EO and Contractor	Site establishment and duration of contract
Land clearance must only be undertaken immediately prior to construction activities and unnecessary land clearance must be avoided.	Contractor	Construction
In terms of best practice and for rehabilitation purposes, it is essential that a 150mm layer of topsoil from the building footprints (i.e. the on-site substation and contractor's site camp) be stripped and stockpiled prior to the commencement of construction activities in each area.	Contractor	Site establishment and duration of contract
The extent of clearing and disturbance to the natural vegetation must be kept to a minimum so that impact on flora and fauna is restricted.	Contractor	Site establishment and duration of contract
Areas to be cleared must be clearly marked on-site to eliminate the potential for unnecessary clearing. No vegetation removal must be allowed outside the designated project development footprint.	Contractors in consultation with the EO	Duration of Construction
Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.	EO and Contractor	Site establishment and duration of contract
No-Go areas are to be demarcated with tape and warning signs prohibiting access erected. Plant and vehicle operators must be instructed by the EO on where these No-Go sites are.	EO and Contractor	Construction
Topsoil must be removed and stored separately from subsoil and must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	EO and Contractor	Construction
All fill material must be sourced from a commercial off-site suitable/permitted and authorised source, quarry or borrow pit. Where possible, material from foundation excavations must be used as fill on-site. Permits must be kept on site.	EO and Contractor	Duration of contract
Topsoil and subsoil must be stockpiled separately and replaced according to the correct profile, i.e. topsoil replaced last. Stockpiles must not be situated such that they obstruct natural water pathways and drainage channels.	Contractor	Site establishment and duration of contract
Topsoil stockpiles must not exceed 2m in height.	Contractor	Site establishment and duration of contract
Soil stockpiles must be dampened with dust suppressant or equivalent to prevent erosion by wind.	Contractor	Construction
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. Stockpiles older than 6 months must be enriched before they can be used to ensure the effectiveness of the topsoil.	Contractor	Site establishment and duration of contract
All graded or disturbed areas which will not be covered by permanent infrastructure such as paving, buildings or roads must be stabilised with erosion control mats (geo-textiles) and revegetated.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Ridges and areas which include protected and red data species must be avoided at all costs during construction, unless the necessary permits are obtained.	EO	Pre-construction; Site establishment
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
Topsoil must be stockpiled and managed in terms of the Erosion Management Plan (**refer to Appendix H**).	Contractor	Duration of contract
A site rehabilitation programme must be developed and implemented.	EO and Contractor in consultation with Ecologist	Duration of contract
Topsoil used for rehabilitation purposes should be reused to mitigate disturbed areas and should not be mixed with sub-soils.	EO and Contractor	Rehabilitation; Post-construction

Performance Indicator	» Zero disturbance outside of designated work areas. » Minimise clearing of existing vegetation. » Topsoil appropriately stored.
Monitoring	» Observation of vegetation clearing activities by EO throughout construction phase. » Supervision of all clearing and earthworks. » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 11: Minimise soil degradation and erosion and loss of land capability

The soil on site may be impacted in terms of:

» Uncontrolled run-off relating to construction activity (excessive wetting, uncontrolled discharge, etc.) which will also lead to accelerated erosion;
» Incorrect storage of topsoil;
» Accidental spillages;
» Poor rehabilitation;
» Erosion from rainwater;
» Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere; and
» Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities which will affect soil forming processes and associated ecosystems. Degradation of parent rock is considered low as there are no deep excavations envisaged.

Project Component/s	» PV panels. » Underground cabling. » Ancillary buildings. » Construction of the internal access roads. » Power line. » On-site substation.
Potential Impact	» Soil and rock degradation. » Soil erosion. » Increased deposition of soil into drainage systems.

	» Increased run-off over the site.
Activities/Risk Sources	» Removal of vegetation, excavation, stockpiling, compaction, and pollution of soil. » Creation of impenetrable surfaces. » Bare soils surfaces due to the removal of vegetation. » Earthworks which destroy the natural layers of the soil profiles. » The construction of access roads and PV panels and associated infrastructure which will cover soil surfaces. » Rainfall - water erosion of disturbed areas. » Wind erosion of disturbed areas. » High velocity discharge of water from construction activities.
Mitigation: Target/Objective	» Minimise extent of disturbed areas. » Minimise activity within disturbed areas. » Minimise soil degradation (mixing, wetting, compaction, etc.). » Minimise soil erosion. » Minimise instability of embankments/excavations. » Revegetate, maintain and monitor the site. » Keep the project footprint as small as possible.

Mitigation: Action/Control	Responsibility	Timeframe
Identify disturbed areas and restrict construction activity to these areas.	EO and Contractor	Before and during construction
Any erosion problems within the development area as a result of the construction activities observed must be rectified immediately and monitored thereafter to ensure that they do not re-occur.	EO and Contractor	Construction Operation
All bare areas, resulting from the development, must be re-vegetated with locally occurring species, to bind the soil and limit erosion potential.	EO and Contractor	Construction Rehabilitation
Re-instate as much of the eroded area to its pre-disturbed, "natural" geometry (no change in elevation).	EO and Contractor	Construction Rehabilitation
Roads and other disturbed areas within the development area must be regularly monitored for erosion problems and problem areas must receive follow-up monitoring by the EO to assess the success of the remediation.	EO and Contractor	Construction Rehabilitation
Practical phased development and vegetation clearing should be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	EO and Contractor	Construction
A method statement must be developed and submitted to the engineer to deal with erosion issues prior to bulk earthworks operations commencing.	EO and Contractor	Before and during construction
During construction the contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.	EO and Contractor	During construction
Activity at the site must be reduced after large rainfall events when the soils are wet. No driving off of hardened roads should occur at any time and particularly immediately following large rainfall events.	Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Access roads to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil.	EO and Contractor	Design and construction
Minimise removal of vegetation which adds stability to soil.	EO and Contractor	Construction
Protective measures must be installed where there are possibilities of surface water sheet flow causing erosion.	EO and Contractor	Erection: Before construction Maintenance: Duration of contract
Stabilisation of cleared areas to prevent and control erosion must be actively managed. This includes: Brush cut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, hand seed-sowing of locally-occurring indigenous species, hydroseeding of locally-occurring indigenous species, soil binders and anti-erosion compounds, gabion bolsters and mattresses for flow attenuation, geofabric, hessian cover and log/ pole fencing.	EO and Contractor	Erection: Before construction Maintenance: Duration of contract
Erosion control measures: Run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, gabions or temporary mulching over denuded area as required.	EO and Contractor	Erection: Before construction Maintenance: Duration of contract
Construction of gabions and other stabilisation features must be undertaken to prevent erosion, where deemed necessary.	EO and Contractor	Construction
Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering watercourses and other sensitive areas.	EO and Contractor	Construction
No soil is to be stripped from areas within the site that the contractor does not require for construction works.	EO and Contractor	Construction
Anti-erosion measures such as silt fences must be installed in disturbed areas.	Contractor	Construction
Erosion control measures to be regularly maintained.	EO and Contractor	Construction
Regular monitoring for erosion must take place to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. All erosion problems observed should be rectified as soon as possible as outlined in the Erosion Management Plan (**Appendix H**).	EO and Contractor	Construction and operation

Performance Indicator	» No activity outside demarcated disturbance areas. » Limited soil erosion around site. » No activity in restricted areas.
Monitoring	» Limited level of soil erosion around the site. » Acceptable state of excavations, as determined by the EO. » Monthly inspections of sediment control devices by the EO. » Monthly inspections of surroundings, including washes (outside the development area) by the EO. » An incident reporting system will record non-conformances. » On-going visual assessment of compliance with erosion prevention by Contractor and ECO. » Monitor visual signs of erosion such as the formation of gullies after rainstorms and the presence of dust emissions during wind storms.

	» Any signs of soil erosion on site should be documented (including photographic evidence and coordinates of the problem areas) and submitted to the management team of the project. » Monitor compliance of construction workers to restrict construction work to the clearly defined limits of the construction site to keep footprint as small as possible. Monitoring to be undertaken by the ECO.

OBJECTIVE 12: 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 Source	» Vegetation clearing. » Construction of the internal access roads. » Construction of the power line and on-site substation. » Chemical contamination of the soil by vehicles and machinery. » Operation of construction camps. » Storage of materials required for construction.
Mitigation: Target/Objective	» Minimise footprints of disturbance of vegetation/habitats. » Minimise loss of protected and indigenous vegetation. » Minimise loss of species of conservation concern.

Mitigation: Action/Control	Responsibility	Timeframe
Areas to be cleared must be clearly marked in the field to eliminate unnecessary clearing.	Contractor	Construction
Vegetation clearing must be limited to the required footprint for actual construction works and operational activities. No unnecessary vegetation must be cleared. Mitigation measures must be implemented to reduce the risk of erosion and the invasion of alien species.	Contractor	Construction
Limit unnecessary impacts on surrounding natural vegetation, e.g. driving around in the veld, use access roads only.	Contractor	Construction
Maintain and augment woody vegetation within the existing 300m wide buffer between the development and the N18 and on the northern boundary of the project site.	Contractor	Construction
Monitor and control declared weeds and invader species. Continually monitor the re-emergence of these species and manage according to the invasive species management plan.	Contractor	Duration of construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation. » Limited impacts on areas of identified and demarcated sensitive habitats/vegetation. » Ecosystem fragmentation is kept to a minimum. » Ecosystem functionality is retained and any degradation prevented. » Re-establishment of rescued species.
Monitoring	» 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 EMPr. » Where vegetation is not re-establishing itself in areas where surface disturbance occurred, soil samples must be collected, analysed for pH levels, electrical conductivity (EC) and major plant nutrient levels (calcium, magnesium, potassium) and sodium. » When vegetation re-establishment still remains unsatisfactory, the bulk density of the soil should be measured with a penetrometer to determine whether compaction is an issue. » The results must be submitted to a professional soil or agricultural scientist for recommendations on the amendment of the issue to ensure that the vegetation cover is established and erosion prevented.

OBJECTIVE 13: Minimise the establishment and spread of alien invasive plants

Major factors contributing to invasion by alien invader plants include high disturbance activities and negative grazing practices. Consequences of this may include:

» Loss of indigenous vegetation;
» Change in vegetation structure leading to change in various habitat characteristics;
» Change in plant species composition;
» Change in soil chemical properties;
» Loss of sensitive habitats;
» Loss or disturbance to individuals of rare, endangered, endemic, and/or protected species;
» Fragmentation of sensitive habitats;
» Change in flammability of vegetation, depending on alien species; and
» Hydrological impacts due to increased transpiration and runoff.

Project Component/s	» Solar facility. » Subcontractor's camps. » Power line. » On-site substation. » Laydown areas. » Temporary access roads.
Potential Impact	» Invasion of natural vegetation surrounding the site by declared weeds or invasive alien species. » Impacts on soil. » Impact on faunal habitats. » Degradation and loss of agricultural potential.
Activities/Risk Sources	» Transport of construction materials to site. » Movement of construction machinery and personnel. » Site preparation and earthworks causing disturbance to indigenous vegetation. » Construction of site access roads. » Stockpiling of topsoil, subsoil and spoil material. » Routine maintenance work – especially vehicle movement.
Mitigation: Target/Objective	» To significantly reduce the presence of weeds and eradicate alien invasive species. » To avoid the introduction of additional alien invasive plants to the site. » To avoid distribution and thickening of existing alien plants in the site.

	» To complement existing alien plant eradication programs in gradually causing a significant reduction of alien plant species throughout the site.

Mitigation: Action/Control	Responsibility	Timeframe
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
When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur.	Contractor	Construction and operation
No plant propagules (seeds or otherwise) are to be introduced onto the site. Any soil to be introduced to the site must be from sites assessed by the IAP practitioner.	Contractor	Construction and operation
Clearing methods must themselves aim to keep disturbance to a minimum.	Contractor	Construction
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
Immediately control any alien plants that become established using registered control methods.	Contractor	Construction and operation
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	Contractor	Construction and rehabilitation

Performance Indicator	» For each alien species: number of plants and aerial cover of plants within the site and immediate surroundings.
Monitoring	» On-going monitoring of area by EO during construction. » On-going monitoring of area by environmental manager during operation. » Annual audit of development footprint 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 site. » The environmental manager/site agent should be responsible for driving this process. » Reporting frequency depends on legal compliance framework.

OBJECTIVE 14: Minimise the impacts on fauna

Faunal species are indirectly affected by the overall loss of habitat as direct construction impacts can often limit the movement of individuals from the path of construction.

With respect to any threatened species, the loss of individuals or localised populations is unlikely to lead to a change in the conservation status of the species, unless they are classified as threatened. In the case of threatened animal species, the loss of a population or individual could lead to a direct change in its conservation status. This may arise if the proposed infrastructure is located where it will affect such individuals or populations or the habitat that they depend on. Consequences may include fragmentation of populations of affected species, reduction in area of occupancy of affected species, and loss of genetic variation within the affected species.

Project Component/s	» PV facility. » Power line. » On-site substation. » Contractor's camp and laydown area.
Potential Impact	» Loss or displacement of fauna. » 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 PV equipment installation. » Mobile construction equipment. » Underground cabling and road 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
The extent of clearing and disturbance to the natural vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	Contractor	Site establishment and duration of contract
Site access should be controlled and no unauthorised persons should be allowed onto the site.	Contractor	Site establishment and duration of contract
Any fauna directly threatened by the construction activities must be removed to a safe location by a suitably qualified person.	Suitably qualified person	Construction
The collection, hunting or harvesting of any plants or animals at the site must be strictly forbidden. Personnel must not be allowed to wander off of the demarcated construction site.	Contractor	Construction
All construction vehicles must adhere to a low speed limit (30km/h) to avoid collisions with susceptible species such as snakes and tortoises.	Contractor	Construction Operation
A firebreak must be maintained around the development boundary to avoid potential fires occurring within the facility from spreading	Contractor	Construction Operation

Mitigation: Action/Control	Responsibility	Timeframe
into the surrounding grasslands, subsequently posing a threat to faunal species occurring within the surrounding environment.		
All hazardous materials must be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site must be cleaned up in the appropriate manner as related to the nature of the spill.	Contractor	Construction Operation
The intentional harming or killing of animals will be prohibited through on-site supervision and worksite rules.	Contractor	Construction Operation
Implement a faunal removal plan/ rescue plan with designated/ trained personnel and contact numbers.	Contractor	Duration of contract
All cable trenches, excavations, etc., through sensitive areas should be excavated carefully in order to minimise damage to surrounding areas and biodiversity. » The trenches must be checked on a daily basis for the presence of trapped animals. » Any animals found must be removed by a suitably qualified person in a safe manner, unharmed, and placed in an area where the animal will be comfortable. » All mammal, large reptiles and avifauna species found injured during construction must be taken to a suitably qualified veterinarian or rehabilitation centre to either be euthanized in a humane manner or cared for until it can be released again.	Contractor	Duration of construction
All personnel must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.	Contractor	Duration of construction

Performance Indicator	» No 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 EO 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 EMPr.

OBJECTIVE 17: Appropriate Storm water Management

The storm water management is covered under the Pre-construction and Construction Phase management, but aspects thereof will also continue into the Operation Phase. It is important that the engineers and contractors responsible for the detailed design of the storm water systems take into account the requirements of this EMPr, as well as the recommendations by the participating specialists.

A basic Storm water Management Plan is attached as **Appendix G**.

Project Component/s	» Alteration of natural areas into hard surfaces impacting on the local hydrological regime of the area.
Potential Impact	» Poor storm water management and alteration of the hydrological regime.
Activities/Risk Sources	» Placement of hard engineered surfaces.
Mitigation: Target/Objective	» Reduce the potential increase in surface flow velocities and the impact on dry riverbeds and the localised drainage systems.

Mitigation: Action/Control	Responsibility	Timeframe
Any storm water within the site must be handled in a suitable manner, i.e. clean and dirty water streams around the plant and install stilling basins to capture large volumes of run-off, shade nets, or gabions trapping sediments and reduce flow velocities.	Contractor and Engineers	Construction
Storm water structures should as far as possible not concentrate runoff by piped systems or similar.	Contractor	Construction
All roads and other hardened surfaces must have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.	Contractor	Construction
Storm water control systems must be implemented to reduce erosion on the project site.	Contractor	Construction
New access roads within the site are to be constructed according to design and contract specifications. The access routes must have suitable storm water management plans and erosion control measures.	Contractor	Construction
Drainage measures must promote the dissipation of storm water run-off.	Contractor	Construction
All storm water mitigation measures must be implemented according to the Storm water Management Plan (**Appendix G**).	Contractor	Construction

Performance Indicator	» No impacts due to runoff » Minimise erosion as far as possible
Monitoring	» Appropriate storm water management system in place

OBJECTIVE 18: Protection of heritage resources

During the field assessment 34 significant heritage sites were identified within the project site and included:

» Twenty one find spots;
» One erosion site exposing Stone Age materials;
» Five significant Stone Age sites;
» One pan like site with extensive exposure of Stone Age artefacts;
» Three historical sites;
» One burial ground;
» One area of stacked stones; and
» One possible grave.

Of these sites listed above, four sites fall within the 300m power line corridor (Alternative 1) and none within the development footprint of the solar energy facility. As these sites have a site significance of GP.B, a 20m no-go area has been established around each site.

Stratigraphic and geographical distribution of Late Archaean stromatolites within the Schmidtsdrift Subgroup and Vryburg Formation of the Transvaal Supergroup is present in the development footprint. The Schmidtsdrift Subgroup has a high palaeontological sensitivity, while the Vryburg Formation has a moderate palaeontological sensitivity. Stromatolite assemblages are recorded within both the Schmidtsdrift Subgroup and Vryburg Formation. The project site consists of characteristic flat-lying terrain and vegetation cover of grassy thornveld. Poorly- to fairly well-preserved stromatolite assemblages were recorded within the project site. Excavations and site clearance will involve substantial excavations into the superficial sediment cover as well as locally into the underlying bedrock. These excavations will modify the existing topography and may disturb damage, destroy or permanently seal-in fossils at or below the ground surface that are then no longer available for scientific research. any fossils occurring within the development area are potentially scientifically and culturally significant and any negative impact on them would be of high significance.

Project Component/s	» PV panels. » Transformers and switchgear etc. » Underground cabling. » Ancillary buildings. » Access roads. » Power line. » On-site substation.
Potential Impact	» Heritage objects or artefacts found on site are inappropriately managed or destroyed.
Activity/Risk Source	» Site preparation and earthworks. » Foundations or plant equipment installation. » Mobile construction equipment movement on site. » Power line construction activities.
Mitigation: Target/Objective	» To ensure that any heritage objects found on site are treated appropriately and in accordance with the relevant legislation.

Mitigation: Action/control	Responsibility	Timeframe
Areas required to be cleared during construction must be clearly marked in the field to avoid unnecessary disturbance of adjacent areas.	Contractor in consultation with Heritage Specialist	Pre-construction
A chance find procedure must be developed and implemented in the event that archaeological or palaeontological resources are found. In the case where the proposed development activities bring these materials to the surface, work must cease and SAHRA must be contacted immediately.	Contractor Heritage specialist	Pre-construction Construction
Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow if they find sites. All staff should also be familiarised with procedures for dealing with heritage objects/sites.	Contractor, ESA and heritage specialist	Duration of contract, particularly during excavations
Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	Heritage Specialist	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
Project employees and any contract staff must maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.	Contractor	Duration of contract
In the event that fossils resources are discovered during excavations, immediately stop excavation in the vicinity of the potential material. Mark (flag) the position and also spoil material that may contain fossils. Inform the site foreman and the EO. EO to inform the developer, the developer contacts the standby archaeologist and/or palaeontologist. EO to describe the occurrence and provide images by email.	Contractor and EO	Construction
Burial Grounds and graves: » Demarcate sites with a 50-meter buffer and avoid them. » Stakeholder engagement will need to be implemented. » If this is not possible a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations.	Contractor Heritage specialist	Construction
Historical structures: » The sites should be avoided with at least a 20 m buffer if activities should occur near them. » If the sites will be affected directly, they will need to be documented before a destruction permit can be applied for at the provincial heritage resource authority (North West Province). » If any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on.	Contractor Heritage specialist	Construction
Archaeological resources: » The sites should be avoided with at least a 20 m buffer if activities should occur near them. » If the sites 035, 036, (037,038, 039) and 041 will be affected directly, the sites will need to be documented with sites being fully excavated before a destruction permit can be applied for at the provincial heritage authority (North West Province). » In the event that any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on mitigation.	Contractor Heritage specialist	Construction

Performance Indicator	» No disturbance outside of designated work areas. » All heritage items located are dealt with as per the legislative guidelines.
Monitoring	» Observation of excavation activities by the EO 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 (if required). » An incident reporting system will be used to record non-conformances to the EMPr.

OBJECTIVE 19: Appropriate handling and management of waste

The construction of the PV 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 PV facility will include:

» general solid waste
» hazardous waste
» inert waste (rock and soil)
» liquid waste (including grey water and sewage)

An integrated Waste Management Plan is attached as **Appendix I**.

Project Component/s	» PV Facility. » Underground cabling. » Ancillary buildings. » Access roads. » Power line. » On-site substation.
Potential Impact	» 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	» Packaging. » Other construction wastes. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation.
Mitigation: Target/Objective	» 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
Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities.	Contractor	Duration of contract
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	Contractor	Duration of contract
Waste disposal at the construction site must be avoided by separating and trucking out of waste.	Contractor	Construction
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	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control.		
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
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	Contractor	Duration of contract
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled.	Contractor	Duration of contract
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
No liquid waste, including grey water, may be discharged into any water body or drainage line. All sewage disposal to take place at a registered and operational wastewater treatment works. Slips of disposal to be retained as proof of responsible disposal.	Contractor	Maintenance: duration of contract within a particular area
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials. The onus is on the Contractor to identify and interpret the applicable legislation. Hazardous waste to be disposed of at a registered landfill site.	Contractor	During and post construction.
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
SABS approved spill kits to be available and easily accessible.	Contractor	Duration of contract
Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	Contractor	Duration of contract
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	Contractor	Duration of contract
In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	Contractor	Duration of construction
Ensure that the below ground storage of the septic tank can withstand the external forces of the surrounding pressure. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from driving around the tank.	Contractor	Duration of construction
Under no circumstances may waste be burnt on site.	Contractor	Duration of construction
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
Waste manifests must be provided for all waste streams generated on site, and must be kept on site.	Contractor	Duration of construction

Mitigation: Action/Control	Responsibility	Timeframe
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at a landfill licensed in terms of section 20(b) of the National Environmental Management Waste Act, 2008 (Act 59 of 2008).	Contractor	Duration of construction
Upon the completion of construction, the area must be cleared of potentially polluting materials. Spoil stockpiles must also be removed and appropriately disposed of or the materials re-used for an appropriate purpose.	Contractor	Completion of construction
Upon the completion of construction, all sanitation facilities (including chemical toilets) must be removed, as well as the associated waste to be disposed of at a registered waste disposal site.	Contractor	Completion of construction

Performance Indicator	» 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	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » 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 EMPr.

OBJECTIVE 20: Appropriate handling and storage of chemicals, hazardous substances

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

Project Component/s	» Laydown areas. » Subcontractors' camps. » Temporary hydrocarbon and chemical storage areas.
Potential Impact	» Release of contaminated water from contact with spilled chemicals. » Generation of contaminated wastes from used chemical containers. » Soil pollution.
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of area and linear infrastructure. » Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks. » Accidental spills of hazardous chemicals. » Polluted water from wash bays and workshops.

	» Pollution from concrete mixing and damaged PV panels.
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. » Prevent and contain hydrocarbon leaks. » Undertake proper waste management. » Store hazardous chemicals safely in a bunded area.

Mitigation: Action/Control	Responsibility	Timeframe
Any liquids stored on site, including admixtures, fuels and lubricants, should be stored in accordance with applicable legislation.	Contractor	Pre-construction and implement for duration of Contract
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Contractor	Duration of contract
Losses of fuel and lubricants from the oil sumps and steering racks of vehicles and equipment must be contained using a drip tray with plastic sheeting filled with absorbent material when not parked on hard standing.	Contractor	Construction Operation
Establish an appropriate Hazardous Stores which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This should include but not be limited to: » Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund; » Protected from the elements, » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents.	Contractor	Pre-construction and implement for duration of Contract
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. Where required, a NEMA Section 30 report must be submitted to DEA within 14 days of the incident.	Contractor	Duration of contract
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
Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	Contractor	Duration of contract
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must	Contractor	Duration of contract

Mitigation: Action/Control	Responsibility	Timeframe
take place, an appropriate drip tray must be used to contain any fuel or oils.		
All stored fuels to be maintained within a bund and on a sealed surface as per the requirements of SABS 089:1999 Part 1.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
Construction machinery must be stored in an appropriately sealed area.	Contractor	Duration of contract
Oily water from bunds at the substation must be removed from site by licensed contractors.	Contractor	Duration of contract
Fuel storage areas must be inspected regularly to ensure bund stability, integrity, and function.	Contractor	Duration of contract
The storage of flammable and combustible liquids such as oils will be in designated areas which are appropriately bunded, and stored in compliance with Material Safety Data Sheets (MSDS) files.	Contractor	Duration of contract
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
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
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
An effective monitoring system must be put in place to detect any leakage or spillage of all hazardous substances during their transportation, handling, installation and storage.	Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	Contractor	Construction

Performance Indicator	» No chemical spills outside of designated storage areas. » No water or soil contamination by spills. » No complaints received regarding waste on site or indiscriminate dumping. » Safe storage of hazardous chemicals. » Proper waste management.
Monitoring	» 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 EMPr. » On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures. » Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record volume and nature of spill, location and clean-up actions. » Monitor maintenance of drains and intercept drains weekly. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs.

	» Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually.

OBJECTIVE 21: Limit direct and indirect terrestrial faunal and avifaunal impacts

Project component/s	Construction activities and human presence.
Potential Impact	» Disturbance of faunal communities due to construction as well as poaching and hunting risk from construction staff. » Decrease in avifaunal populations. » Decrease in avifaunal species diversity. » Displacement of birds from their habitat.
Activity/risk source	Habitat transformation during construction, site fencing, and the presence of construction and operation personnel.
Mitigation: Target/Objective	» Low faunal impact during construction and operation. » To minimise injury and death to avifaunal species. » To minimise loss of avifaunal populations. » To minimise loss of species diversity.

Mitigation: Action/control	Responsibility	Timeframe
Environmental induction must be given to all staff regarding the impacts on fauna and avifauna. This should include an adequate briefing for site personnel on the possible important (Red Data) species occurring and/or nesting in the area and the procedures to be followed.	Contractor	Construction and Operation
Mark sections of the lines in High to Medium-High sensitive areas with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart, and must be installed as soon as the conductors are strung. These line marking devices include spiral vibration dampers, strips, Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls	Contractor	Construction and operation
All internal electrical reticulation should be placed underground, while the alignment of the power line and substation should be placed parallel to existing lines, as far as possible.	Contractor	Construction
EO to monitor and enforce ban on hunting, collecting or harvesting etc. of all plants and animals or their products.	EO	Construction and Operation
Contractors and working staff should stay within the development area and movement outside these areas especially into avian micro-habitats must be restricted.	Contractor	Construction
Any bird nests are found during the construction period must be reported to the Environmental Officer (EO) and where deemed necessary an appropriate buffer should be placed around the nest. If any of the Red Data species identified in the Avifaunal	EO	Construction

Mitigation: Action/control	Responsibility	Timeframe
Impact Assessment are observed to be roosting and/or breeding in the vicinity of the development footprint, the EO must be notified and where deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such a buffer, the ECO may contact an avifaunal specialist for advice.		
Bird friendly structure with a bird perch (as per standard Eskom guidelines) must be used for the tower infrastructure. All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents. Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components. Bird deterrent devices such as "bird diverters" and "flappers" can be used.	Contractor	Construction
All construction vehicles must adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.	Contractor	Construction
Apply bird deterrent devices at selective areas (for example at the corners and middle part of the facility) to the PV panels to discourage birds from colonising the infrastructure or to discourage birds from constructing nests. These could include visual or bio-acoustic deterrents such as highly reflective rotating devices, anti-perching devices such as bird guards, scaring or chasing activities involving the use of trained dogs or raptors and/or netting.	Contractor	Construction
All new power lines should be fitted with bird flight diverters.	Contractor	Construction
Insulate live components at support structures.	Contractor	Construction

Performance Indicator	» Minimum disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for fauna and avifauna. » Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring	» Monitoring for compliance during the construction phase. All incidents to be noted.

OBJECTIVE 22: Effective management of concrete batching plants

A considerable amount of concrete is required during the construction of the PV facility. In this regard there could be a need to establish a batching plant within the site. Turbid and highly alkaline wastewater, dust emissions and noise are the key potential impacts associated with concrete batching plants. Concrete batching plants, cement, sand and aggregates can produce dust. Potential pollutants in batching plant wastewater and storm water include cement, sand, aggregates, chemical additive mixtures, fuels and lubricants.

Project component/s	» Batching plant. » Storm water system.
Potential Impact	» Dust emissions

	» Release of contaminated water » Generation of contaminated wastes from used chemical containers » Inefficient use of resources resulting in excessive waste generation
Activity/risk source	» Operation of the batching plant » Packaging and other construction wastes » Hydrocarbon use and storage
Mitigation: Target/Objective	» To ensure that the operation of the batching plant does not cause pollution to the environment or harm to persons

Mitigation: Action/control	Responsibility	Timeframe
Concrete batching plants should be sited such that impacts on the environment or the amenity of the local community from noise, odour or polluting emissions are minimised.	Contractor	Construction phase
Where there is a regular movement of vehicles, access and exit routes for heavy transport vehicles should be planned to minimise noise and dust impacts on the environment.	Contractor	Construction phase
Good maintenance practices must be implemented, including regular sweeping to prevent dust build-up.	Contractor	Construction phase
The prevailing wind direction should be considered to ensure that bunkers and conveyors are sited in a sheltered position to minimise the effects of the wind.	Contractor	Construction phase
Aggregate material should be delivered in a damp condition, and water sprays or a dust suppression agent should be correctly applied to reduce dust emissions and reduce water usage.	Contractor	Construction phase
Process wastewater collected from the entire batching plant area should be diverted to an impervious settling tank or pond. Water should be reused in the concrete batching process, where possible.	Contractor	Construction phase
A contaminated storm water system must be specifically designed for the batching plant to ensure effective control of contaminated storm water originating from the batching plant and prevent contamination to the surrounding environment.	Contractor	Construction phase
Where possible, waste concrete should be used for construction purposes at the batching plant or project site.	Contractor	Construction phase
Artificial wind barriers must be installed around the batching plant to minimise air, land and water pollution. Wind barriers must enclose the entire batching plant and not allow fly ash and other dusts from moving through the barrier. The artificial barrier must be maintained daily for any defects and corrected when necessary.	Contractor	Pre-construction/ construction
The concrete wash bay structure must be constructed in a double brick arrangement or be reinforced to maintain its integrity throughout operation.	Contractor	Construction phase

Performance Indicator	» No complaints regarding dust » No water or soil contamination by chemical spills » No complaints received regarding waste on site or indiscriminate dumping

Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase. » 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 and non-conformance register will be used to record incidents and non-conformances to the EMPr. » The appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 23: Enhancement of positive social impacts and mitigation of negative social impacts

During the construction phase of the Moeding Solar PV Facility, both positive and negative impacts are expected to occur. Positive impacts can be enhanced through the application of enhancement measures and negative impacts can be mitigated and the significance reduced through the application of mitigation measures.

Project component/s	» Construction of the Moeding Solar PV Facility and the associated infrastructure.
Potential Impact	» Opportunities and benefits associated with the creation of local employment and skills development to be maximised. » Potential local economic benefits. » Population changes resulting in additional pressure on resources, service delivery, infrastructure maintenance and social dynamics during the construction phase as a result of an influx of construction workers into the area. » Decline on local economic and social infrastructure and services as well as a rise in social conflicts from an influx of jobseekers. » Increase in traffic disruptions, safety hazards, and impacts on movement patterns of local community as well as impact on private property due to the upgrade of the existing road and heavy vehicle traffic in the local area. » Intrusion impacts could impact the area's "sense of place". » Heavy vehicles and construction activities can generate noise and dust impacts. » Increase in crime due to influx of non-local workforce and jobseekers into the area.
Activity/risk source	» Construction activities. » Construction procurement practice employed by the EPC Contractor. » Developers investment and procurement plans. » Influx of construction workers and jobseekers. » Construction activities affecting daily living and movement patterns. » Safety and security risks associated with construction activities.
Mitigation: Target/Objective	» The developer should aim to fill as many of the low-skilled and semi-skilled positions from the local area as possible. This should also be made a requirement for all contractors. » Increase in the procurement of goods and services, especially within the local economy. » To avoid or minimise the potential impact on local infrastructure, services and local communities and their livelihoods. » To avoid and minimise the potential noise and dust impacts associated with construction activities.

Mitigation: Action/control	Responsibility	Timeframe
The perimeter of the construction site is to be appropriately secured to prevent any unauthorised access to the site. The fencing of the site is to be maintained throughout the construction period.	Contractor	Pre-construction Construction
Employ local contractors that are compliant with Broad Based Black Economic Empowerment (B-BBEE) criteria, as much as possible.	Contractor	Construction
Adopt a local employment policy to maximise the opportunities made available to the local labour force.	Contractor	Construction
In the recruitment selection process, a minimum percentage of women must be employed	Contractor	Pre-construction Construction
Set realistic local recruitment targets for the construction phase.	Contractor	Construction
Source as much goods and services as possible from the local area. Engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers where feasible.	Contractor	Construction
Implement a grievance and communication system for community issues and appoint a Community Liaison Officer (CLO) for implementing the grievance mechanism. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community and landowners to express any complaints or grievances with the construction process.	Contractor	Construction
A 'locals first' policy should be utilised for employment opportunities, especially for semi and low-skilled job categories.	Contractor	Construction
Working hours must be kept during daylight hours as far as possible during the construction phase, and / or as any deviation that is approved by the relevant authorities.	Contractor	Construction
Implement penalties for drivers of heavy vehicles for reckless driving or speeding as a way to enforce compliance with traffic rules.	Contractor	Construction
Ensure that damage caused by construction related traffic/ project activities to the existing roads is repaired before the completion of the construction phase.	Contractor	Construction
Infrastructure such as fencing and gates along access routes must be maintained in the present condition or repaired if disturbed due to construction activities.	Contractor	Construction
Ensure roads utilised are either maintained in the present condition or restored if disturbed from construction activities.	Contractor	Construction
Limit noise generating activities to normal daylight working hours and avoid undertaken construction activities on weekends and public holidays.	Contractor	Construction
The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods where feasible.	Contractor	Construction
Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.		
Communication, complaints and grievance channels must be implemented and contact details of the CLO are to be provided to the local community.	Contractor	Construction

Performance Indicator	» Employ as much local semi and unskilled labour as possible given the number of positions available. » Local goods and services are purchased from local suppliers where feasible. » Community Liaison Officer is appointed. » Ensure no recruitment takes place on site. » Control/removal of loiters. » Vehicles are roadworthy, inspected regularly and speed limits are adhered to. » Ensure that there are traffic warning signs along access roads, and ensure that these are well illuminated (especially at night). » Roads and electric fencing are maintained or improved upon if disturbed from project activities. » Limit noise generating activities. » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase. » Enforcement of strict speeding limits. » CLO available for community grievances and communication channel. » The construction site is appropriately secured with a controlled access system.
Monitoring	» The Developer and Contractor must keep a record of local recruitments and information on local labour to be shared with the Environmental Control Officer (ECO) for reporting purposes.

OBJECTIVE 24: Minimise impacts on water resources

Project component/s	» Construction activities » Storage of dangerous goods. » Ablution facilities.
Potential Impact	» 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.
Activity/risk source	» Fuelling, usage and maintenance of construction vehicles. » Cement batching and usage. » Labourer using ablution facilities. » Use of any chemicals or hazardous materials/dangerous goods during construction.
Mitigation: Target/Objective	» No incidents related to spills of chemicals and hazardous materials. » No release of contaminated water in watercourses including streams and wetlands. » No misbehaviour of construction workers (i.e. ablution activities, washing).

Mitigation: Action/control	Responsibility	Timeframe
Implement strict management of all hazardous materials/dangerous goods used on site. Spilled fuel, oil or	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
grease is retrieved where possible, and contaminated soil removed, cleaned and replaced. Contaminated soil to be collected by the Contractor and disposed of at a waste site designated for this purpose.		
Ensure strict management of potential sources of pollution (hydrocarbons from vehicles and machinery, cement during construction, etc.). Bunded containment to be provided below and around any fuel storage containers.	Contractor	Construction
Construction equipment is to be checked daily (by Contractor) to ensure that no fuel spillage takes place from construction vehicles or machinery.	Contractor	Construction
Proper use of chemical toilets should be strictly enforced.	Contractor	Construction
No activities shall be allowed to encroach into a watercourse or wetland/stream.	Contractor	Construction
If any concrete mixing takes place on site, this is to be done on a board or plastic sheeting, which is to be removed from the site once concreting is completed; or in areas to be covered by further construction.	Contractor	Construction
Sand, stone and cement are stored in demarcated areas, and are covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	Contractor	Construction
Any excess sand, stone and cement must be removed from site at the completion of the construction period.	Contractor	Construction
Implement strict management of all hazardous materials/dangerous goods used on site. Spilled fuel, oil or grease is retrieved where possible, and contaminated soil removed, cleaned and replaced. Contaminated soil to be collected by the Contractor and disposed of at a waste site designated for this purpose.	Contractor	Construction
No activities may be allowed outside of the development area, and especially within the identified wetland areas. These areas are regarded as no-go areas.	Contractor	Construction
Apart from linear activities that are allowed, no other activities and infrastructure may be allowed or placed within the recommended wetland buffer areas whose natural vegetation cover should be maintained.	Contractor	Construction
Any areas disturbed during the construction phase should be encouraged to rehabilitate as fast and effective as possible and were deemed necessary by the ECO or Contractor's EO, artificial rehabilitation (e.g. re-seeding with collected or commercial indigenous seed mixes) should be applied in order to speed up the rehabilitation process in critical areas (e.g. steep slopes and unstable soils).	Contractor	Construction
No unnecessary vegetation clearance may be allowed and vegetation should be allowed to persist under and around the PV panels once operational.	Contractor	Construction

Performance Indicator	» No major preventable spillages are recorded
Monitoring	» Monitor management measures in place for potentially hazardous materials

OBJECTIVE 25: 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	» Solar field. » Temporary access roads. » Batching plant. » Vegetation clearing.
Potential Impact	» Dust generation 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
Activity/risk source	» Clearing of vegetation and topsoil. » Excavation, grading, scraping, levelling, digging, drilling and associated construction activities. » Transport of materials, equipment, and components on internal access roads and the associated increased traffic. » Vehicle movement on gravel 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 » Suppression of dust, pollution control and minimise dust generation

Mitigation: Action/control	Responsibility	Timeframe
Implement appropriate dust suppression measures on a regular basis along the gravel access road and on the proposed site.	Contractor	Construction
Use of dust suppressants on roads and limit development of new roads.	Contractor	Lifetime of the facility
Areas to be cleared in a progressive manner. Road surfaces and other infrastructure to be constructed as soon as possible after vegetation clearing in order to minimise exposed ground surfaces, specifically roads which carry traffic.	Contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
Roads must be maintained to a manner that will ensure that nuisance to the community from dust emissions from road or vehicle sources is not visibly excessive.	Contractor	Site establishment and construction
Appropriate dust suppressant must be applied on all gravel roads associated, exposed areas and stockpiles associated to the project as required to minimise/control airborne dust.	Contractor	Duration of contract
Height of spoil/subsoil/overburden (not topsoil) stockpiles to be limited to 3m. Spoil and subsoil to be compacted and watered down as necessary.	Contractor	Duration of contract
Haul vehicles moving outside the construction site carrying material that can be wind-blown will be covered with suitable material tarpaulins shade cloth.	Contractor	Duration of contract
Speed of construction vehicles must be restricted, as defined by the Health and Safety Manager.	Contractor	Duration of contract
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
Disturbed areas must be re-vegetated as soon as practicable in line with the progression of construction activities.	Contractor	Completion of construction
Vehicles and equipment must be maintained in a road-worthy condition at all times.	Contractor	Duration of contract
All vehicles and containers used for moving waste must encapsulate the waste, which prevents the waste from causing odours and from escaping or blowing around the site. This will also prevent leachate material from spilling out of the containers, which is hazardous.	Contractor	Duration of contract
The batching plant must be enclosed with shade cloth to reduce the amount of cement particulates/ particles released into the environment.	Contractor	Duration of contract
Roads must be maintained to a manner that will ensure that nuisance to the neighbouring farmers from dust is not visibly excessive.	Owner/Contractor	Site establishment and construction

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Visual presence of dust and air quality » Dust does not cause health (inhaling, eye irritation) and safety risks (low visibility). » Dust suppression measures implemented for all heavy vehicles that require such measures during the construction phase. » 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. » A complaints register must be maintained, in which any complaints from neighbouring farmers will be logged, and thereafter complaints will be investigated and, where appropriate, acted upon.

Monitoring	Monitoring must be undertaken to ensure emissions are not exceeding the prescribed levels via the following methods: » 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 register and non-conformance must be used to record incidents and non-conformances to the EMPr. » A complaints register must be used to record grievances by the public.

6.3 Detailing Method Statements

OBJECTIVE 26: 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 EMPr 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:

» Responsible person/s;
» 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.

Method Statements must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the method statement: pre, during and post construction include:

- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc. Including a site camp plan indicating all of these).
- Preparation of the site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e.: comply strictly to licence and legislation requirements and restrictions).
- Storm water method statement.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management.
- Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into the surrounding environment. Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into an existing facility where possible. Where no facilities are available, grey water runoff must be controlled to ensure no seepage into the surrounding environment occurs.
- Dust and noise pollution:
  - Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
  - Procedure to control dust at all times on the site, access roads and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.
- Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply).
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at storage and handling areas.
  - All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
- Fire prevention and management measures on site.
- Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary).
  - Rehabilitation, re-vegetation process and bush clearing.
- Incident and accident reporting protocol.
- General administration
- Designate access road and the protocols while roads are in use.
- Requirements on gate control protocols.

The Contractor may not commence the activity covered by the Method Statement until it has been approved by the Site Manager (with input from the ECO), 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. Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.

6.4 Awareness and Competence: Construction Phase

OBJECTIVE 27: 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 all personnel involved in the project are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The ECO is responsible for monitoring compliance pre, during and post construction. 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:

- All Employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of Method Statements are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity are to have copies of the relevant Method Statements and be aware of the contents thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff are aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr 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 an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
    - 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.
- All sub-contractors must have a copy of the EMPr and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- Contractors and main sub-contractors should have a basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the site.
- Awareness of any other environmental matters, which are deemed to be 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.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

6.4.1 Environmental Awareness and Induction Training

The EO, in consultation with the contractor, shall ensure that all construction workers receive an induction presentation, as well as on-going environmental education and awareness, on the importance and implications of the EMPr and the environmental requirements it prescribes. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.

As a minimum, induction training should include:

» Explanation of the importance of complying with the EMPr;
» Explanation of the importance of complying with the Environmental Authorisation;
» Discussion of the potential environmental impacts of construction activities;
» Awareness regarding sensitivities on the site, including sensitive plant species (including the use of visual aids and on-site identification);
» The benefits of improved personal performance;
» Employees' roles and responsibilities, including emergency preparedness (this should be combined with this induction, but presented by the contractor's Health and Safety Representative);
» Explanation of the mitigation measures that must be implemented when carrying out their activities; and
» Explanation of the specifics of this EMPr and its specification (no-go areas, etc.).

Environmental Awareness Training must take the form of an on-site talk and demonstration by the EO/ECO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO/ECO on site. Proof of awareness training should be kept on record. Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's Environmental Officer and should include discussing the developer's environmental policy and values, the function of the EMPr and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO/ECO on site.

6.4.2 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least twice a month) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and ones recommended by the on site EO and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

6.5 Monitoring Programme: Construction Phase

OBJECTIVE 28: 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 EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr 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, the Developer will determine and stipulate the period and frequency of monitoring required in consultation with relevant stakeholders and authorities. The Technical Director/ Project Manager will ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process would be to 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 in communication and feedback to authorities and stakeholders

All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DEA in terms of the Environmental Authorisation, must be submitted to the Director: Compliance Monitoring of the Department.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

6.5.1. Non-Conformance Reports

All supervisory staff including Foremen, Engineers, and the ECO must be provided the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

6.5.2. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to the Director: Compliance Monitoring at DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out. The contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the DEA regarding waste related activities.

6.5.3. Audit Reports

The holder of the Environmental Authorisation must, for the period during which the Environmental Authorisation and EMPr remain valid, ensure that project compliance with the conditions of the Environmental Authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the DEA.

An environmental internal audit must be conducted and submitted every 3 months and an external audit must be conducted once a year. An annual audit report must be compiled and submitted to DEA until the completion of the construction and rehabilitation. This report must be compiled in accordance with Appendix 7 of the EIA Regulations, 2014, as amended, and indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

6.5.4. Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities. The report must be submitted within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr.

CHAPTER 7: MANAGEMENT PROGRAMME: REHABILITATION

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 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	» Construction camps. » Laydown areas. » Access roads. » Ancillary buildings. » Power line. » On-site substation.
Potential Impact	» Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion and increased runoff, and the requirement for on-going management intervention.
Activity/Risk Source	» Temporary construction areas » Temporary access roads/tracks » Other disturbed areas/footprints
Mitigation: Target/Objective	» 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
Implement Revegetation and Rehabilitation Plan (**refer to Appendix D**).	Contractor	Following execution of the works
All temporary facilities, equipment, and waste materials must be removed from site as soon as construction is completed.	Contractor	Following execution of the works
All temporary fencing and danger tape must be removed once the construction phase has been completed.	Contractor	Following completion of construction activities in an area
The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these must be cleaned up.	Contractor	Following completion of construction activities in an area

Mitigation: Action/Control	Responsibility	Timeframe
No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	Contractor	Following completion of construction activities in an area
All hardened surfaces within the construction equipment 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
Temporary roads must be closed and access across these blocked. The temporary access roads must be rehabilitated.	Contractor	Following completion of construction activities in an area
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
Remove all temporary works.	Contractor	Following completion of construction activities in an area
Topsoil from all excavations and construction activities must be salvaged and reapplied during reclamation.	Contractor	Following completion of construction activities in an area
Disturbed areas must be rehabilitated as soon as possible after construction and local indigenous plants must be used to enhance the conservation of the existing natural vegetation on site.	Contractor	Following completion of construction activities in an area
Where disturbed areas are not to be used during the operation of the proposed power line and on-site substation, these areas must be rehabilitated/re-vegetated with appropriate natural indigenous 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. No exotic plants must be used for rehabilitation purposes.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Disturbed areas containing no infrastructure and hard surfaces must be rehabilitated with natural vegetation as soon as possible to avoid the potential of erosion and invasion with alien plants. The area should be monitored (responsibility of EO) on a weekly basis throughout the construction phase and on a monthly basis thereafter and to the point where the area has rehabilitated to a satisfactory level.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Re-vegetated areas may need to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Proponent in consultation with rehabilitation specialist	Post-rehabilitation
Erosion control measures should be used in sensitive areas such as areas with steep slopes.	Proponent in consultation with EO and rehabilitation specialist (if required)	Post-rehabilitation
On-going alien plant monitoring and removal must be undertaken on all areas of natural vegetation on an annual basis.	Proponent	Post-rehabilitation

Mitigation: Action/Control	Responsibility	Timeframe
It can be anticipated that invasive species and weeds will germinate on rehabilitated soils; these need to be hand-pulled before they are fully established and/or reaching a mature stage where they can regenerate. Where invasive shrubs re-grow, they will have to be eradicated according to the Working for Water specifications.	Contractor/ Developer	Construction/ Operation
A site rehabilitation programme should be implemented and this will be developed in collaboration with specialists following completion of construction	Contractor in consultation with Specialist	Duration of contract

Performance Indicator	» All portions of the 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	» 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.

CHAPTER 8: OPERATION MANAGEMENT PROGRAMME

Overall Goal: To ensure that the operation of the PV 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 facility in a way that:

» Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
» Enables the 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.
» Establish an environmental baseline for solar energy sites in South Africa.

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

8.1. Objectives

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

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the Operations Manager, and Environmental Manager for the operation phase of this project are detailed below.

The **Operations Manager** will:
» Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

The **Technical/SHEQ Manager** will:

» Develop and Implement an Environmental Management System (EMS) for the PV facility and associated infrastructure.
» Manage and report on the facility's environmental performance.
» Maintain a register of all known environmental impacts and manage the monitoring thereof.
» Conduct internal environmental audits and co-ordinate external environmental audits.
» Liaise with statutory bodies such as the National and Provincial Department of Environmental Affairs (DEA) on environmental performance and other issues.
» Conduct environmental training and awareness for the employees who operate and maintain the PV facility.

- Compile environmental policies and procedures.
- Liaise with interested and affected parties on environmental issues of common concern.
- Track and control the lodging of any complaints regarding environmental matters.

The Technical/SHEQ Manager must provide fourteen (14) days written notification to the DEA that the operation phase will commence.

OBJECTIVE 2: 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	» Rehabilitated areas. » Areas along the perimeter fence. » Areas between PV panels. » Topsoil stockpile areas. » Power line.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat. » Environmental integrity of the site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activities/Risk Sources	» Movement of employee vehicles within and around the 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
Rehabilitate disturbed areas should the previous attempt be unsuccessful.	O&M Contractor	Operation
Shading from PV panels may prevent or slow down the re-establishment of some desirable vegetation species, therefore re-establishment should be monitored and species composition adapted if vegetation fails to establish sufficiently.	O&M Contractor	Operation
It may be necessary to routinely trim vegetation growing between the PV panel rows and/or the plant screens planted along the development site fencing. This is to avoid shading of the panels and reduce fire risks.	O&M Contractor	Operation
Soil surfaces where no revegetation seems possible will have to be covered with gravel or small rock fragments to increase porosity of the soil surface, slow down runoff and prevent wind and water erosion.	O&M Contractor	Operation
Any vegetation clearing that needs to take place as part of the maintenance activities must be done in an environmentally	Contractor	Operation and maintenance

Mitigation: Action/Control	Responsibility	Timeframe
friendly manner, including avoiding the use of herbicides and using manual clearing methods wherever possible.		
Vehicle movements must be restricted to designated access roads.	O&M Contractor	Operation
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	O&M Contractor	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (bags, logs), silt fences, storm water catch-pits, and shade nets).	O&M Contractor	Operation
Develop and implement an appropriate stormwater management plan for the operation phase of the power line and on-site substation.	O&M Contractor	Operation
Site access should be controlled and only authorised staff and contractors should be allowed on-site.	O&M Contractor	Operation
Notice boards stating that fauna and flora may not be collected, harvested etc. should be placed at the entrances to the site.	O&M Contractor	Operation
Any maintenance activities should avoid listed plant species and strive to keep the footprint as low as possible.	O&M Contractor	Operation
No herbicides should be used and if vegetation clearing needs to take place, this should be done by hand.	O&M Contractor	Operation
An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	O&M Contractor	Operation
The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	O&M Contractor	Operation
A botanist and/or ecologist familiar with the vegetation of the area should monitor the rehabilitation success and alien plant removal on an annual basis. The monitoring should be undertaken until the rehabilitation is considered adequate and sufficient.	Specialist	Annual monitoring until successful re-establishment of vegetation in an area
All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.	O&M Contractor	Operation
Spill kits must be kept on-site.	O&M Contractor	Operation
A botanist familiar with the vegetation of the area should monitor the rehabilitation success and alien plant removal on an annual basis.	Developer in consultation with Specialist	Annual monitoring until successful re-establishment of vegetation in an area
A faunal/ avifauna incident register must be maintained on site.	O&M Contractor SHEQ Manager	Operation
Implement an animal removal plan to ensure safety of workers and fauna.	O&M Contractor	Operation
Regular monitoring for erosion post-construction to ensure that no erosion problems have developed as a result of the past disturbance.	O&M Contractor	Operation
All declared alien species must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983). There must be an alien species	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
monitoring and eradication program to prevent encroachment of these problem plants for the duration of the operation. The eradication and monitoring program must aim to address alien plant problems within the whole site, not just the development footprint.		
Regular monitoring must be undertaken for alien plant invasion, which is likely to occur in previously disturbed areas or in areas receiving runoff from the hardened surfaces of the infrastructure.	O&M Contractor	Operation
The washing of panels during maintenance must be done with biodegradable soaps to avoid soil contamination and the poisoning of small animals.	O&M Contractor	Operation
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities must be removed to a safe location.	O&M Contractor	Operation

Performance Indicator	» Acceptable level of soil erosion around site, as determined by the site manager. » Acceptable level of increased siltation in washes, as determined by the site manager. » No further disturbance to vegetation or terrestrial faunal habitats. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by the facility manager and environmental manager. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas. » Inspections of the site on a bi-annual basis. » Storm water Management Plan.

OBJECTIVE 3: Protection of avifauna from collision and electrocution

During the operation, the threat of collision with the existing Eskom power lines, as well as proposed 132kV power line, is the biggest potential threat to avifauna, particularly sensitive, collision prone species that may occur in the study area. The threat of electrocution while perching on the power line and associated infrastructure serves as a threat to certain sensitive species, depending on the power line structures implemented.

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

Mitigation: Action/Control	Responsibility	Timeframe
Any electrocution and collision events that occur should be recorded, including the species affected and the date. If repeated collisions occur within the same area, then further mitigation and avoidance measures may need to be implemented.	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
If birds are nesting on the infrastructure of the facility and cannot be tolerated due to operational risks of fire, electrical short, soiling of panels or other problems, birds must be prevented from accessing nesting sites by using mesh or other manner of excluding them. Birds must not be shot, poisoned or harmed as this is not an effective control method and has negative ecological consequences. Birds already with eggs and chicks must be allowed to fledge their chicks before nests are removed. Should issues with birds persist, an avifaunal specialist should be consulted for advice on further mitigation.	O&M Contractor	Operation
Bird nests must be removed when nest-building attempts are noticed.	O&M Contractor	Operation
Reduce or minimise the use of outdoor lighting to avoid attracting birds to the lights or to reduce potential disorientation to migrating birds.	O&M Contractor	Operation
Power line inspections should be ongoing for the operational life of the line. Report avifauna mortalities (number locality and species) to the Electrical Energy Mortality Register at the Endangered Wildlife Trust.	O&M Contractor	Operation

Performance Indicator	» Minimal collision, or electrocution events. » Reduced statistical detection/observation of bird mortalities.
Monitoring	» Observation of electrocution or collision events with the power line. » Monitor power line servitude for mortalities.

OBJECTIVE 4: Minimise soil degradation, erosion and alien plant invasion

The soil on site may be impacted in terms of:

» *Soil degradation including erosion* - by wind and water and subsequent deposition elsewhere is of a concern across the entire site.
» *Uncontrolled run-off* - relating to construction activity (excessive wetting, uncontrolled discharge, etc.) will also lead to accelerated erosion and possible sedimentation of drainage systems outside of the project site during operation.
» *Degradation* - of the natural soil profile due to pollution.

Project Component/s	» PV facility » Ancillary buildings. » Access roads. » Power line.
Potential Impact	» Soil degradation. » Soil erosion. » Increased deposition of soil into drainage systems. » Increased run-off over the site.

Activities/Risk Sources	» 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	» Ensure rehabilitation of disturbed areas is maintained. » Minimise soil degradation (i.e. wetting). » Minimise soil erosion. » Ensure continued stability of embankments/excavations.

Mitigation: Action/Control	Responsibility	Timeframe
Ensure dust control on site through wetting of denuded areas or the use of an appropriate dust suppression measure.	O&M Contractor	Operation
Monitor the area below and around the panels regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation efforts accordingly.	O&M Contractor	Operation
Runoff may have to be specifically channelled or storm water adequately controlled to prevent localised rill and gully erosion.	O&M Contractor	Operation
Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, stormwater catch-pits, and shade nets).	O&M Contractor	Operation
Control depth of excavations and stability of cut faces/sidewalls.	O&M Contractor	Operation
Regular monitoring by the operation and maintenance team for alien plants at the site should occur and could be conducted simultaneously with erosion monitoring.	O&M Contractor	Operation
Regular monitoring of the site (minimum of twice annually) to identify possible areas of erosion is recommended, particularly after large summer thunder storms have been experienced.	O&M Contractor	Operation
Roads and other disturbed areas within the development site should be regularly monitored for erosion problems and problem areas should receive follow-up monitoring to assess the success of the remediation.	O&M Contractor	Operation

Performance Indicator	» Acceptable level of soil erosion around the site, as determined by the site manager. » Minimal issues related to alien plant invasion
Monitoring	» Inspections of the site on a bi-annual basis. » Water management plan developed and implemented.

OBJECTIVE 5: Minimise dust and air emissions

During the operation 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	» Hard engineered surfaces. » On-site vehicles.
Potential Impact	» Dust and particulates from vehicle movement to and on-site. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles.
Activities/Risk Sources	» Re-entrainment of deposited dust by vehicle movements. » Wind erosion from unsealed roads and surfaces. » Fuel burning vehicle and construction engines.
Mitigation: Target/Objective	» 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
Roads must be maintained that will ensure that nuisance to the community from dust is not visibly excessive.	O&M Contractor	Operation
Appropriate dust suppression must be applied to the roads as required to minimise/control airborne dust.	O&M Contractor	Operation
Speed of vehicles must be restricted on site, as defined by the Environmental Manager.	O&M Contractor	Operation
Vehicles and equipment must be maintained in a road-worthy condition at all times.	O&M Contractor	Operation

Performance Indicator	» No complaints from affected residents or community regarding dust or vehicle emissions. » Dust suppression measures implemented where required. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed.
Monitoring	» 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 EMPr.

OBJECTIVE 6: Ensure the implementation of an appropriate fire management plan and general management measures during the operation phase

The following recommendations below must be considered with regards to fire protection on site:

» Alien Invasive species should be completely eradicated in order to decrease the fire risk associated with the site.
» Cigarette butts may not be thrown in the veld, but must be disposed of correctly. Designated smoking areas must be established with suitable receptacles for disposal.
» In case of a fire outbreak, contact details of the local fire and emergency services must be readily available.
» Contractors must ensure that basic firefighting equipment is available on site as per the specifications defined by the health and safety representative / consultant.

» The fire risk on site is a point of discussion that must take place as part of the environmental induction training prior to commencement of construction.
» The contractor must also comply with the requirements of the Occupational Health and Safety Act with regards to fire protection.

The following below can be used as a guide for appropriate fire management (also refer to **Appendix J**):

Project Component/s	» Operation and maintenance of the PV 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 PV 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
Provide adequate firefighting equipment on site and establish a fire-fighting management plan during operation (**refer to Appendix J**).	O&M Contractor	Operation
Provide fire-fighting training to selected operation and maintenance staff.	O&M Contractor	Operation
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	O&M Contractor	Operation
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.).	Contractor	Operation
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.	O&M Contractor	Operation
Contact details of emergency services should be prominently displayed on site.	O&M Contractor	Operation
Road borders must be regularly maintained to ensure that vegetation remains short and that they therefore serve as an effective firebreak.	O&M Contractor	Operation
Staff and general trips to the site should occur outside of peak traffic periods.	O&M Contractor	Operation
Should panels be required to be replaced, the following will apply: » Materials and panels are to be stored within the previously disturbed construction laydown area. No disturbance of areas outside of these areas should occur. » Full clean-up of all materials must be undertaken after the removal and replacement of the solar panel arrays and associated infrastructure is complete, and disturbed areas appropriately rehabilitated. » Most of the materials used for solar panel systems can be recycled. The majority of the glass and semiconductor materials can be recovered and re-used or recycled.	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site. » Waste material which cannot be recycled shall be disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.		

Performance Indicator	» Firefighting equipment and training provided before the operation phase commences. » Appropriate fire breaks in place.
Monitoring	» The O&M operator must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 7: 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 is anticipated to have minimal negative social impacts in this regard.

The operations at the PV facility 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.

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	» Possible negative impacts of activities undertaken on site on the activities of surrounding property owners. » Impact on farming activities on site.
Potential Impact	» Possible limited intrusion impact on surrounding landowners. » Visual impact of facility degradation and vegetation rehabilitation failure.
Activities/Risk Sources	» Traffic to and from site could affect daily living and movement patterns of surrounding residents. » Viewing of the facility by observers in a negative light due to degradation and rehabilitation failure.
Mitigation: Target/Objective	» Effective management of the facility. » Mitigation of intrusion impacts on property owners. » Mitigation of impact on farming activities. » Well maintained and neat facility.

Mitigation: Action/Control	Responsibility	Timeframe
Effective management of the facility to avoid any environmental pollution focusing on water, waste and sanitation infrastructure and services.	Contractor and Security Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Vehicle movement to and from the site should be minimised as far as possible.	Contractor and Security Contractor	Operation
Infrastructure such as fencing and/or gates must be maintained in the present condition or repaired if disturbed due to project activities.	O&M Contractor	Operation
Maintain the general appearance of the facility as a whole, including the PV panels, servitudes and the ancillary structures.	O&M Contractor	Operation
Maintain roads and servitudes to forego erosion and to suppress dust.	O&M Contractor	Operation
Monitor rehabilitated areas, and implement remedial action as and when required.	O&M Contractor	Operation

Performance Indicator	» 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 in surrounding areas. » Well maintained and neat facility with intact vegetation on and in the vicinity of the facility.
Monitoring	» The O&M operator should be able to demonstrate that the facility is well managed without environmental pollution and that the above requirements have been met. » Monitoring of the entire site on an ongoing basis (by the O&M operator).

OBJECTIVE 8: Appropriate handling and management of hazardous substances, waste and dangerous goods

The operation of the PV 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 sewage waste.

Project Component/s	» On-site substation. » PV facility. » Operation and maintenance staff. » Workshop / control room.
Potential Impact	» 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	» Substation, transformers, switchgear and supporting equipment. » Workshop / control room.
Mitigation: Target/Objective	» 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
Hazardous substances (such as used/new transformer oils, etc.) must be stored in sealed containers within a clearly demarcated designated area.	O&M Contractor	Operation
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	Owner O&M Operator	Operation and maintenance
Storage areas for hazardous substances must be appropriately sealed and bunded.	O&M Contractor	Operation
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.	O&M Contractor	Operation
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 bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	O&M Contractor	Operation and maintenance
Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor, The developer / waste management contractor	Operation
Waste handling, collection, and disposal operations must be managed and controlled by a waste management contractor.	Contractor, waste management contractor	Operation
All sewage disposal to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	O&M Contractor	Operation
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.	O&M Contractor	Operation
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	O&M Contractor	Operation
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	O&M Contractor	Operation

Performance Indicator	» 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	» 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.

	» Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the O&M operator. » All appropriate waste disposal certificates accompany the monthly reports.

OBJECTIVE 9: Enhancement of positive social impacts and mitigation of negative social impacts

During the operation phase of the Moeding Solar PV Facility, both positive and negative impacts are expected to occur. Positive impacts can be enhanced through the application of enhancement measures and negative impacts can be mitigated and the significance reduced through the application of mitigation measures.

Project Component/s	» Operational PV facility
Potential Impact	» Loss of opportunities to stimulate production and employment of the local economy
Activity/Risk Source	» Labour practices employed during operation
Mitigation: Target/Objective	» Maximise local community employment benefits in the local economy

Mitigation: Action/Control	**Responsibility**	**Timeframe**
Adopt a local employment policy to maximise the opportunities made available to the local labour force.	O&M operator	Operation
Establish vocational training programs for the local labour force to promote the development of skills	O&M operator	Operation

Performance Indicator	» Percentage of workers that were employed from local communities » Number of people attending vocational training on an annual basis
Monitoring	» The O&M operator must keep a record of local recruitments and information on local labour for reporting purposes

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The PV facility is expected to have a lifespan of 25 - 30 years (i.e. with routine maintenance). The infrastructure would only be decommissioned and rehabilitated once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the PV facility considered in the BA process would comprise the disassembly and replacement of the individual components 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 are not repeated in this section.

» ***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. laydown areas, construction platform) and the mobilisation of construction equipment.

» ***Disassemble and Remove Infrastructure***
Disassembled components will be reused, recycled, or disposed of in accordance with regulatory requirements.

9.1. Objectives

Within a period of at least 12 months prior to the decommissioning of the site, a Decommissioning Method Statement must be prepared and submitted to the Local Planning Authority, as well as the Provincial and National Environmental Authority. This method statement must cover site restoration, soil replacement, landscaping, conservation, and a timeframe for implementation. Furthermore, this decommissioning must comply with all relevant legal requirements administered by any relevant and competent authority at that time.

The objectives of the decommissioning phase of the proposed project are to:

» Follow a process of decommissioning that is progressive and integrated into the short- and long-term project plans that will assess the closure impacts proactively at regular intervals throughout project life.
» Implement progressive rehabilitation measures, beginning during the construction phase.
» Leave a safe and stable environment for both humans and animals and make their condition sustainable.
» Return rehabilitated land-use to a standard that can be useful to the post-project land user.
» Where applicable, prevent any further soil and surface water contamination by maintaining suitable storm water management systems.
» Maintain and monitor all rehabilitated areas following re-vegetation, and if monitoring shows that the objectives have been met, apply for closure.

9.2. Approach to the Decommissioning Phase

It is recommended that planning of the decommissioning of the project and rehabilitation of the site should take place well in advance (at least two years) of the planned decommissioning activities. Important factors that need to be taken into consideration are detailed below.

Two possible scenarios for this decommissioning phase are detailed below:

SCENARIO 1: TOTAL DECOMMISSIONING OF PV FACILITY.

If the decision is taken at the end of the project lifespan to totally decommission the facility, i.e. make the land available for an alternative land use, the following should take place:

- All concrete and imported foreign material must be removed from the PV facility i.e. panels, support structures etc.;
- The holes where the panel support structures are removed must be levelled and covered with subsoil and topsoil;
- Infrastructure not required for the post-decommissioning use of the site must be removed;
- Access roads and servitudes not required for the post-decommissioning use of the site must be rehabilitated. If necessary, an ecologist should be consulted to give input into rehabilitation specifications;
- Tracks that are to be utilised for the future land use operations should be left *in-situ*. The remainder of the tracks to be removed (ripped) and topsoil replaced;
- All ancillary buildings and access points are to be removed unless they can be used for the future land use;
- The underground electric cables are to be removed if they cannot be used in the future land use;
- All material (cables, PV Panels etc.) must be re-used or recycled wherever possible;
- The competent authority may grant approval to the owner not to remove the landscaping and underground foundations;
- The site must be seeded with locally sourced indigenous vegetation to allow revegetation of the site; and
- Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.

SCENARIO 2: PARTIAL DECOMMISSIONING OF ENERGY FACILITY.

Should more advanced technology become available it may be decided to continue to use the site as a PV facility. Much of the existing infrastructure is likely to be re-used in the upgraded facility. In this case, all infrastructure that will no longer be required for the upgraded facility must be removed as described for scenario 1. The remainder of the infrastructure should remain in place or upgraded depending on the requirements of the new facility. Any upgrades to the facility at this stage must comply with relevant legislation.

9.2.1. Identification of structures for post-closure use

Access roads should be assessed in conjunction with the future land users to determine if these could be used. Where not required, these access roads should be decommissioned and rehabilitated.

9.2.2. Removal of infrastructure

All infrastructure must be dismantled and removed. Inert material must be removed from site and disposed of at a suitably registered landfill site. The PV facility components must be removed and recycled where possible or disposed of at a suitably registered landfill site. All foundations must be removed to a depth of 1m. Hard surfaces must be ripped to a depth of 1m and vegetated.

9.2.3. Soil rehabilitation

The steps that should be taken during the rehabilitation of soils are as follows:

- The deposited soils must be ripped to ensure reduced compaction;
- An acceptable seed bed should be produced by surface tillage;
- Restore soil fertility;
- Incorporate the immobile fertilisers in to the plant rooting zone before ripping; and
- Apply maintenance dressing of fertilisers on an annual basis until the soil fertility cycle has been restored.

9.2.4. Establishment of vegetation

The objective is to restore the project site to a self-sustaining cycle, i.e. to realise the re-establishment of the natural nutrient cycle with ecological succession initiated.

The objectives for the re-vegetation of reshaped and top-soiled land are to:

- Prevent erosion;
- Restore the land to the agreed land capability;
- Re-establish eco-system processes to ensure that a sustainable land use can be established without requiring fertilizer additions; and
- Restore the biodiversity of the area as far as possible.

9.2.5. Maintenance

Established vegetation requires regular maintenance. If the growth medium consists of low-fertility soils, then regular maintenance will be required until the natural fertility cycle has been restored.

9.2.6. Monitoring

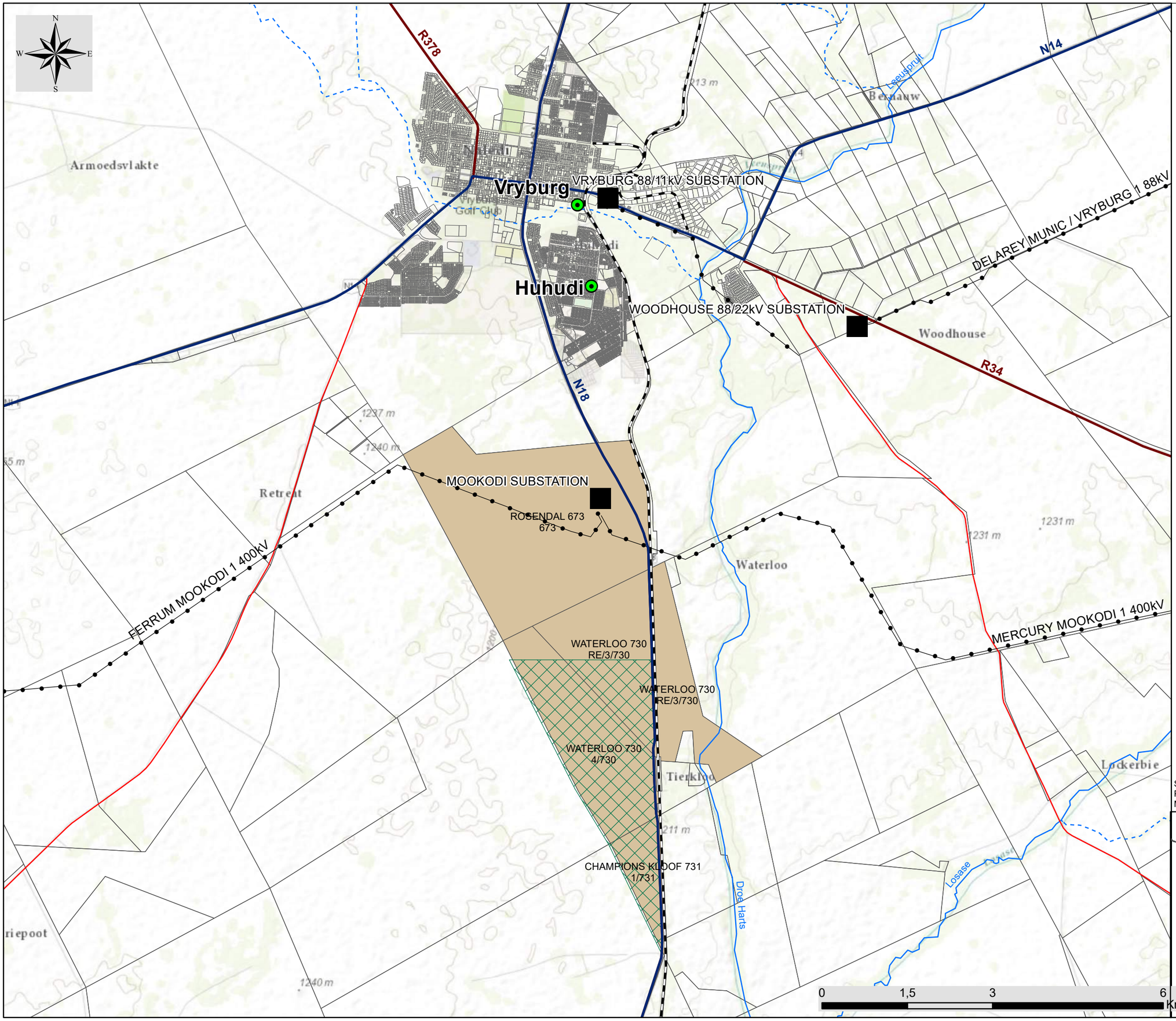
The purpose of monitoring is to ensure that the objectives of rehabilitation are met and that the rehabilitation process is followed. The physical aspects of rehabilitation should be carefully monitored during the progress of establishment of desired final ecosystems.

The following items should be monitored continuously:
- Erosion status;
- Vegetation species diversity; and
- Faunal re-colonisation.

APPENDIX K(A):
LAYOUT AND SENSITIVITY MAPS

Moeding Solar PV Facility and associated infrastructure, North West Province

Locality Map



Legend

- Town
- Eskom Substation
- Railway
- National Route
- Regional Road
- Main Road
- Non-perennial River
- Perennial River
- Project Site
- Affected Property
- Farm Portion

savannah environmental

Scale: 1:62 500
Projection: LO25
Map Ref: Moeding Regional Map 18.12.2018

Moeding Solar PV Facility, North West

Layout Map

MOOKODI SUBSTATION

ROSENDAL 673
673

WATERLOO 730
RE/3/730

WATERLOO 730
4/730

WATERLOO 730
RE/3/730

CHAMPIONS KLOOF 731
1/731

N18

N18

Waterloo

Tierkloof

Droe Harts

1212 m
1218 m
1214 m
1217 m
1209 m
1200 m

0 0,5 1 2 Km

Legend

- Eskom Substation
- National Route
- Mookodi - Magopela 132kV Power Line (to be constructed)
- Railway
- Non-perennial River
- Perennial River
- Development_Area (436,6ha)
- Project Site (642ha)
- Affected Property

Layout:

- Internal Access Road
- Power Line Alternative 2
- 300m Corridor for Power Line Alternative 1
- On-site Substation
- Inverters
- O&M Building
- Permanent Compound Area
- Solar Field

Scale: 1:21 281
Projection: LO25
Map Ref: Moeding Prelim
Sensi Map 27.06.2018

savannah environmental

Moeding Solar PV Facility, North West Province

Environmental Sensitivity Map - Development Area

N18

Droe Harts

Tierkloof

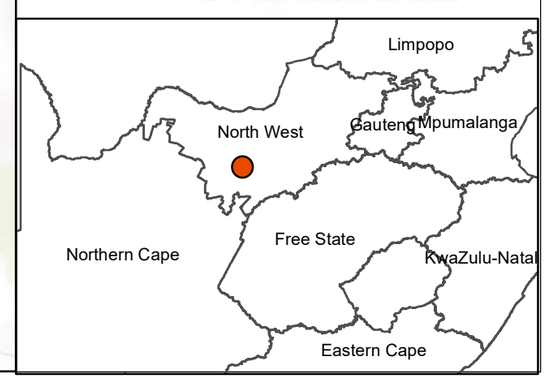
Legend

- Mookodi - Magopele 132kV (to be constructed)
- Railway
- National Route
- Non-perennial River
- Perennial River
- Development Area (436,6ha)
- Project Site (642ha)
- Farm Portion

Environmental Sensitivities:

- Visual Receptor
- Heritage Sites
- High Heritage Sensitivity (No-go Area)
- Very High Ecological Sensitivity (No-go Area)
- High Ecological Sensitivity
- High Avifauna Sensitivity
- Medium Ecological Sensitivity
- Medium Avifauna Sensitivity
- Medium-Low Avifauna Sensitivity
- Medium-Low Ecological Sensitivity
- Low Ecological and Avifauna Sensitivity

savannah environmental



Scale: 1:10 451
Projection: LO25
Map Ref: Moeding Sensi Map 07.01.18

0 0,25 0,5 1 Km

Moeding Solar PV Facility, North West Province

Environmental Sensitivity Map - 300m Power Line Corridor

FERRUM MOOKODI 1 400kV

MOOKODI SUBSTATION

N18

MERCURY MOOKODI 1 400kV

Droe Harts

1218 m

1200 m

1217 m

Legend

- Eskom Substation
- Mookodi - Magopele 132kV (to be constructed)
- Railway
- National Route
- Non-perennial River
- Perennial River
- 300m Corridor for Power Line Alternative 1
- Development Area (436,6ha)
- Project Site (642ha)
- Farm Portion

Environmental Sensitivities:

- Visual Receptor
- Heritage Sites
- High Heritage Sensitivity (No-go Area)
- Very High Ecological Sensitivity (No-go Area)
- High Ecological Sensitivity
- High Avifauna Sensitivity
- Medium Ecological Sensitivity
- Medium Avifauna Sensitivity
- Medium-Low Ecological Sensitivity
- Medium-Low Avifauna Sensitivity
- Low Ecological and Avifauna Sensitivity

savannah environmental

Scale: 1:16 477
Projection: LO25
Map Ref: Moeding Corridor Sensi Map 07.01.18

0 0,425 0,85 1,7 Km

Moeding Solar PV Facility, North West Province

Preferred Layout and Environmental Sensitivity Map

Legend

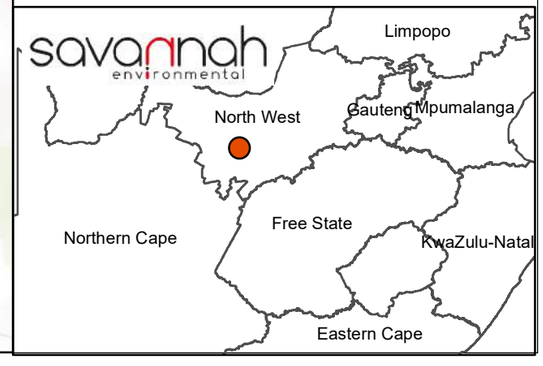
- Mookodi - Magopele 132kV (to be constructed)
- Railway
- National Route
- Perennial River
- Development Area (436,6ha)
- Project Site (642ha)
- Farm Portion

Layout:

- Internal Access Road
- Power Line Alternative 2 (preferred)
- On-site_Substation
- Inverters
- O&M Building
- Permanent Compound Area
- Solar Field

Environmental Sensitivities:

- Visual Receptor
- Heritage Sites
- High Heritage Sensitivity (No-go Area)
- Very High Ecological Sensitivity (No-go Area)
- High Ecological Sensitivity
- High Avifauna Sensitivity
- Medium Ecological Sensitivity
- Medium Avifauna Sensitivity
- Medium-Low Ecological Sensitivity
- Medium-Low Avifauna Sensitivity
- Low Ecological and Avifauna Sensitivity



Scale: 1:10 451
Projection: LO25
Map Ref: Moeding Sensi Map 07.01.18

0 0,25 0,5 1 Km

N

W E

S

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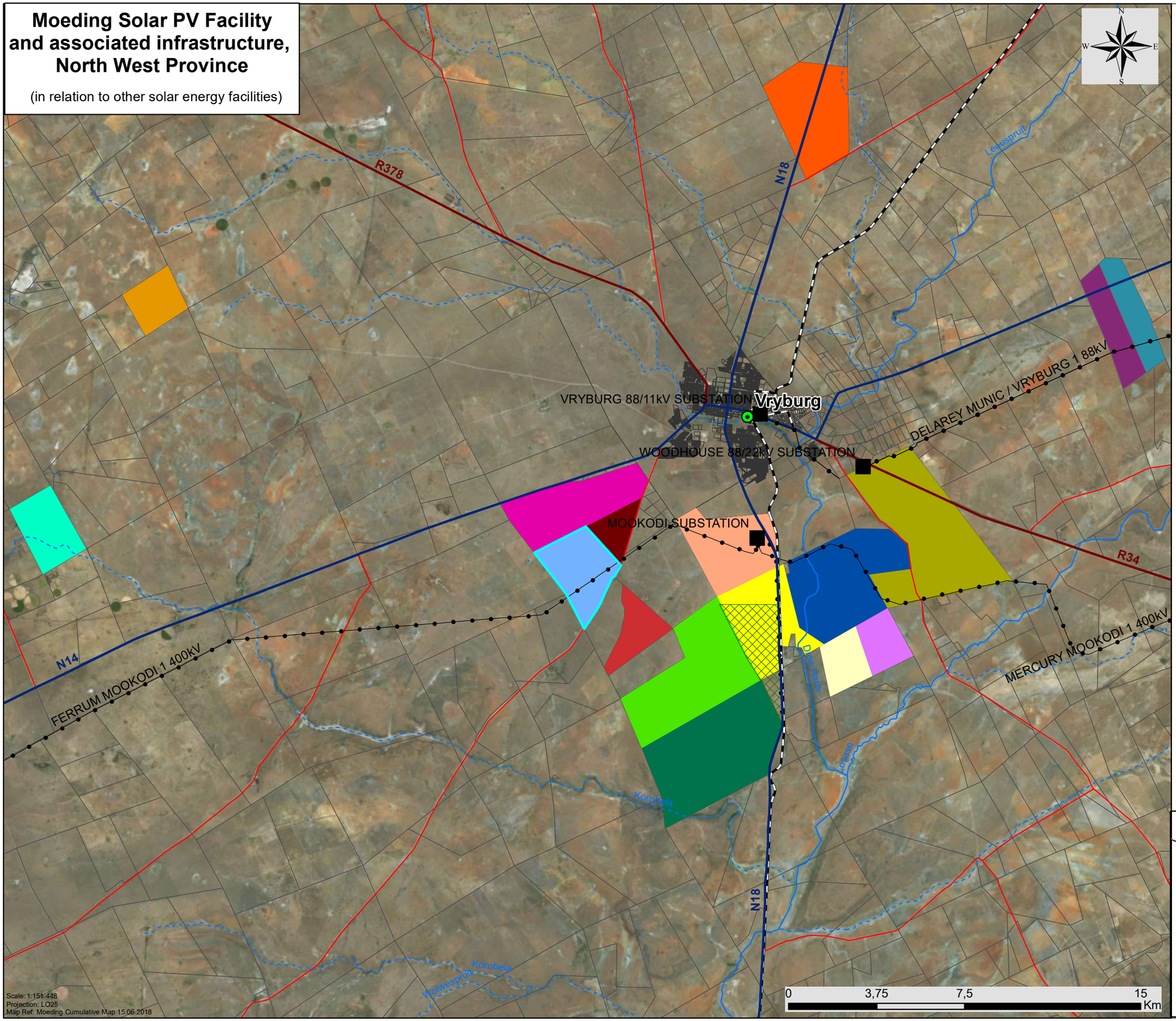
Droe Harts

Tierkloof

Moeding Solar PV Facility and associated infrastructure, North West Province

(in relation to other solar energy facilities)



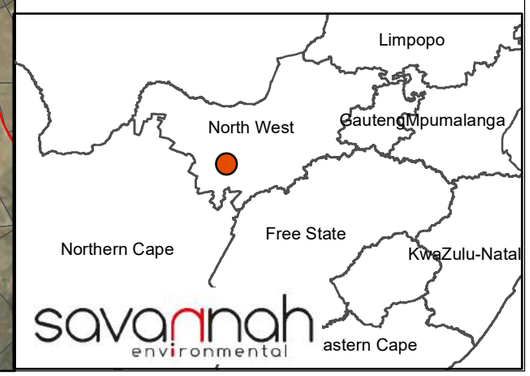
Scale: 1:151 448
Projection: LO25
Map Ref: Moeding Cumulative Map 15.06.2018

Legend

- Town
- Eskom Substation
- Existing Power Line
- Railway
- National Route
- Regional Road
- Main Road
- Non-perennial River
- Perennial River
- Project Site
- Farm Portion

Other Solar Energy Facilities (SEF):
(illustrations based on affected properties and not project site)

- Subsolar Sonbesie (1 x PV)
- Subsolar Rosendal (1 x PV)
- Subsolar Protea (1x PV)
- Subsolar Waterloo (1 x PV)(PB4)
- Subsolar Khubu (1 x PV)
- Subsolar Gamma (1x PV)
- Biotherm Sedawo (3 x PV)
- Kabi Solar Tiger Kloof (1 x PV)
- Genesis Eco-Energy Woodhouse (2 x PV)
- ABO Wind Vryburg Solar 1 (1 x PV)
- ABO Wind Vryburg Solar 2 & 3 (2 x PV)
- AMDA Klondike (3 x PV)
- Alpha Solar Power Plant (1 x PV)
- Meerkat Solar Power Plant (1 x PV)
- Carocraft Solar Park (1 x PV)
- 60MW Carocraft PV Solar Park (1 x PV)
- Renewable Energy Generation Project (1 x PV)



APPENDIX K(B):
GRIEVANCE MECHANISM FOR PUBLIC COMPLAINTS AND ISSUES

GRIEVANCE MECHANISM / PROCESS

PURPOSE

This Grievance Mechanism has been developed to receive and facilitate the resolution of concerns and grievances regarding the project's environmental and social performance. The aim of the Grievance Mechanism is to ensure that grievances or concerns raised by stakeholders are addressed in a manner that:

- Provides a predictable, accessible, transparent, and credible process to all parties, resulting in outcomes that are fair and equitable, accountable and efficient.
- Promotes trust as an integral component of broader community relations activities.
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to provide a process to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

The following proposed grievance procedures are to be complied with throughout the construction, operation and decommissioning phases of the project. These procedures should be updated as and when required to ensure that the Grievance Mechanism is relevant for the project and effective in providing the required processes.

- Local landowners, communities and authorities must be informed in writing by the Developer of the grievance mechanism and the process by which grievances can be brought to the attention of the Developer through its designated representative. This must be undertaken with the commencement of the construction phase.
- A company representative must be appointed as the contact person to which grievances can be directed. The name and contact details of the contact person must be provided to local landowners, communities and authorities when requested.
- Project related grievances relating to the construction, operation and or decommissioning phases must be addressed in writing to the contact person. The contact person should assist local landowners and/ or communities who may lack resources to submit/prepare written grievances, by recording grievances and completing written grievance notices where applicable, translating requests or concerns or by facilitating contact with relevant parties who can address the raised concerns. The following information should be obtained, as far as possible, regarding each written grievance, which may act as both acknowledgement of receipt as well as record of grievance received:
    a. The name and contact details of the complainant;
    b. The nature of the grievance;
    c. Date raised, received, and for which the meeting was arranged;
    d. Persons elected to attend the meeting (which will depend on the grievance); and
    e. A clear statement that the grievance procedure is, in itself, not a legal process. Should such avenues be desired, they must be conducted in a separate process and do not form part of this grievance mechanism.

- The grievance must be registered with the contact person who, within 2 working days of receipt of the grievance, must contact the Complainant to discuss the grievance and, if required, agree on suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- The contact person must draft a letter to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed and only if required).
- A grievance register must be kept on site (in electronic format, so as to facilitate editing and updating), and shall be made available to all parties wishing to gain access thereto.
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting, as well as a suitable venue. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or Developer are entitled to invite their legal representatives to attend the meeting/s, it should be made clear to all the parties involved in the process that the grievance mechanism process is not a legal process, and that if the Complainant invites legal representatives, the cost will be their responsibility. It is therefore recommended that the involvement of legal representatives be limited as far as possible, as a matter of last resort, and that this process be primarily aimed at stakeholder relationship management as opposed to an arbitration or litigation mechanism.
- The meeting should be chaired by the Developer's representative appointed to address grievances. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- Draft copies of the minutes must be made available to the Complainant and the Developer within 5 working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days of receipt of the draft minutes.
- The meeting agenda must be primarily the discussion of the grievance, avoidance and mitigation measures available and proposed by all parties, as well as a clear indication of the future actions and responsibilities, in order to put into effect the proposed measures and interventions to successfully resolve the grievance.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the Developer regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, the Developer will be required to identify three (3) mediators and forward the names and CVs to the Complainant within 2 weeks of the dispute being declared. The Complainant, in consultation with the Developer, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Developer. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.

- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Developer for comment before being finalised and signed by all parties, which signature may not be unreasonably withheld by either party. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within 5 working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action is required, or indeed possible. Closure status must be classified and captured following mediation or successful resolution in the Complaints Register as follows:

- Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- Unresolved. Complaints where it has not been possible to reach an agreed resolution despite mediation.
- Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Developer, either party may be entitled to legal action if an appropriate option, however, this grievance mechanisms aims to avoid such interactions by addressing the grievances within a short timeframe, and to mutual satisfaction, where possible.

APPENDIX K(C):
ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Moeding Solar PV Facility and associated infrastructure. The broad objectives of the plan include the following:

- Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal and encroachment.
- Develop and implement a monitoring and eradication programme for alien and invasive plant species.
- Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

This plan should be updated throughout the life-cycle of the PV facility, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation.

2. RELEVANT ASPECTS OF THE SITE

Weeds and invasive alien species are not abundant within the development area and are represented by twenty four (24) species of which only six (6) species are listed as Invasive Alien Plants (NEM:BA, 2017).

These include:
- *Eucalyptus camaldulensis,*
- *E. Sederoxylon;*
- *Prosopis glandulosa;*
- *Opuntia ficus-indica;*
- *Datura stamonium;* and
- *Argeomone mexicana.*

None of these species occur at high densities within the development area with most species confined to areas around homesteads and where soils are regularly disturbed (e.g. typically within highly trampled areas around watering and feeding points and kraals). The only species that was recorded to occur within the primary grassland/open savanna was *Opuntia ficus-indica*. Highly trampled areas were regularly invaded with *Argeomone mexicana* and *Datura stramonium* of which the densities of these species are not regarded as problematic during the time of the survey.

3. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally

responsible for the control of invasive alien plants on their properties. In terms of this Act alien invasive plant species are ascribed to one of the following categories:

» Category 1: Prohibited and must be controlled.
» Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
» Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEM:BA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

» **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
» **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
» **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
» **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

The following guide is a useful starting point for the identification of alien plant species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

4. ALIEN PLANT MANAGEMENT PRINCIPLES

4.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When additional Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on site.

4.2. Containment and control

If any alien invasive plants are found to become established on site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The uses of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

4.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. <u>Clearing Methods</u>

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion and that they are appropriate to the specific species of concern. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the site. The best-practice clearing method for each species identified should be used.

» **Mechanical control**

This entails damaging or removing the plant by physical action. Different techniques could be used, e.g. uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive, and could cause severe soil disturbance and erosion.

» **Chemical Control**

Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Agriculture, Forestry and Fisheries (DAFF) can be contacted.

4.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an on-going monitoring programme for construction phase to detect and quantify any alien species that may become established.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute towards reducing alien species abundance. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.
- Alien plant management is an iterative process and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally-occurring species should be used.

» During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every 6 months for the first two years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

4.5. Monitoring

In order to assess the impact of clearing activities, follow-ups and rehabilitation efforts, monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

» Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
» Simple records must be kept of daily operations, e.g. area/location cleared, labour units and, if ever used, the amount of herbicide used.
» It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien plant species	Preconstruction Monthly during Summer and Autumn (Middle November to end March) 3 Monthly during Winter and Spring
Document alien plant distribution	Alien plant distribution map within priority areas	3 Monthly
Document & record alien plant control measures implemented	Record of clearing activities	3 Monthly

Operation Phase

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

APPENDIX K (D):
RE-VEGETATION AND REHABILITATION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the site for the Moeding Solar PV Facility, and that are not required for operation are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas.
- Re-vegetate all disturbed areas with suitable local plant species.
- Minimise visual impact of disturbed areas.
- Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Rehabilitation Plan should be read in conjunction with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Invasive Management Plan and Plant Rescue and Protection Plan. Prior to the commencement of construction, a detailed Rehabilitation Plan and Method Statement for the site should be compiled with the aid of a suitably qualified, professionally registered specialist (with a botanical or equivalent qualification).

2. RELEVANT ASPECTS OF THE SITE

The Moeding Solar project site is situated in the Savanna Biome, and Eastern Kalahari Bushveld Bioregion. The vegetation within and surrounding the project site comprises Ghaap Plateau Vaalbosveld (SVk 7).). The distribution of the vegetation type is spread across the Northern Cape and North West Province, from Campbell in the south east of Danielskuil through Reivilo to around Vryburg in the north. The Ghaap Plateau Vaalbosveld vegetation type can be described as a flat plateau with well-developed shrub layer with *Tarchonanthus camphoratus* and *Acacia karroo*. Much of the south-central portion of this unit has remarkably low cover of Acacia species for an arid savanna and is dominated by the non-thorny *T. camphoratus, R. lanceae* and *O. europaea* subsp. *africana.*

During the Ecological survey conducted by Botha (2018), nine units were identified within the solar as well as power line development footprint:

- Open Vaalbos Shrubland
- Short Griekwa Karee Shrubland
- Palaeo drainages
- Tall Vaalbos Shrubland
- Tall Karee Woodland
- Secondary Open Woodland
- Tall Mixed Woodland Patch.
- Tall Woodland Fringe
- Depression Wetlands (Pans)

Generally, the tree/shrub layer decreases along a soil moisture gradient with trees and shrubs almost entirely absent from the depression wetland areas apart from some woody patches at the peripheral fringe of some of the pan wetlands. Furthermore, as the soil layer becomes deeper and sandier in texture, the tree / shrub layer becomes less dense. The current and historical grazing regimes also play some part in this tree/shrub and grass relationship, although to a lesser extent. This grazing regimes on the other hand play a more important role in terms of species composition within the grass/forb layer. According to the grass species composition, it is evident that this area has been exposed to long term overgrazing and cattle stocking rates exceeding the carrying capacity of the veld.

3. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- Clearing of invaded areas should be conducted as per the Alien Management Plan, included in the EMPr.
- No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- Indigenous plant material must be kept separate from alien material.
- Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Topsoil should be reserved wherever possible on site, to be utilised during rehabilitation.
- Sods used for revegetation should be obtained directly from the site, but not from the sensitive areas. Sods should contain at least a 50 mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.
- On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- In areas where soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- The final rehabilitated area should resemble the current composition and structure of the soil as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been rehabilitated.
- Where rehabilitation sites are located within actively grazed areas, they should be fenced off, this must be undertaken in consultation with the landowner.
- Any runnels, erosion channels or wash-aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.

- Re-vegetated areas should be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or grown be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- The stockpiled vegetation from the clearing operations should be reduced to mulch where possible, and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- Mulches must be collected in such a manner as to restrict the loss of seed.
- Mulch must be stored for as short a period as possible.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited, and only the correct herbicide type should be applied.
- Once rehabilitated, areas should be protected to prevent trampling and erosion.
- Fencing should be removed once a sound vegetative cover has been achieved.

4. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- Associated nature and stability of surface soils.
- Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- Rehabilitation areas should be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
- Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
- Any areas showing erosion, should be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas

must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commenced.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species should all continue for as long as is considered necessary, depending on regrowth rates.

APPENDIX K(E):
PLANT RESCUE AND PROTECTION PLAN

PLANT RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the Plant Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the Environmental Management Programme (EMPr) to reduce the impact of the development of the Moeding Solar PV Facility on listed and protected plant species and their habitats and to provide guidance on search and rescue of species of conservation concern.

2. RELEVANT ASPECTS OF THE SITE

A total of 369 indigenous species have been recorded in the Vryburg region according to the SANBI database. Of the species that are considered to occur within the geographical area under consideration, 19 species are regarded conservation worthy. According to the South African Red List Categories 1 is listed as Rare (*Gnaphalium nesonii*), 1 as Vulnerable (*Rennera stellata*) and 1 as Near Threatened (*Lithops lesliei*). The remaining 15 species are protected within the Transvaal Nature Conservation Ordinance (TNCO) and Bophuthatswana Nature Conservation Act (BNCA).

Six conservation important species were identified within the project site of which two species are Red Listed Species (*Boophone disticha* – Declining and *Acacia erioloba* – Declining) whilst the remaining four species area listed as protected species within the relevant provincial conservation ordinations (*Ammocharis coranica*, *Nerine laticoma*, *Babiana hypogea and Aloe greatheadii*). Although *Boscia albitrunca* is the only tree species protected according to the National Forest Act (NFA) that may potentially occur within the project site, none were identified within the development footprint.

Since a large proportion of the identified conservation-worthy species at the project site are geophytic and succulent species (e.g. *Aloe greatheadii, Nerine laticoma, Babiana hypogea* and *Boophone disticha*), the potential for successful translocation is considered to be high.

3. PRINCIPLES FOR SEARCH AND RESCUE

Successful plant rescue can only be achieved if:

- Species can be removed from their original habitat with minimal damage to the plant, especially the roots.
- All plants removed are safely stored and treated according to their specific requirements prior to being transplanted again.
- They are relocated into a suitable habitat and protected from further damage and all disturbances to aid their re-establishment.
- Timing of planting activities is planned with the onset of the growing season.
- Steps are taken where necessary to aid the initial establishment of vegetation, including occasional watering.

The following principles apply in terms of plant rescue and protection:

- A permit is required from the North West Department of Rural, Environmental and Agricultural Development (READ) to translocate or destroy any listed and protected species identified by the ecological walkthrough survey undertaken for the optimised final Moeding Solar layout. This permit should be obtained prior to any search and rescue operations being undertaken.
- Where suitable species are identified, a search and rescue operation of these species should be undertaken within the development footprint, where these species would be affected, and prior to the commencement of construction.
- As far as possible, timing of search and rescue activities should be planned with the onset of the growing season.
- Affected individuals should be translocated to a similar habitat outside of the development footprint and marked and recorded for monitoring purposes. For each individual plant that is rescued, the plant must be photographed before removal, tagged with a unique number or code and a latitude longitude position recorded using a hand-held GPS device.
- The rescued plants must be planted into a container to be housed within a temporary nursery on site or immediately planted into the target habitat.
- Rescued plants, if re-planted back in the wild, should be placed as close as possible to where they were originally removed. Re-planting into the wild must cause as little disturbance as possible to existing natural ecosystems. The position of the rescued individual/s must be recorded to aid in future monitoring of that plant as noted earlier.
- During construction, the Contractor's Environmental Officer (EO)/ Environmental Representative must monitor vegetation clearing at the site. Any deviations from the plans that may be required should first be checked for listed species by a suitably qualified specialist, and any listed species present which are able to survive translocation should be translocated to a safe site.
- Any listed species suitable for translocation observed within the development footprint, and that would be affected, that were not previously observed be translocated to a safe site.
- The collecting of plants of their parts should be strictly forbidden. Staff should be informed of the legal and conservation aspects of harvesting plants from the wild as part of the environmental induction training.
- Sensitive habitats and area outside project development should be clearly demarcated as no go areas during the construction and operational phase to avoid accidental impacts.

APPENDIX K(F):
TRAFFIC MANAGEMENT PLAN

PRINCIPLES FOR TRAFFIC AND TRANSPORTATION MANAGEMENT

1. PURPOSE

The purpose of this Traffic and Transportation Management Plan (TTMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation of project components and the construction of temporary and long-term access within the vicinity of the Moeding Solar PV Facility project site. The objectives of this plan include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

Prior to the commencement of construction, a detailed TTMP and Method Statement for the site should be compiled.

2. RELEVANT ASPECTS OF THE PROJECT

Direct access to the project site is possible via the national route (N18) which is aligned with the eastern boundary of the project site. This route will provide direct access to the main entrance of the Moeding Solar PV Facility. Internal access roads will be constructed between the PV arrays for construction and maintenance purposes. These internal roads will be gravel and will be 4-6m in width.

3. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

The following principles apply in terms of transportation and traffic management:

- The Transport Contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and project components to the site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
- All employees must attend an environmental training programme (e.g. toolbox talks) by the Environmental Officer (EO). Through this programme, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
- The contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.

- Adjacent landowners must be notified of the construction schedule.
- Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
- Signs must be posted in the project area to notify landowners and others of the construction activity.
- Flagging must be provided at access points to the site and must be maintained until construction is completed on the site.
- Speed limits must be established prior to commencement of construction and enforced over all construction traffic.
- Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.
- Throughout construction the contractor will be responsible for monitoring the condition of roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- Drivers must have an appropriate valid driver's license and other operation licences required by applicable legislation.
- All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear view mirror, safety belts, signal indicators, and lenses.
- Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

4. MONITORING

- The principal contractor must ensure that all vehicles adhere to the speed limits.
- A speeding register must be kept with details of the offending driver.
- Repeat offenders must be penalised.
- Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

APPENDIX K(G):
STORMWATER AND EROSION MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes it is possible to develop storm water management systems in a manner that reduces these potentially negative impacts and mimic nature. The main risks associated with inappropriate storm water management are increased erosion risk and risks associated with flooding. Therefore, this Storm water Management Plan and the Erosion Management Plan are closely linked to one another and should be managed together.

This Storm water Management Plan addresses the management of storm water runoff from the development site and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of storm water management measures and infrastructure are:

» Topography and slope gradients;
» Placing of infrastructure and infrastructure design;
» Annual average rainfall; and
» Rainfall intensities.

The objective of the plan is therefore to provide measures to address runoff from disturbed portions of the site, such that they:

» do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
» do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
» do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Storm water Management Plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The project site is situated approximately 0.8km west of the Dry Harts River and approximately 3.8km north-east of the Korobela River. These two watercourses along with the Losase River form the most important surface hydrological features of the region. Surface water features identified within the project site includes five depression wetlands (pans) and one small drainage line (~107 m), connecting two (2) wetlands. The drainage line is situated at the base of the almost inconspicuous, low ridge line. The remaining three depressions have no clear channeled in- and out flow and are thus endorheic features. These depression wetlands are in a mostly near-natural condition with some local areas of trampling and soil compaction.

The Vryburg area is typically characterised as having a local steppe climate (BSk) with little rainfall during the year. The area receives a mean annual average rainfall of approximately 477mm. Precipitation is highest in January with an average of 89mm; and lowest in July with an average of 4mm. Minimal rain occurs between May to September. The average annual temperature in Vryburg is 17.9°C. January is the

hottest month of the year with an average temperature of 24.8°C, while July is the coldest month of the year with an average temperature of 9.3°C. The figure below (**Figure 1**) illustrates a climatic graph of the Vryburg area.

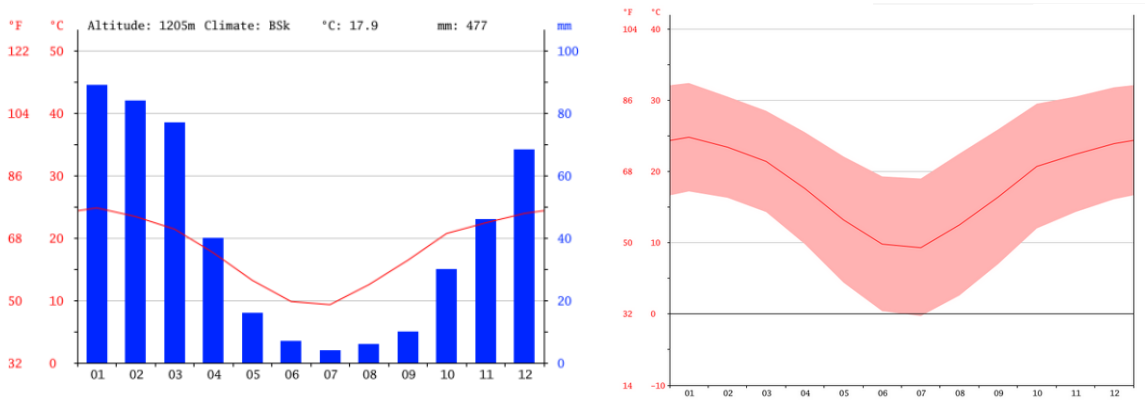


Figure 1: Climate and Temperature graphs for Vryburg, North Western Province (Source: en.climate-data.org).

3. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various storm water management principles should be considered including:

- Prevent concentration of storm water flow at any point where the ground is susceptible to erosion.
- Reduce storm water flows as far as possible by the effective use of attenuating devices (such as swales, berms, silt fences). As construction progresses, the storm water control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary.
- Minimse the area of exposure of bare soils to minimse the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of storm water flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all storm water control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct storm water management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development storm water flow should not exceed the capacity of the culvert. To assist with the storm water run-off, gravel roads should typically be graded and shaped with a 2-3% crossfall back into the slope, allowing storm water

to be channelled in a controlled manner towards the, natural drainage lines and to assist with any sheet flow on the site.

» Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development storm water flow at that point. Provide detention storage on the road and/or upstream of the storm water culvert.
» Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
» Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by storm water must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the storm water system.
» Preferably all drainage channels on site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Storm water Management Plan describing and illustrating the proposed storm water control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of this Storm water Management Plan. This should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction) must be indicated within the Final/Updated Storm water Management Plan.
» All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Storm water Management Plan.
» The drainage system for the site should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying storm water around and away from infrastructure.
» Procedures for storm water flow through a project site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
» An on-site Engineer or Environmental Officer is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved storm water plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the contractor must prepare a Storm water Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Storm water Management Plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Storm water Control Method Statement and shall ensure that no construction work takes place before the relevant storm water control measures are in place.

An operation phase Storm water Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

APPENDIX K(H):
EROSION MANAGEMENT PLAN

PRINCIPLES FOR EROSION MANAGEMENT

1. PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. Therefore, this Erosion Management Plan, the Storm water Management Plan and the Revegetation and Rehabilitation Plan are closely linked to one another and should not operate independently, but should rather be seen as complementary activities within the broader environmental management of the site and should therefore be managed together.

This Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

» A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction related activities.
» An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

This plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE SITE

The landscape within the project site can be described as a flat plateau with a well-developed shrub layer. The project site is characterised by small micro-topographical variations mostly due to small geological variations such as low scattered bedrock exposures, depression features (pan wetlands) and overlying calcretes. The project site is located at the edge of the valley rim of the Droë Harts River valley which is characterised by steep, narrow inner slopes and a relatively narrow valley floor. Wetlands identified within the project site occur most frequently in valley bottoms but can also occur on crests, mid slopes and foot slopes.

During construction, there will be a lot of disturbed and loose soil at the site which will render the area vulnerable to erosion. Erosion is one of the greater risk factors associated with the development and it is therefore critically important that proper erosion control structures are built and maintained over the lifespan of the project.

Soil compaction and increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may potentially impact the downstream watercourses, wetlands and aquatic habitats, mainly due to an increase of surface water and silt inflow from the surrounding disturbed areas. These potential impacts may result in a reduction in the buffering capacities of the landscape during extreme weather events.

3. EROSION AND SEDIMENT CONTROL PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

» Protect the land surface from erosion;

» Intercept and safely direct run-off water from undisturbed upslope areas through the site without allowing it to cause erosion within the site or become contaminated with sediment; and
» Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

3.1. On-Site Erosion Management

General factors to consider regarding erosion risk at the site includes the following:

» Due to the sandy nature of soils in the study area, soil loss will be greater during dry periods as it is more prone to wind erosion. Therefore, precautions to prevent erosion should be present throughout the year.
» Soil loss will be greater on steeper slopes. Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
» Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
» The extent of disturbance will influence the risk and consequences of erosion. Therefore, site clearing should be restricted to areas required for construction purposes only. As far as possible, large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
» Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
» Where necessary, new roads constructed should include water diversion structures with energy dissipation features present to slow and disperse the water into the receiving area.
» Roads used for project-related activities and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» Runoff may have to be specifically channeled or storm water adequately controlled to prevent localised rill and gully erosion.
» Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
» All bare areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
» Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
» Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
» Activity at the site after large rainfall events when the soils are wet and erosion risk is increased should be reduced. No driving off of hardened roads should occur at any time, and particularly immediately following large rainfall events.

» Topsoil should be removed and stored in a designated area separately from subsoil and away from construction activities (as per the recommendations in the EMPr). Topsoil should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation in cleared areas.
» Regular monitoring of the site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

3.1.1. Erosion control mechanisms

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

» Reno mattresses;
» Slope attenuation;
» Hessian material;
» Shade catch nets;
» Gabion baskets;
» Silt fences;
» Storm water channels and catch pits;
» Soil bindings;
» Geofabrics;
» Hydro-seeding and/or re-vegetating;
» Mulching over cleared areas;
» Boulders and size varied rocks; and
» Tilling.

3.2. Engineering Specifications

A detailed engineering specifications Storm water Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of the Storm water Management Plan (**Appendix H** of the EMPr) and this should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final storm water control measures (post construction).
» All temporary and permanent water management structures or stabilisation methods must be indicated within the Storm water Management Plan.
» An on-site Engineer or Environmental Officer (EO)/ SHE Representative to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO should monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved Storm water Management Plan is not correctly or appropriately implemented and damage to the environment is caused.

3.3. Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on-site the Environmental Officer (EO)/ SHE Representative (during construction) or Environmental Manager (during operation) must:

- Assess the significance of the situation.
- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
- Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- Report and monitor the progress of rehabilitation weekly and record all the findings in a site register (during construction).
- All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

- Select a system/mechanism to treat the erosion.
- Design and implement the appropriate system/mechanism.
- Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- Continue monitoring until the area has been stabilised.

4. CONCLUSION

The Erosion Management Plan is a document to assist the Proponent/ EPC Contractor with guidelines on how to manage erosion during all phases of the project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable). During the construction phase, the contractor must prepare an Erosion Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of this plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Method Statement and shall ensure that relevant erosion control measures are in place throughout the construction phase.

An operation phase Erosion Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

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APPENDIX K(I):
WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

This WMP has been compiled as part of the project EMPr and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated once further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages. This plan should be updated throughout the life-cycle of the PV facility, as required in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the site should be compiled by the Contractor.

2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the Moeding Solar PV Facility will generate construction solid waste, as well as general waste and hazardous waste during the lifetime of the solar energy facility.

Waste generated on site, originates from various sources, including but not limited to:

- Concrete waste generated from spoil and excess concrete.
- Contaminated water, soil, rocks and vegetation due to hydrocarbon spills.
- Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, and waste ink cartridges.
- Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE) and cardboard.
- Organic waste from food waste as well as alien and endemic vegetation removal.
- Sewage from portable toilets and septic tanks.
- Inert waste from spoil material from site clearance and trenching works.

3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008);
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);
- The South African Constitution (Act 108 of 1996);
- Hazardous Substances Act (Act 5 of 1973);

- Health Act (Act 63 of 1977);
- Environment Conservation Act (Act 73 of 1989);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Water Act (Act 36 of 1998);
- The National Environmental Management Act (Act 107 of 1998) (as amended);
- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- Air Quality Act (Act 39 of 2004).

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in GNR 926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on site. Such an approach is illustrated in **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- Reducing volumes of waste is the greatest priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and
- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner.

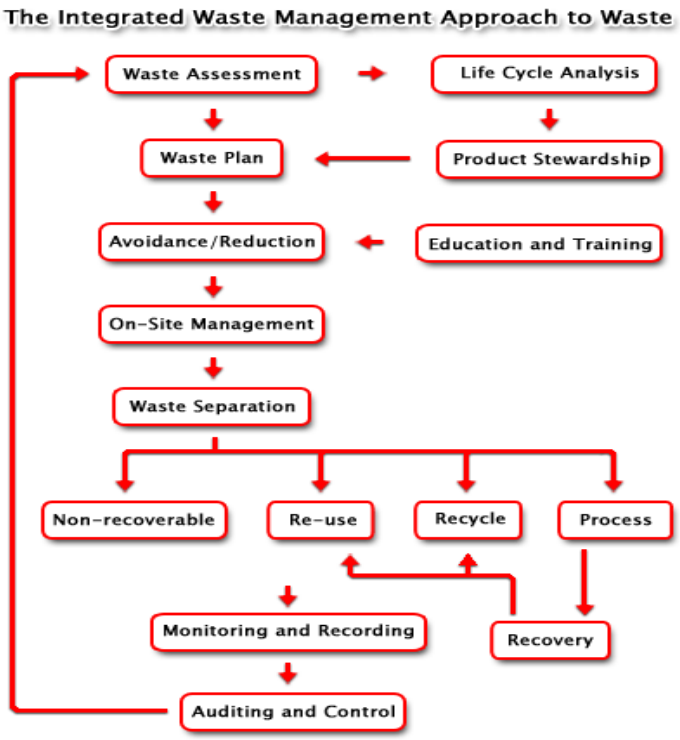

Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer.

4.1.1. Waste Assessment / Inventory

- The Environmental Officer (EO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling and storage

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- Septic tanks and portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from moving around in the surrounding area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements, and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 120% of the net capacity of the largest tank.
- Take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.

- Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria.
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- A dedicated waste management team must be appointed by the principal contractors' SHE Officer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the SHE Officer.
- All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

4.1.3. Management of waste storage areas

- Waste storage must be undertaken in accordance with the relevant Norms and Standards.
- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable storm water system separating clean and contaminated storm water.
- Collection bins placed around the site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- If any leaks occur in the bund, these must be amended immediately.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- No mixing of hazardous and general waste is allowed.

4.1.4. Disposal

- Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process,

however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

4.1.5. Record keeping

The success of the WMP is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

» Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
» Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

» The SHE Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
» Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
» Recyclable waste must be removed from the waste stream and stored separately.
» All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
» Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
» Waste generated on site must be removed on a regular basis throughout the operation phase.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled;
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must from part of the EO's reports to the ECO on a monthly basis.

APPENDIX K(J):
EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of the construction phase detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

Moeding Solar (Pty) Ltd proposes the development of the Moeding Solar PV Facility, also known as Moeding Solar, a solar energy facility and associated infrastructure on a site near Vryburg, in the North West Province. The solar facility will be designed to have a contracted capacity of up to 100MW, and will make use of photovoltaic (PV) solar technology. The project will comprise the following key infrastructure and components:

- Arrays of PV panels (either a static or tracking PV system) with a contracted capacity of up to 100MW.
- Mounting structures to support the PV panels.

- Cabling between the project components, to be laid underground where practical.
- On-site inverters to convert the power from a direct current to an alternating current.
- An on-site substation to facilitate the connection between the solar energy facility and the Eskom electricity grid.
- A new 132kV power line between the on-site substation and the Eskom grid connection point.
- Battery storage with up to 6 hours of storage capacity.
- Offices and workshop areas for maintenance and storage.
- Laydown areas.
- Internal access roads and fencing around the development area.

Due to the scale and nature of this development, it is anticipated that the following risks could potentially arises during the construction and operation phases:

- Fires;
- Leakage of hazardous substances;
- Storage of flammable materials and substances;
- Flood events;
- Accidents; and
- Natural disasters.

3. EMERGENCY RESPONSE PLAN

There are three levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

- All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
- All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
- No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.
- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk.
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies located outside of the project site. The following methods could be used:

» *Dykes* - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches* - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated, or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an approved disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify the Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.

7. Record the incident on the company database or filing register.

ii. Procedures

Because large scale fires may spread very fast it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguishers, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in the use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality.

» Report fire immediately to the site manager, who will determine if it is to be reported to the relevant emergency services and authorities.
» The site manager must have copies of the Report form to be completed.

SUMMARY: RESPONSE PROCEDURE

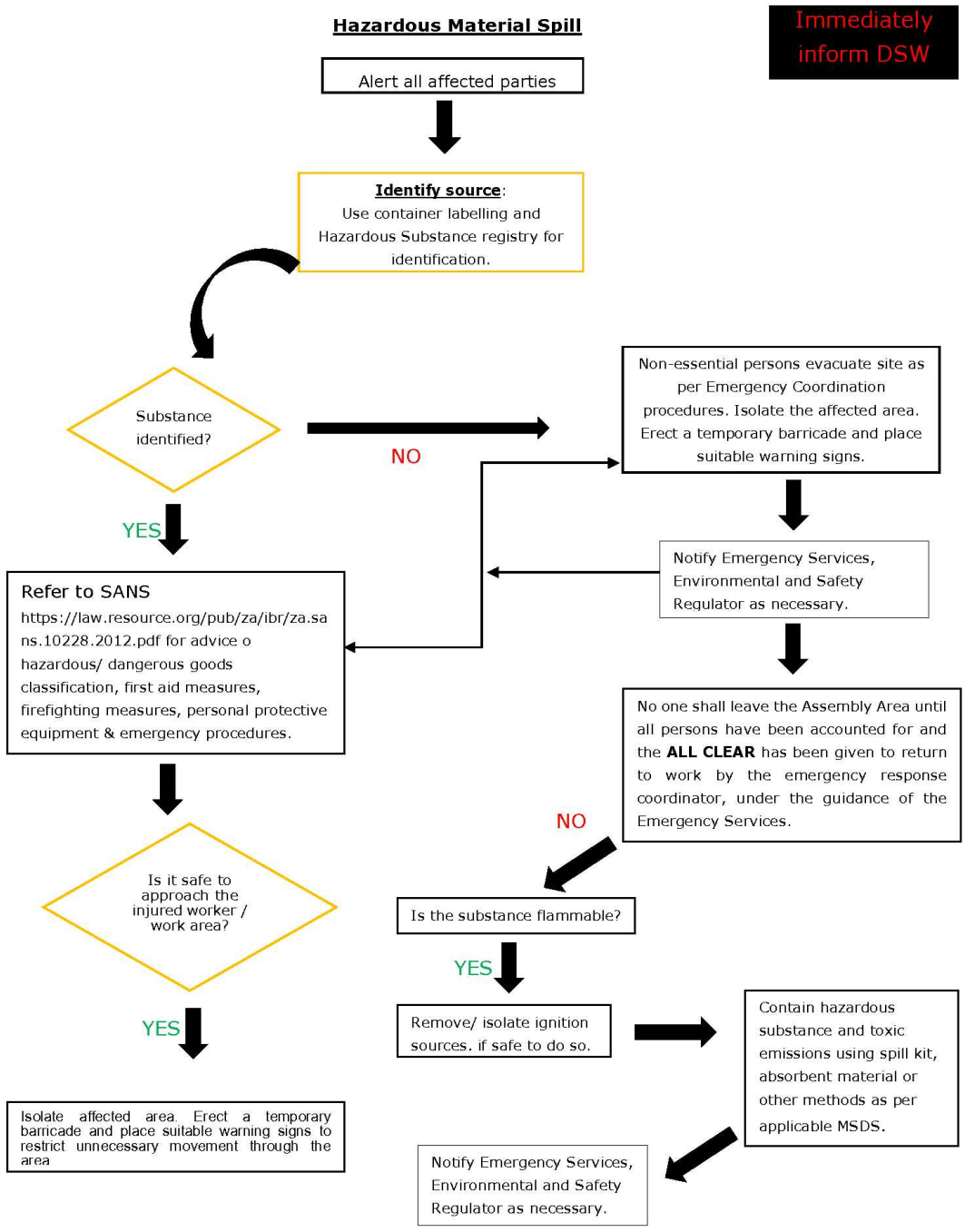

Figure 1: Hazardous Material Spill

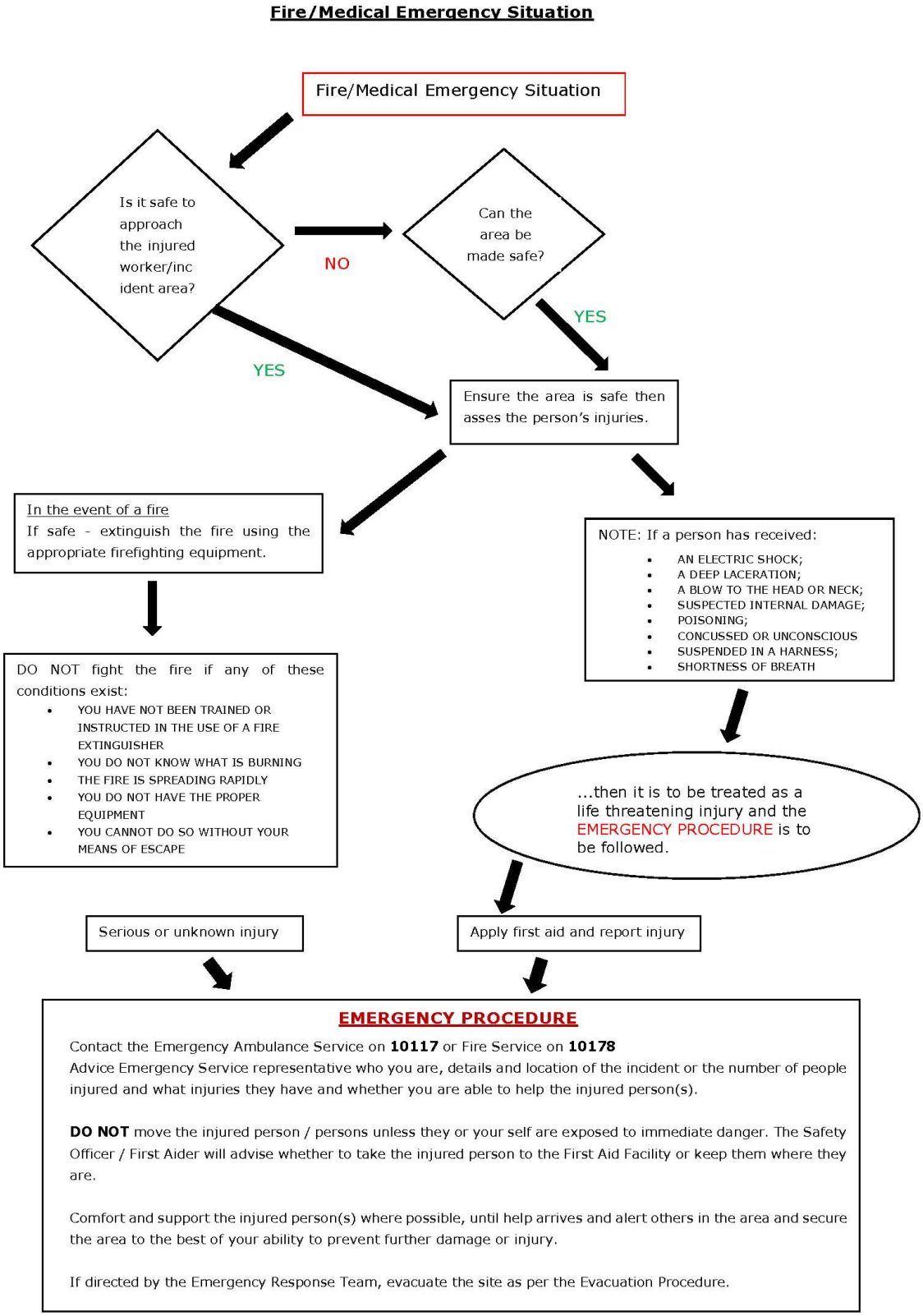

Figure 2: Emergency Fire/Medical

4. PROCEDURE RESPONSIBILITY

The Contractor's Safety, Health and Environment (SHE) Representative, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this Plan, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE must act as liaison and advisor on all environmental and related issues.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness programmes.

APPENDIX K(K):
CHANCE FIND PROCEDURE

CHANCE FIND PROCEDURE

The possibility of the occurrence of subsurface finds of heritage resources (palaeontological and archaeological artefacts, graves, etc) cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified palaeontologist or archaeologist must be contacted for an assessment of the find.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

1. RELEVANT ASPECTS OF THE SITE

1.1. ARCHAEOLOGY RESOURCES

Heritage resources present on the affected properties were identified through a field survey, archival research and evaluation of aerial photography. During the field assessment 34 significant heritage sites were identified within the project site and included:

- Twenty one find spots;
- One erosion site exposing Stone Age materials;
- Five significant Stone Age sites;
- One pan like site with extensive exposure of Stone Age artefacts;
- Three historical sites;
- One burial ground;
- One area of stacked stones; and
- One possible grave.

Of these sites listed above, four sites fall within the 300m corridor and none within the development footprint of the solar energy facility. These sites have a site significance of GP.B.

1.2. PALAEONTOLOGICAL RESOURCES

The north eastern portion of the project site is underlain by a small section of the Vryburg Formation of the Transvaal Supergroup (geologically older than 2.6 billion year-old) while the remaining portion of the project site is primarily underlain by the Schmidtsdrift Subgroup, Ghaap Group of the Transvaal Supergroup. The Schmidtsdrift Subgroup has a high palaeontological sensitivity, while the Vryburg Formation has a moderate palaeontological sensitivity. Stromatolite assemblages[1] are recorded within both the

[1] Stromatolites are layered mounds, columns and sheet-like sedimentary rocks. These structures were originally formed by the growth of layer upon layer of cyanobacteria, a single-celled photosynthesizing microbe. Cyanobacteria are prokaryotic cells (simplest form of modern carbon-bases life). Stromatolites are first found in Precambrian rocks and are known as the earliest known fossils. The

Schmidtsdrift Subgroup and Vryburg Formation. The project site consists of characteristic flat-lying terrain and vegetation cover of grassy thornveld. Poorly- to fairly well-preserved stromatolite assemblages were recorded within the project site. Both power line alternatives are underlain by the Vryburg Formation of the Transvaal Supergroup. No fossils were uncovered on the Remaining Extent of the Farm Rosendal 673 during the field survey undertaken in June 2018.

2. GENERAL PROCEDURES FOR CHANCE FINDS

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the EO and ECO of the chance find and its immediate impact on operations. The EO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

3. MONITORING PROGRAMME FOR ARCHAEOLOGY

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camps area and small-scale infrastructure development associated with the project. It is possible that cultural material will be exposed during construction and may be recoverable. A heritage practitioner should be appointed to develop a heritage induction programme and conduct training for the ECO, as well as team leaders, in the identification of heritage resources and artefacts.

The following procedure is required should any archaeological finds be identified within the development footprint during construction:

- An appropriately qualified archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.
- Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities be halted.
- The qualified archaeologist will then need to undertake a site visit to evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and impact on the heritage resource.
- The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the material and data are recovered.
- Construction can recommence as soon as the site has been cleared and signed off by the archaeologist.

oxygen atmosphere that we depend on was generated by numerous cyanobacteria photosynthesizing during the Archaean and Proterozoic Era.

In the case where a grave is identified during construction the following measures must be taken:

» Upon the accidental discovery of graves, a buffer of at least 50m should be implemented.
» If graves are accidentally discovered during construction, activities must cease in the area and a qualified archaeologist be contacted to evaluate the find. To remove the remains a permit must be applied for from SAHRA (Section 36 of the NHRA) and other relevant authorities (National Health Act and its regulations). The local South African Police Services must immediately be notified of the find.
» Where it is recommended that the graves be relocated, a full grave relocation process that includes comprehensive social consultation must be followed.

The grave relocation process must include:

i. A detailed social consultation process, that will trace the next-of-kin and obtain their consent for the relocation of the graves, that will be at least 60 days in length;
ii. Site notices indicating the intent of the relocation;
iii. Newspaper notices indicating the intent of the relocation;
iv. A permit from the local authority;
v. A permit from the Provincial Department of Health;
vi. A permit from the South African Heritage Resources Agency, if the graves are older than 60 years or unidentified and thus presumed older than 60 years;
vii. An exhumation process that keeps the dignity of the remains intact;
viii. The whole process must be done by a reputable company that is well versed in relocations;
ix. The exhumation process must be conducted in such a manner as to safeguard the legal rights of the families as well as that of the developing company.

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction timeframes. Guidelines for lead times on permitting is included in **Appendix H** of the BA Report.

4. MONITORING PROGRAMME FOR PALAEONTOLOGY

The following procedure is only required if fossils are seen on the surface and when construction commences.

» When a chance find has be identified during the construction phase, all work near the find should be stopped instantly.
» The site must be secured to protect it from any additional damage.
» The finder of the fossil heritage must immediately report the find to his/her direct supervisor, according to the reporting protocols instituted by the development management. The supervisor must in turn report the find to his/her manager and the EO and ECO. The EO must report the find to the relevant Authorities and a relevant palaeontologist.
» The Contractor must appoint a relevant palaeontologist to investigate and access the chance find and site.
» Both the EO and palaeontologist must ensure that accurate records and documentation are kept. The documentation must start with the initial chance find report, including records of all actions taken, persons involved and contacted, comments received and findings.
» These documents will be necessary to request authorisations and permits from the relevant Authorities to continue with the work on site.
» The reports and all other documents will be submitted to SAHRA by the palaeontologist.

» The report must include recommendations for additional specialist work if necessary, or request approval to continue with the development.
» When the necessary approvals have been issued, the development may continue with construction.

Figure 1: Isolated loose stromatolite identified within the project site (27°02'23"S; 24°44'39"E).

Figure 2: Weathered *in situ* domal structures of stromatolite identified within the project site (27° 02' 43"S; 24°45'03"E).

APPENDIX K(L):
CURRICULUM VITAE

savannah environmental

1st Floor, Block 2, 5 Woodlands Drive Office Park
Woodlands Drive, Woodmead
Johannesburg, South Africa

Email: joanne@savannahsa.com
Tel: +27 (11) 656 3237

CURRICULUM VITAE OF JO-ANNE THOMAS

Profession:	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
Specialisation:	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
Work experience:	Twenty one (21) years in the environmental field

VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

Professional Society Affiliations:

- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Associated for Impact Assessment South Africa (IAIAsa): 5601
- Member of the South African Wind Energy Association (SAWEA)

EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2006 - Current:	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
1997 – 2005:	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
January – July 1997:	Sutherland High School, Pretoria	Junior Science Teacher

PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP
Karoshoek CPV facility on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Project Name & Location	Client Name	Role
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State Province	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Litchtenburg, North West	FRV Energy South Africa	Project Manager & EAP
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6	Building Energy	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West Province	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Thaba Eco Lodge PV Facility, Gauteng	Camco Clean Energy	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Allemans Fontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doornplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspruit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
UpingtonAirport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel, Northern Cape	Enel Green Power	Project Manager
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublanary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation	REISA	Project Manager

Project Name & Location	Client Name	Role
activities at the Kathu PV facility, Northern Cape		
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape province	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape province	BioTherm Energy	Project Manager

Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublunary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Networx S28 Energy	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Environmental Permitting for the Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshoek Solar One	Project Manager

Project Name & Location	Client Name	Role
ECO for the construction of the folar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshoek Solar One CSP Facility, Northern Cape	Karoshoek Solar One	Project Manager

Screening Studies

Project Name & Location	Client Name	Role
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

Compliance Advice and ESAP reporting

Project Name & Location	Client Name	Role
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangalethu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rheboksfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager

EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape Province	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape Province	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind farm	Cennergi	Project Manager
External environmental and social audit for the Tsitsikamma Wind farm	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape province	BioTherm Energy	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting for the Power Line between the Tsitikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP

Project Name & Location	Client Name	Role
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (COAL)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Mutsho Power Station near Makhado, Limpopo Province	Mutsho Consortium	Project Manager & EAP
Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP
Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo Province	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephalale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (GAS)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project &400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400 kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing Ankerlig Power Station in Atlantis Industria, Western Cape	Eskom Holdings	Project Manager & EAP
Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP

Project Name & Location	Client Name	Role
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Westnern Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager

EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshoek Solar One	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

MINING SECTOR PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	liso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment) , Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Seskoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager

Project Name & Location	Client Name	Role
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westornaria, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gautng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

Project Name & Location	Client Name	Role
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Qoboshane bridge & access roads, Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	Building Energy	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor
ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Environmental Advisor

WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
S24G and WULA for the Ilegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorror Language Services	Project Manager & EAP

HOUSING AND URBAN PROJECTS

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Postmasburg Housing Development, Northern Cape	*Transnet*	*Project Manager & EAP*

Compliance Advice and reporting

Project Name & Location	**Client Name**	**Role**
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

ENVIRONMENTAL MANAGEMENT TOOLS

Project Name & Location	**Client Name**	**Role**
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP
Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMPr for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP

State of the Environment (SoE) for Emalahleni Local Municipality, Mpumalanga	Simo Consulting on behalf of Emalahleni Local Municipality	Project Manager & EAP
Aspects and Impacts Register for Salberg Concrete Products operations	Salberg Concrete Products	EAP
First State of Waste Report for South Africa	Golder on behalf of the Department of Environmental Affairs	Project Manager & EAP

PROJECTS OUTSIDE OF SOUTH AFRICA

Project Name & Location	Client Name	Role
Advisory Services for the Zizabona Transmission Project, Zambia, Zimbabwe, Botswana & Namibia	PHD Capital	Advisor
EIA for the Semonkong WEF, Lesotho	MOSCET	Project Manager & EAP
EMP for the Kuvaninga Energia Gas Fired Power Project, Mozambique	ADC (Pty) Ltd	Project Manager & EAP
Environmental Screening Report for the SEF near Thabana Morena, Lesotho	Building Energy	EAP
EPBs for the Kawambwa, Mansa, Mwense and Nchelenge SEFs in Luapula Province, Zambia	Building Energy	Project Manager & EAP
ESG Due Diligence for the Hilton Garden Inn Development in Windhoek, Namibia	Vatange Capital	Project Manager
Mandahill Mall Rooftop PV SEF EPB, Lusaka, Zambia	Building Energy	Project Manager & EAP
Monthly ECO for the PV Power Plant for the Mocuba Power Station	Scatec	Project Manager

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CURRICULUM VITAE OF THALITA BOTHA

Profession: Environmental Assessment Practitioner (EAP)

Specialisation: Environmental Assessments, Report writing, report reviewing, Geographical Information Systems (GIS), development of project proposals for procuring new projects, project administration

Work Experience: 3 years' experience in Environmental Assessments and GIS

VOCATIONAL EXPERIENCE

Professional execution of consulting services for projects in the environmental management field, specialising in Environmental Impact Assessment studies, environmental permitting, public participation, compilation of Environmental Management Plans and Programmes, environmental policy, and integrated environmental management. Responsibilities include report writing, analysis and the manipulation of geographical and technical experience with the use of ArcGIS, project management, review of specialist studies and the identification and assessment of potential negative environmental impacts and benefits. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Experience in conducting environmental impact assessments for Concentrated Solar Power (CSP) Projects, Wind Energy Projects and grid infrastructure projects as well as infrastructure projects. Recent projects have been undertaken for both the public- and private-sector, including electricity generation and transmission projects (wind and solar), linear developments (such local roads and power lines), as well as general environmental planning, development and management. The completion of a diverse set of environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements.

SKILLS BASE AND CORE COMPETENCIES

- Compilation of environmental impact assessment reports and environmental management programmes in accordance with relevant environmental legislative requirements;
- Analysis and manipulation of geographical information and data and technical experience with the use of ArcGIS;
- Identification and assessment of potential negative environmental impacts and benefits through the review of specialist studies;
- Public participation/involvement and stakeholder consultation;
- Identification of practical and achievable mitigation measures and the compilation of appropriate management plans; and
- Key experience in the assessment of impacts associated with renewable energy and large infrastructure projects.

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Sc. (Hons.) Environmental Management (2014), North-West University, Potchefstroom
- B.Sc. Environmental- and Biological Science (2013), North–West University, Potchefstroom

Courses:

- Integrated Water Resources Management, the National Water Act and Water Use Authorisations (2017), Carin Bosman Sustainable Solutions

EMPLOYMENT

Date	Company	Roles and Responsibilities
September 2015 - Current	Savannah Environmental (Pty) Ltd	Environmental Assessment Practitioner *Tasks include: Compilation of Environmental Impact Assessment (EIA) reports; Basic Assessment (BA) reports and Environmental Management Programmes; Environmental Screening reports; Co-ordination of the public participation process; Project management; project proposals and tenders; Client liaison and Marketing; Process EIA Applications.* GIS (utilising ArcGIS), *Tasks include: Analysis and manipulation of data, screening assessments; compilation of maps.*

PROJECT EXPERIENCE

<u>Renewable Power Generation Projects: Solar Energy Facilities</u>

Basic Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Thaba Eco Hotel SEF, Gauteng	*Camco Clean Energy*	*EAP*
Moeding Solar PV Facility, North West Province	*Moeding Solar*	*EAP*

Screening Studies

Project Name & Location	Client Name	Role
Pre-feasibility desktop screening and fatal flaw analysis for a solar PV project near Hotazel, Northern Cape Province	*ABO Wind*	*EAP*
Pre-feasibility desktop screening and fatal flaw analysis for a solar PV project near Vryburg, North West Province	*ABO Wind*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
Sol Invictus PV 1, Aggeneys, Northern Cape	*Cyraclox*	*GIS*
Sol Invictus PV 2, Aggeneys, Northern Cape	*Cyracraft*	*GIS*
Sol Invictus PV 3, Aggeneys, Northern Cape	*Cyrafusion*	*GIS*
Sol Invictus PV 4, Aggeneys, Northern Cape	*Cyralex*	*GIS*
Pre-feasibility desktop screening and fatal flaw analysis for a solar PV project near Hotazel, Northern Cape Province	*ABO Wind*	*GIS*
Pre-feasibility desktop screening and fatal flaw analysis for a solar PV project near Aggeneys, North West Province	*ABO Wind*	*GIS*
Moeding Solar PV Facility, North West Province	*Moeding Solar*	*GIS*

Renewable power generation projects: Wind Energy Facilities

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Hartebeest WEF, Moorreesburg, Western Cape	*Hartebeest Wind Farm*	*EAP*

Environmental Permitting & WUL Applications

Project Name & Location	Client Name	Role
Karusa WEF WUL Application, Northern Cape	*ACED*	*EAP*
Soetwater WEF WUL Application, Northern Cape	*ACED*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
Hartebeest WEF, Moorreesburg, Western Cape	*Hartebeest Wind Farm*	*GIS*
Karusa WEF WUL Application, Northern Cape	*ACED*	*GIS*
Soetwater WEF WUL Application, Northern Cape	*ACED*	*GIS*

Renewable Power Generation Projects: Concentrated Solar Facilities (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ilanga CSP 9, Northern Cape	*Emvelo Holdings*	*EAP*
Noupoort CSP, Northern Cape	*CRESCO Energy*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
Noupoort CSP, Northern Cape	*CRESCO Energy*	*GIS*

Renewable Power Generation Projects: Hydroelectrical Power Generation Facilities

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Kruisvallei Hydroelectric Power Generation Scheme	*Zevobuzz*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role

Kruisvallei Hydroelectric Power Generation Scheme	*Zevobuzz*	*GIS*

Environmental Permitting & WUL Applications

Project Name & Location	Client Name	Role
WULA for the Kruisvallei Hydroelectric Power Generation Scheme	*Zevobuzz*	*EAP*
GA for the power line associated with the Kruisvallei Hydroelectric Power Generation Scheme	*Zevobuzz*	*EAP*

Steam Generation Projects:

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Clayville Thermal Plant, Gauteng	*Bellmall Energy*	*EAP*

Screening Studies

Project Name & Location	Client Name	Role
Fatal flaw analysis for the Clayville Thermal Plant, Gauteng	*Bellmall Energy*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
Clayville Thermal Plant, Gauteng	*Bellmall Energy*	*GIS*

Grid Infrastructure Projects

Basic Assessments

Project Name & Location	Client Name	Role
Gunstfontein Switching Station and Power Line, Northern Cape	*ACED*	*EAP*
Zonnebloem Switching Station and Power Lines, Mpumalanga	*Eskom SOC Ltd*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
Zonnebloem Switching Station and Power Lines, Mpumalanga	*Eskom SOC Ltd*	*GIS*

Mining Sector Projects

Environmental Permitting & WUL Applications

Project Name & Location	Client Name	Role
S53 for Steynsrus PV 1, Western Cape	*Cronimet Power Solutions*	*EAP*
S53 for Steynsrus PV 2, Western Cape	*Cronimet Power Solutions*	*EAP*
S53 for Heuningspruit PV 1, Western Cape	*Cronimet Power Solutions*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
S53 for Steynsrus PV 1, Western Cape	*Cronimet Power Solutions*	*GIS*

S53 for Steynsrus PV 2, Western Cape	*Cronimet Power Solutions*	*GIS*
S53 for Heuningspruit PV 1, Western Cape	*Cronimet Power Solutions*	*GIS*

Infrastructure Development Projects (bridges, pipelines, roads, waste etc)

Basic Assessments

Project Name & Location	Client Name	Role
MN73 Road Realignment, Northern Cape	*Northern Cape Department of Roads and Public Works*	*EAP*
S24G for the unlawful commencement of activities within a watercourse, Honeydew, Gauteng	*Soror Language Services cc*	*EAP*
Access Roads and Watercourse Crossings for the Iziduli Emoyeni Wind Energy Facility	*Emoyeni Wind Farm Renewable Energy*	*EAP*
Access Roads and Watercourse Crossings for the Msenge Emoyeni Wind Energy Facility	*Amakhala Emoyeni Renewable Energy*	*EAP*

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
S24G for the operation of a Aluminium, Alumino-thermic, Briquetting, Separation and Manganese Plant, Gauteng Province	*GfE-MIR Alloys and Minerals SA*	*EAP*

Geographical Information Systems (GIS)

Project Name & Location	Client Name	Role
MN73 Road Realignment, Northern Cape	*Northern Cape Department of Roads and Public Works*	*GIS*
S24G for the unlawful commencement of activities within a watercourse, Honeydew, Gauteng	*Soror Language Services cc*	*GIS*
Access Roads and Watercourse Crossings for the Iziduli Emoyeni Wind Energy Facility	*Emoynei Wind Farm Renewable Energy*	*GIS*
Access Roads and Watercourse Crossings for the Msenge Emoyeni Wind Energy Facility	*Amakhala Emoyeni Renewable Energy*	*GIS*
S24G for the operation of a Aluminium, Alumino-thermic, Briquetting, Separation and Manganese Plant, Gauteng Province	*GfE-MIR Alloys and Minerals SA*	*GIS*

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CURRICULUM VITAE OF SARAH WATSON

Profession: Environnemental Consultant

Specialisation: Environmental Impact Assessment, Environmental Management, Environmental Compliance and Due Diligence, and Compilation of Reports for projects in the infrastructure sector.

Work Experience: Seven (7) years in the environmental field

VOCATIONAL EXPERIENCE

Sarah has a Bachelor of Social Science (B.Soc.Sci.) Honours Degree in Geography and Environmental Management from the University of KwaZulu-Natal (UKZN), and seven (7) years of experience as an Environmental Consultant in the field of Environmental Impact Assessment and Environmental Management. She has experience working on a range of projects, specifically within the telecommunications; residential; industrial; bulk infrastructure; rural development; and energy sectors.

SKILLS BASE AND CORE COMPETENCIES

- Environmental Assessment
- Environmental Management
- Environmental Compliance Monitoring
- Geographic Information System (GIS)
- Stakeholder Engagement

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Soc.Sci. Honours in Geography and Environmental Management, University of KwaZulu-Natal, 2007
- B.Soc.Sci. Geography and Environmental Management, University of KwaZulu-Natal, 2006

Short Courses:

- Environmental and Social Risk Management (ESRM), International Finance Corporation, 2018

Professional Society Affiliations:

- Member of the South African affiliate of the International Association for Impact Assessment (IAIAsa)
- Member of the Society of South African Geographers (SSAG).

EMPLOYMENT

Date	Company	Roles and Responsibilities
October 2016 – Current	Savannah Environmental (Pty) Ltd	Environmental Consultant *Tasks included: Executing Environmental Impact Assessment (EIA) processes, GIS Work, Environmental Screening, Environmental Due Diligence, and Environmental Management and auditing*
December 2013 – December 2014	Golder Associates Africa (Pty) Ltd	Environmental Consultant *Tasks included: Executing Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes, GIS work, Environmental Due Diligence, and Environmental Management and auditing*
January 2011 – November 2013	Scientific and Industrial Research (CSIR)	Environmental Consultant *Tasks included: Executing Environmental Impact Assessment (EIA) and Basic Assessment (BA) processes, GIS work, Public Participation, Environmental Screening, and Environmental Management*
April 2008 – December 2010	K2M Environmental (Pty) Ltd	Environmental Consultant *Tasks included: Assisting Senior Environmental Consultant with executing Basic Assessment (BA) processes, GIS work, Public Participation, Preliminary Environmental Screening, and Environmental Managements*

PROJECT EXPERIENCE

Renewable Power Generation Projects: Solar Energy Facilities

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	*Client Name*	*Role*
Combined EIA for the Betelgeuse PV Solar Projects 1, 2, 3 and 4; between Murraysburg and Victoria West, Western Cape Province.	*Aurora Power Solutions (Pty) Ltd*	*Environmental, GIS and Public Participation Consultant (Scoping Phase)*
EIA for the 75 MW Glen Thorne PV Solar Facility, near Bloemfontein, Free State Province.	*SolaireDirect*	*Author of the draft Scoping Report (SR)*

Basic Assessments

Project Name & Location	*Client Name*	*Role*
BA for the PV Power Project on Kennilworth Farm, Northern Cape.	*Biotherm Energy*	*Author of the draft Basic Assessment Report (BAR)*

Screening Studies

Project Name & Location	*Client Name*	*Role*
Environmental Site Screening Assessment For Solar PV Energy Facilities proposed at Salima, Lilongwe and Golomoti, Central Region, Malawi.	*H1 Holdings (Pty) Ltd*	*Environmental and GIS Consultant*

Environmental Compliance, Auditing and ECO

Project Name & Location	***Client Name***	***Role***
2017 Annual Environmental Compliance Evaluation with the Equator Principles and Environmental and Social Action Plan for the Mulilo Solar PV De Aar Photovoltaic Solar Energy Facility, Northern Cape Province	*Mulilo Renewable Energy Solar PV De Aar (Pty) Ltd*	*Auditor*
2017 Annual Environmental Compliance Evaluation with the Equator Principles and Environmental and Social Action Plan for the Mulilo Solar PV Prieska Photovoltaic Solar Energy Facility, Northern Cape Province	*Mulilo Renewable Energy Solar PV Prieska (Pty) Ltd*	*Auditor*
Biannual Environmental Compliance Audit of the Konkoonsies 10MW Photovoltaic (PV) Solar Energy Facility near Pofadder, Northern Cape Province	*Limarco 77(Pty) Ltd*	*Auditor*
Biannual Environmental Compliance Audit of the Aries 10MW Photovoltaic (PV) Solar Energy Facility near Kenhardt, Northern Cape Province	*Sevenstones 159 (Pty) Ltd*	*Auditor*
Final Environmental Compliance Audit for the Xina Solar One Thermal Plant, near Pofadder, Northern Cape Province	*Xina Solar One RF (Pty) Ltd*	*Auditor*

Renewable Power Generation Projects: Wind Energy Facilities

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Combined EIA for the Ishwati Emoyeni Wind Energy Facility and associated Eskom Grid Connection Infrastructure, near Murraysburg, Western Cape Province.	*Windlab Developments South Africa (Pty) Ltd (WDSA)*	*Environmental, GIS, and Public Participation Consultant (Scoping Phase)*
EIA for the proposed Universal Wind Energy Project in the Coega IDZ, Eastern Cape Province.	*Universal Wind*	*Environmental Consultant*

Screening Studies

Project Name & Location	***Client Name***	***Role***
Environmental Screening Study (ESS) of Sites being Investigated for Potential Wind Energy Projects, in the Northern Cape, Eastern Cape, Western Cape; and KwaZulu-Natal Provinces.	*Confidential*	*Environmental and GIS Consultant*

Due Diligence Reporting

Project Name & Location	***Client Name***	***Role***
Environmental and Social Due Diligence Report for the Roggeveld Wind Farm in the Northern and Western Cape Province.	*Building Energy South Africa (Pty) Ltd*	*Environmental Consultant*

Conventional Power Generation Projects (Coal)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***

H2 Energy Power Station and associated infrastructure near KwaMhlanga, Mpumalanga Province.	*H2 Clean Energy (Pty) Ltd*	*Environmental and GIS Consultant*
Mutsho Power Project and Associated Infrastructure on a site near Makhado (Louis Trichardt), Limpopo Province.	*Mutsho Power (Pty) Ltd*	*Environmental and GIS Consultant*

Screening Studies

Project Name & Location	***Client Name***	***Role***
Environmental Site Screening Assessment for a new coal-fired power station near Makhado (Louis Trichardt), Limpopo Province.	*Confidential*	*Environmental and GIS Consultant*

<u>Mining Sector Projects</u>

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
ESIA for a proposed Iron Ore Mine near Melmoth, Northern KwaZulu-Natal.	*Jindal Mining (Pty) Ltd*	*Environmental Consultant (Scoping Phase)*
ESIA for a proposed Iron Ore Processing Site near Melmoth, KwaZulu-Natal Province.	*Jindal Processing (Pty) Ltd*	*Environmental Consultant (Scoping Phase)*

Environmental Compliance, Auditing and ECO

Project Name & Location	***Client Name***	***Role***
Independent External Compliance audit of Palesa Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga Province	*HCI Coal*	*Auditor*
Independent External Compliance audit of Palesa Mine's Waste Management License (WML), near KwaMhlanga, Mpumalanga Province	*HCI Coal*	*Auditor*
Independent External Compliance audit of Mbali Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga Province	*HCI Coal*	*Auditor*

Infrastructure Development Projects (bridges, pipelines, roads, etc.)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
EIA for the proposed Vopak-Reatile Terminal Richards Bay Bulk Liquid Storage and Handling Facility, Richards Bay, KwaZulu-Natal Province.	*Vopak South Africa Developments (Pty) Ltd.*	*Environmental Consultant (Scoping Phase)*
EIA for a proposed Common User Marine Servitude and Pipelines	*Coega Development Corporation (CDC)*	*Environmental Consultant (Scoping Phase)*

Basic Assessments

Project Name & Location	***Client Name***	***Role***
BA for site clearing and site preparation activities on Lots 4 and 5 of Portion 3 of Erf 11478 in the South Dunes Precinct of the Port of Richards Bay, KwaZulu-Natal Province.	*Vopak South Africa Developments (Pty) Ltd.*	*Environmental Consultant*
BA for the proposed Hlabisa Bulk Water Supply Scheme, Hlabisa, KwaZulu-Natal Province.	*Mhlathuze Water*	*Environmental, GIS and Public Participation Consultant*
BA for the proposed construction of a Bulk Sewage Rising Main, City of uMhlathuze, KwaZulu-Natal Province.	*City of uMhlathuze Local Municipality.*	*Environmental, GIS and Public Participation Consultant*
BA for the proposed Rita Light Industrial Park Development, near Camperdown, KwaZulu-Natal Province.	*Daisy Wheel Investments (Pty) Ltd*	*Environmental, GIS and Public Participation Consultant*
BA for the development of a Light Industrial Park on Portion 10 of the Farm Balgowrie, Camperdown, KwaZulu-Natal.	*Daisy Wheel Investments (Pty) Ltd*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Richards Bay, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station at Felixton, near Empangeni, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Ballito, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Howick, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Richmond, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station in Durban, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Kokstad, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*

Project Name & Location	***Client Name***	***Role***
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Richmond, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Mkondeni, Pietermaritzburg, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station in Pietermaritzburg, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station in Bulwer, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Camperdown, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Underberg, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station in Cowies Hill, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station in Phoenix, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Kokstad, Eastern Cape Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Vulindlela, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MTN Telecommunication Mast and associated Base Station near Mpendle, KwaZulu-Natal Province.	*BSO International on behalf of MTN*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Water Tower Transmission Installations and associated Base Stations in Isipingo, KwaZulu-Natal Province	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Water Tower Transmission Installations and associated Base Stations in Umlazi, KwaZulu-Natal Province	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Rooftop Transmission Installation and associated Base Station in Reservoir Hills, KwaZulu-Natal Province.	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Rooftop Transmission Installation and associated Base Station in Wentworth, KwaZulu-Natal Province.	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Rooftop Transmission Installation and associated Base Station in Queensburgh, KwaZulu-Natal Province.	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*

Project Name & Location	Client Name	Role
BA for the construction of a MultiChoice Rooftop Transmission Installation and associated Base Station at the University of KwaZulu-Natal (UKZN), KwaZulu-Natal Province.	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of a MultiChoice Rooftop Transmission Installation and associated Base Station in Amanzimtoti, KwaZulu-Natal Province.	*BSO International on behalf of MultiChoice*	*Environmental, GIS and Public Participation Consultant*
BA for the construction of an iBurst Telecommunication Mast and associated Base Station in Kloof, KwaZulu-Natal Province	*BSO International on behalf of iBurst*	*Environmental, GIS and Public Participation Consultant*

Screening Studies

Project Name & Location	Client Name	Role
ESS for the proposed Development of Pier 1 Phase 2 Container Terminal in the Port of Durban, KwaZulu-Natal Province.	*Transnet Capital Projects (TCP).*	*Environmental Consultant and co-author*

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Construction of a New Distribution Centre and Warehouse on Erf 5539 and 5540 (Chloorkop X74), Lords View Industrial Park, Gauteng Province	*Olivier & Partners on behalf of ARB Holdings (Pty) Ltd*	*Environmental Control Officer (ECO)*
Gap Analysis of Venture Diversified Product (VDP) Rosslyn Facility's EMS, in Rosslyn, Gauteng Province	*Venture Diversified Product (VDP) Rosslyn*	*Auditor*
Construction of the Hlabisa Bulk Water Supply Scheme, in Hlabisa, KwaZulu-Natal Province	*Mhlathuze Water*	*Environmental Control Officer (ECO)*

Training

Project Name & Location	Client Name	Role
Capacity Building Workshop on Amended Environmental Impact Assessment Regulations and Associated Legislation, Durban, KwaZulu-Natal	*Transnet*	*Assistant Environmental Consultant and Researcher*

Housing and Urban Projects

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
EMP for the Makhasaneni Rural Subsidised Housing Development, in Mthonjaneni (Ward 5), KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Mthonjaneni Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
EMP for the Ntembisweni Rural Subsidised Housing Development in the Ntembisweni Traditional Authority Area near Greytown, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Umvoti Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*

Project Name & Location	Client Name	Role
EMP for the Sikhonyane Rural Subsidised Housing Development, in the Sikhonyane Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Mandeni Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
EMP for the Umzumbe Cluster A Rural Subsidised Housing Development, near Umzumbe, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Umzumbe Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
EMP for the Applebosch Rural Subsidised Housing Development near Ndwedwe, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Msunduzi Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*

Basic Assessments

Project Name & Location	Client Name	Role
BA for the proposed Loch-Sloy Rural Subsidised Housing Development, near Estcourt, KwaZulu-Natal Province.	*Imbabazane Local Municipality*	*Environmental, GIS and Public Participation Consultant*
BA for the proposed "Living in THE PARK" Residential Development, near Albert Falls, KwaZulu-Natal Province.	*J.H.K Developers*	*Environmental, GIS and Public Participation Consultant*
BA for the proposed Residential Development on the Remainder of Erf 215, Prince's Grant, KwaZulu-Natal Province.	*Princes Grant*	*Environmental, GIS and Public Participation Consultant*
BA for the proposed Greenmeadow Lane Retirement Village, KwaZulu-Natal Province.	*Rodney Blake Jolly on behalf of Georgies Avenue Investments (Pty) Ltd*	*Environmental, GIS and Public Participation Consultant*

Screening Studies

Project Name & Location	Client Name	Role
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, in the Ntembisweni Traditional Authority area near Greytown, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Umvoti Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, in the Mkhwanazi Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the City of uMhlathuze Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at Makhasaneni in Ward 5 of the Mthonjaneni Local Municipality, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Mthonjaneni Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*

Project Name & Location	***Client Name***	***Role***
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at the Sikhonyane Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Mandeni Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, near Ndwedwe, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Msunduzi Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at Nxamalala Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Impendle Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at KwaDolo Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Msinga Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at Ndlangubo Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the uMlalazi Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at the Embo Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Maphumulo Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for a Rural Subsidised Housing Development, at Mthandeni Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Maphumulo Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*
Preliminary Environmental Assessment for the Highflats Slum Clearance Housing Project near Ixopo, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Ubuhlebezwe Local Municipality, and the KwaZulu-Natal Department of Housing.*	*Environmental and GIS Consultant*

Environmental Permitting & WUL Applications

Project Name & Location	***Client Name***	***Role***
Application for Planning Consent for the proposed Kwamavundla Rural Subsidised Housing Development in the Kwamavundla Traditional Authority area, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Hibiscus Coast Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Ngolokodo Rural Subsidised Housing Development, near Nquthu KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Ubuhlebezwe Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Mdletshe Traditional Authority Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Hlabisa Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Makhasaneni Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Mthonjaneni Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Njomelwane Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Ntambanana Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Umzumbe Cluster A Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Umzumbe Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Ntanzi Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Nongoma Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*
Application for Planning Consent for the proposed Abakwahlabisa Rural Subsidised Housing Development, KwaZulu-Natal Province.	*Stedone Developments and Bigen Africa on behalf of the Hlabisa Local Municipality, and the KwaZulu-Natal Department of Housing.*	*GIS Consultant and assistant Environmental Consultant*

Environmental Management Tools

Screening Studies

Project Name & Location	***Client Name***	***Role***
Umzinyathi District Municipality's Strategic Environmental Assessment (July 2009).	*Umzinyathi District Municipality*	*Assistant GIS Consultant*

Specialist Studies

Social Impact Assessments

Project Name & Location	***Client Name***	***Role***
BA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	*Zevobuzz (Pty) Ltd*	*Social Consultant*
Lake Management Plan for Lake Mzingazi, Richards Bay, KwaZulu-Natal Province	*City of uMhlathuze*	*Social Consultant (Review and update of Social Assessment)*

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CURRICULUM VITAE OF NICOLENE VENTER

Profession : Public Participation and Social Consultant

Specialisation: Public participation process; stakeholder engagement; facilitation (workshops, focus group and public meetings; public open days; steering committees); monitoring and evaluation of public participation and stakeholder engagement processes

Work Experience: 21 years' experience as a Public Participation Practitioner and Stakeholder Consultant

VOCATIONAL EXPERIENCE

Over the past 21 years Nicolene established herself as an experienced and well recognised public participation practitioner, facilitator and strategic reviewer of public participation processes. She has experience in managing public participation projects and awareness creation programmes. Her experience includes designing and managing countrywide public participation and awareness creation projects, managing multi-project schedules, budgets and achieving project goals. She has successfully undertaken several public participation processes for EIA, BA and WULA projects. The EIA and BA process include linear projects such as the NMPP, Eskom Transmission and Distribution power lines as well as site specific developments such as renewable energy projects i.e. solar, photo voltaic and wind farms. She also successfully managed stakeholder engagement projects which were required to be in line with the Equator Principles.

SKILLS BASE AND CORE COMPETENCIES

- Project Management
- Public Participation, Stakeholder Engagement and Awareness Creation
- Public Speaking and Presentation Skills
- Facilitation (workshops, focus group meetings, public meetings, public open days, working groups and committees)
- Social Assessments (Stakeholder Analysis / Stakeholder Mapping)
- Monitoring and Evaluation of Public Participation and Stakeholder Engagement Processes
- Community Liaison
- IFC Performance Standards
- Equator Principles
- Minute taking, issues mapping, report writing and quality control

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- Higher Secretarial Certificate, Pretoria Technicon (1970)

Short Courses:

- Techniques for Effective Public Participation, International Association for Public Participation, IAP2 (2008)
- Foundations of Public Participation (Planning and Communication for Effective Public Participation, IAP2 (2009)
- Certificate in Public Relations, Public Relation Institute of South Africa, Damelin Management School (1989)

Professional Society Affiliations:

- Board Member of International Association for Public Participation (IAP2): Southern Africa

EMPLOYMENT

Date	Company	Roles and Responsibilities
November 2018 – current	Savannah Environmental (Pty) Ltd	Public Participation and Social Consultant <u>*Tasks include:*</u> *Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.* *Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.*
2016 – October 2018	Imaginative Africa (Pty) Ltd *(company owned by Nicolene Venter)*	Independent Consultant *Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements:* <u>*Tasks include:*</u> *Tasks include: Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.* *Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project*

		affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved *<u>Clients</u>:* *SiVEST Environmental, Savannah Environmental, Baagi Environmental; Royal Haskoning DHV (previously SSI)*
2013 - 2016	Zitholele Consulting *Contact person: Dr Mathys Vosloo* *Contact number: 011 207 2060*	Senior Public Participation Practitioner and Project Manager <u>Tasks included:</u> *Project managed public participation process for EIA/BA/WULA/EAL projects. Manages two Public Participation Administrators. Public Participation tasks as outlined as above and including financial management of public participation processes.*
2011 - 2013	Imaginative Africa (Pty) Ltd *(company owned by Nicolene Venter)*	Independent Consultant Consulting to various Environmental Assessment Practitioners for Public Participation and Stakeholder Engagements <u>Tasks included:</u> *Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.* *Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved* *<u>Clients</u>:* *Bohlweki Environmental, Bembani Sustainability (Pty) Ltd; Naledzi Environmental*
2007 – 2011	SiVEST SA (Pty) Ltd *Contact person: Andrea Gibb* *Contact number: 011 798 0600*	Unit Manager: Public Participation Practitioner *<u>Tasks included:</u>* *Project managed public participation process for EIA/BA projects. Manages two Junior Public Participation Practitioners. Public Participation*

		tasks as outlined as above and including financial management of public participation processes.
2005 – 2006	Imaginative Africa (Pty) Ltd *(company owned by Nicolene Venter)*	Independent Consultant Public Participation and Stakeholder Engagement Practitioner <u>*Tasks included:*</u> *Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, Tribal Chiefs, affected landowners, etc.* *Managing interaction between Stakeholders and Team Members, liaising with National, Provincial and Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical information communicated to and consultation with all level of stakeholders involved.* <u>*Clients:*</u> *Manyaka-Greyling-Meiring (previously Greyling Liaison and currently Golder Associates)*
1997 - 2004	Imaginative Africa (Pty) Ltd *(company owned by Nicolene Venter)*	Independent Consultant: Public Participation Practitioner. <u>*Tasks included:*</u> *Drafting of a Public Participation Plan with key deliverable dates and methodology to be followed, Background Information Document, Letters to Stakeholders and Interested and/or Affected Parties (I&APs) inclusive of key project deliverables and responses to questions / concerns raised; Stakeholder identification; facilitating stakeholder workshops, focus group and public meetings; conduct one-on-one consultation with Community Leaders, affected landowners, etc.* *Managing interaction between Stakeholders and Team Members, liaising with National, Provincial Local Authorities, managing community consultation and communications in project affected areas, attend to the level of technical*

		information communicated to and consultation with all level of stakeholders involved. *<u>Clients</u>:* *Greyling Liaison (currently Golder Associates); Bembani Sustainability (Pty) Ltd; Lidwala Environmental; Naledzi Environmental*

PROJECT EXPERIENCE

<u>RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES</u>

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Lichtenburg PVs (3 PVs) & Power Lines (grid connection), Lichtenburg, North West Province	*Atlantic Energy Partners* *EAP: Savannah Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders*
Allepad PVs 4 PVs) & Power Lines (grid connection), Upington, Northern Cape Province	*IL Energy* *EAP: Savannah Environmental*	
Hyperion Solar PV Developments (4 PVs) and Associated Infrastructures, Kathu, Northern Cape Province	*Building Energy* *EAP: Savannah Environmental*	
Aggeneys Solar PV Developments (2 PVs) and Associated Infrastructures, Aggeneys, Northern Cape Province	*Atlantic Energy Partners and ABO Wind* *EAP: Savannah Environmental*	

Project Name & Location	***Client Name***	***Role***
Tlisitseng PV, including Substations & Power Lines, Lichtenburg, North West Province	*BioTherm Energy* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
Sendawo PVs, including Substations & Power Lines, Vryburg, North West Province		
Helena Solar 1, 2 and 3 PVs, Copperton, Northern Cape Province		
Farm Spes Bona 23552 Solar PV Plants, Bloemfontein, Free State Province	*Surya Power* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
De Aar Solar Energy Facility, De Aar, Northern Cape Province	*South Africa Mainstream Renewable Power Developments* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
Droogfontein Solar Energy Facility, Kimberley, Northern Cape Province		
Kaalspruit Solar Energy Facility, Loeriesfontein, Northern Cape Province		
Platsjambok East PV, Prieska, Northern Cape Province		
Renosterburg PV, De Aar, Northern Cape Province	*Renosterberg Wind Energy Company* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*

19MW Solar Power Plant on Farm 198 (Slypklip), Danielskuil, Northern Cape Province	*Solar Reserve South Africa* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*

Basic Assessments and Environmental Management Programmes – Located within the Renewable Energy Development Zones (REDZ)

Project Name & Location	***Client Name***	***Role***
Moeding Solar PV Solar Energy Facility, Vryburg, North West Province	*Kabi Solar* *EAP: Savannah Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders*
Sirius Solar PV Solar Energy Facility, Upington, Northern Cape Province	*SOLA Future Energy* *EAP: Savannah Environmental*	

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Aletta Wind Farm, Copperton, Northern Cape Province	*BioTherm Energy* *EAP: SiVEST*	*Public Participation*
Eureka Wind Farm, Copperton, Northern Cape Province		
Loeriesfontein Wind Farm, Loeriesfontein, Northern Cape Province	*South Africa Mainstream Renewable Power Developments* *EAP: SiVEST*	*Public Participation*
Droogfontein Wind Farm, Loeriesfontein, Northern Cape Province		
Four Leeuwberg Wind Farms, Loeriesfontein, Northern Cape Province		
Noupoort Wind Farm, Noupoort, Northern Cape Province		
Mierdam PV & Wind Farm, Prieska, Northern Cape Province		
Platsjambok West Wind Farm & PV, Prieska, Northern Cape Province		

Basic Assessments and Environmental Management Programmes – Located within the Renewable Energy Development Zones (REDZ)

Project Name & Location	**Client Name**	**Role**
Nama Wind Energy Facility, Northern Cape Province	*Genesis ECO* *EAP: Savannah Environmental*	*Project Manage the Public Participation Process* *Facilitate all meetings* *Consultation with Government Officials, Key Stakeholders, Landowners & Community Leaders*
Zonnequa Wind Energy Facility, Northern Cape Province		

Environmental Authorisation Amendments

Project Name & Location	***Client Name***	***Role***

Beaufort West 280MW Wind Farm into two 140MW Trakas and Beaufort West Wind Farms, Western Cape	*South Africa Mainstream Renewable Power Developments* *EAP: SiVEST*	*Public Participation*

RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Upington Concentrating Solar Plant and associated Infrastructures, Northern Cape Provionce	*Eskom Holdings* *EAP: Bohlweki Environmental*	*Public Participation*

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Pluto-Mahikeng Main Transmission Substation and 400kV Power Line (Carletonville to Mahikeng), Gauteng and North West Provinces	*Eskom Holdings* *EAP: Baagi Environmental*	
Thyspunt Transmission Lines Integration Project, Eastern Cape Province	*Eskom Holdings* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
Westrand Strengthening Project, Gauteng Province		*Public Participation,*
Mookodi Integration Project, North-West Province		
Transnet Coallink, Mpumalanga and KwaZulu-Natal Provinces		
Delarey-Kopela-Phahameng Distribution power line and newly proposed Substations, North-West Province		*Public Participation, Landowner and Community Consultation*
Invubu-Theta 400kV Eskom Transmission Power Line, KwaZulu-Natal Province	*Eskom Holding* *EAP: Bembani Environmental*	

Facilitation

Project Name & Location	***Client Name***	***Meeting Type***
Bloemfontein Strengthening Project, Free State Province	*Eskom Holdings* *EAP: Baagi Environmental*	*Public Meetings*
Mooidraai-Smitkloof 132kV Power Line and Substation, Northern Cape Province	*Eskom Holdings* *EAP: SSI*	*Focus Group Meetings*
Aggeneis-Oranjemond 400kV Eskom Transmission Power Line, Northern Cape Province	*Eskom Holdings* *EAP: Savannah Environmental*	*Focus Group Meetings & Public Meetings*
Ariadne-Eros 400kV/132kV Multi-Circuit Transmission Power Line (Public Meetings)	*Eskom Holdings* *EAP: ACER Africa*	*Public Meetings*
Majuba-Venus 765kV Transmission Power Lines, Mpumlanaga Province		*Public Meetings*

Basic Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***

Melkhout-Kudu-Grassridge 132kV Power Line Project (project not submitted to DEA), Eastern Cape Province	*Eskom Holdings* *EAP: SiVEST*	*Public Participation, Landowner and Community Consultation*
Tweespruit-Welroux-Driedorp-Wepener 132Kv Power Line, Free State Province		*Public Participation, Landowner and Community Consultation*
Kuruman 132Kv Power Line Upgrade, Northern Cape Province	*Eskom Holdings* *EAP: Zitholele*	*Public Participation, Landowner and Community Consultation*
Vaalbank 132Kv Power Line, Free State Province		*Public Participation, Landowner and Community Consultation*
Pongola-Candover-Golela 132kV Power Line (Impact Phase), KwaZulu-Natal Province		*Public Participation, Landowner and Community Consultation*
Ndumo-Geziza 132kV Power Line, KwaZulu-Natal Province		*Public Participation, Landowner and Community Consultation*

Screening Studies

Project Name & Location	***Client Name***	***Role***
Potential Power Line Alternatives from Humansdorp to Port Elizabeth, Eastern Cape Province	*Nelson Mandela Bay Municipality* *EAP: SiVEST*	*Social Assessment*

CONVENTIONAL POWER GENERATION PROJECTS (COAL, GAS AND ASSOCIATED INFRASTRUCTURE)

Stakeholder Engagement

Project Name & Location	***Client Name***	***Role***
Determination, Review and Implementation of the Reserve in the Olifants/Letaba System	*Department of Water and Sanitation* *Golder Associates*	*Secretarial Services*
Orange River Bulk Water Supply System		
Levuvu-Letaba Resources Quality Objectives		

Facilitation

Project Name & Location	***Client Name***	***Meeting Type***
Thabametsi IPP Power Station, Limpopo Province	*Thabametsi Power Company* *EAP: Savannah Environmental*	*Focus Group Meeting & Public Meeting*

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Richards Bay Combined Cycle Power Plant, Richards Bay, Kwa-Zulu Natal Province (Impact Phase)	*Eskom Holdings* *EAP: Savannah Environmental*	*Public Participation*
Medupi Flue Gas Desulphurisation Project (up to completion of Scoping Phase), Limpopo Province	*Eskom Holdings SOC Ltd* *EAP: Zitholele Consulting*	*Public Participation, Landowner and Community Consultation*
Kendal 30-year Ash Disposal Facility, Mpumalanga Province		
Kusile 60-year Ash Disposal Facility, Mpumalanga Province		

Camden Power Station Ash Disposal Facility, Mpumalanga Province		
Tutuka Fabric Filter Retrofit and Dust Handling Plant Projects, Mpumalanga Province	*Eskom Holdings SOC Ltd* *EAP: Lidwala Environmental*	*Public Participation, Landowner and Community Consultation*
Eskom's Majuba and Tutuka Ash Dump Expansion, Mpumalanga Province		*Public Participation, Landowner and Community Consultation*
Hendrina Ash Dam Expansion, Mpumalanga Province		*Public Participation, Landowner and Community Consultation*

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, RAILWAY LINES, ROADS, WATER RESOURCES, STORAGE FACILITIES, ETC)

Facilitation

Project Name & Location	***Client Name***	***Meeting Type***
Determination, Review and Implementation of the Reserve in the Olifants/Letaba System	*Department of Water and Sanitation* *Golder Associates*	*Secretarial Services*
Orange River Bulk Water Supply System	*Department of Water and Sanitation* *Golder Associates*	*Secretarial Services*
Levuvu-Letaba Resources Quality Objectives	*Department of Water and Sanitation* *Golder Associates*	*Secretarial Services*
SmancorCR Chemical Plant (Public Meeting), Gauteng Province	*Samancor Chrome (Pty) Ltd* *EAP: Environment al Science Associates*	*Public Meeting*
SANRAL N4 Toll Highway Project (2nd Phase), Gauteng & North West Provinces	*Department of Transport* *EAP:*	*Public Meetings*

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	***Client Name***	***Role***
Transnet's New Multi-Products Pipeline traversing Kwa-Zulu Natal, Free State and Gauteng Provinces	*Transnet* *EAP: Bohlweki Environmental*	*Public Participation*

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Realignment of the Bulshoek Dam Weir near Klawer and the Doring River Weir near Clanwilliam, Western Cape Province	*Dept of Water and Sanitation* *EAP: Zitholele*	*Public Participation*

MINING SECTOR

Environmental Impact Assessment and Environmental Management Programme

Project Name & Location	**Client Name**	**Role**
Zero Waste Recovery Plant at highveld Steel, Mpumalanga Province	*Anglo African Metals* *EAP: Savannah Environmental*	*Public Participation*
Koffiefontein Slimes Dam, Free State Province	*Petra Diamond Mines* *EAP: Zitholele*	*Public Participation*

Baobab Project: Ethenol Plant, Chimbanje, Middle Sabie, Zimbabwe	*Applicant: Green Fuel* *EAP: SiVEST*	*Public Participation & Community Consultation*
BHP Billiton Energy Coal SA's Middelburg Water Treatment Plant, Mpumalanga	*BHP Billiton Group* *EAP: Jones & Wagener*	*Public Participation*

CURRICULUM VITAE:

Gerhard Botha

Name:	:	Gerhardus Alfred Botha
Date of Birth	:	11 April 1986
Identity Number	:	860411 5136 088
Postal Address	:	PO Box 12500 Brandhof 9324
Residential Address	:	3 Jock Meiring Street Park West Bloemfontein 9301
Cell Phone Number	:	084 207 3454
Email Address	:	gabotha11@gmail.com
Profession/Specialisation	:	Ecological and Biodiversity Consultant
Nationality:	:	South African
Years Experience:	:	8
Bilingualism	:	Very good – English and Afrikaans

Professional Profile:

Gerhard is a Managing Director of Nkurenkuru Ecology and Biodiversity (Pty) Ltd. He has a BSc Honours degree in Botany from the University of the Free State Province and is currently completing a MSc Degree in Botany. He began working as an environmental specialist in 2010 and has since gained extensive experience in conducting ecological and biodiversity assessments in various development field, especially in the fields of conventional as well as renewable energy generation, mining and infrastructure development. Gerhard is a registered Professional Natural Scientist (Pr. Sci. Nat.)

Key Responsibilities:

Specific responsibilities as an Ecological and Biodiversity Specialist include, inter alia, professional execution of specialist consulting services (including flora, wetland and fauna studies, where required), impact assessment reporting, walk through surveys/ground-truthing to inform final design, compilation of management plans, compliance monitoring and audit reporting, in-house ecological awareness training to on-site personnel, and the development of project proposals for procuring new work/projects.

Skills Base and Core Competencies

- Research Project Management
- Botanical researcher in projects involving the description of terrestrial and coastal ecosystems.
- Broad expertise in the ecology and conservation of grasslands, savannahs, karroid wetland and aquatic ecosystems.
- Ecological and Biodiversity assessments for developmental purposes (BAR, EIA), with extensive knowledge and experience in the renewable energy field (Refer to Work Experiences and References)
- Over 3 years of avifaunal monitoring and assessment experience.
- Mapping and Infield delineation of wetlands, riparian zones and aquatic habitats (according to methods stipulated by DWA, 2008) within various South African provinces of KwaZulu-Natal, Mpumalanga, Free State, Gauteng and Northern Cape Province for inventory and management purposes.
- Wetland and aquatic buffer allocations according to industry best practice guidelines.
- Working knowledge of environmental planning policies, regulatory frameworks and legislation
- Identification and assessment of potential environmental impacts and benefits.
- Assessment of various wetland ecosystems to highlight potential impacts, within current and proposed landscape settings, and recommend appropriate mitigation and offsets based on assessing wetland ecosystem service delivery (functions) and ecological health/integrity.
- Development of practical and achievable mitigation measures and management plans and evaluation of risk to execution
- Qualitative and Quantitative Research

- Experienced in field research and monitoring
- Working knowledge of GIS applications and analysis of satellite imagery data
- Completed projects in several Provinces of South Africa and include a number of projects located in sensitive and ecological unique regions.

Education and Professional Status

Degrees:

- *2015:* Currently completing a M.Sc. degree in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- *2009:* B.Sc. Hons in Botany (Vegetation Ecology), University of the Free State, Bloemfontein, RSA.
- *2008:* B.Sc. in Zoology and Botany, University of the Free State, University of the Free State, Bloemfontein, RSA.

Courses:

- *2013*: Wetland Management (ecology, hydrology, biodiversity and delineation) – University of the Free State accredited course.
- *2014*: Introduction to GIS and GPS (Code: GISA 1500S) – University of the Free State accredited course.

Professional Society Affiliations:

- The South African Council of Natural Scientific Professions: Pr. Sci. Nat. Reg. No. 400502/14 (Botany and Ecology).

Employment History

- December 2017 – Current: Nkurenkuru Ecology and Biodiversity (Pty) Ltd
- 2016 – November 2017: ECO-CARE Consultancy
- *2015 - 2016*: Ecologist, Savannah Environmental (Pty) Ltd
- *2013 – 2014*: Working as ecologist on a freelance basis, involved in part-time and contractual positions for the following companies
    - Enviroworks (Pty) Ltd
    - GreenMined (Pty) Ltd
    - Eco-Care Consultancy (Pty) Ltd

- Enviro-Niche Consulting (Pty) Ltd
- Savannah Environmental (Pty) Ltd
- Esicongweni Environmental Services (EES) cc

- *2010 - 2012*: Enviroworks (Pty) Ltd

Publications

Publications:

- Botha, G.A. & Du Preez, P.J. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. S. *Afr. J. Bot*., **98**: 172-173 .

Congress papers/posters/presentations:

- Botha, G.A. 2015. A description of the wetland and riparian vegetation of the Nxamasere palaeo-river's backflooded section, Okavango Delta, Botswana. 41st Annual Congress of South African Association of Botanists (SAAB). Tshipise, 11-15 Jan. 2015.
- Botha, G.A. 2014. A description of the vegetation of the Nxamasere floodplain, Okavango Delta, Botswana. 10st Annual University of Johannesburg (UJ) Postgraduate Botany Symposium. Johannesburg, 28 Oct. 2014.

Other

- Guest speaker at IAIAsa Free State Branch Event (29 March 2017)
- Guest speaker at the University of the Free State Province: Department of Plant Sciences (3 March 2017):

References:

- Christine Fouché
  Manager: GreenMined (Pty) LTD
  Cell: 084 663 2399
- Professor J du Preez
  Senior lecturer: Department of Plant Sciences
  University of the Free State
  Cell: 082 376 4404

WORK EXPERIENCES

&

References

Gerhard Botha

ECOLOGICAL RELATED STUDIES AND SURVEYS

- Barcelona 88/11kV substation and 88kV loop-in lines – Botanical Study (for Eskom Distribution).
- Farm development for academic purposes (Maluti FET College) on the Farm Rosedale 107, Harrismith – Ecological Study (for Agri Development Solutions).
- New boardwalk from Suiderstrand Gravel Road to Rasperpunt, Agulhas National Park – Botanical Survey (for SANPARKS).
- New boardwalk linking the southern most tip of Africa to the Cape Agulhas Lighthouse, Agulhas National Park – Botanical Survey (for SANPARKS)
- Construction of an icon at the southern most tip of Africa, Agulhas National Park – Botanical Survey (for SANPARKS).
- Optic Fibre Infrastructure Network, City of Cape Town Municipality – Assisted in botanical field work (for Dark Fibre Africa (Pty) Ltd).
- Optic Fibre Infrastructure Network, Swartland Municipality – Assisted in botanical field work (for Dark Fibre Africa).
- National long haul optic fibre infrastructure network project, Bloemfontein to Beaufort West – Protected and Endangered Species Walk-Through Survey & Invasive Plant Management Plan (for NEOTEL Ltd).
- National long haul optic fibre infrastructure network project, Bloemfontein to Beaufort West – Vegetation Rehabilitation Plan for illegally cleared areas (for NEOTEL Ltd).

- Proposed establishment of the Tugela Ridge Eco Estate on the farm Kruisfontein, Bergville – Ecological Study (for Enviroworks (Pty) Ltd).
- De Aar Freight Transport Hub – Ecological Scoping and Feasibility Study (for Enviroworks (Pty) Ltd).
- Construction of Botshabelo 132 kV line – Ecological Study (for Enviroworks (Pty) Ltd).
- Establishment of Rocks Farm chicken broiler houses – Botanical study (for Rocks Farm (Pty) Ltd).
- Illegally ploughed land on the Farm Wolwekop 2353 – Vegetation Rehabilitation Study (for Enviroworks (Pty) Ltd).
- Proposed Gihon Solar Farm - Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed expansion of the existing Afrimat quarry near Hluhluwe – Botanical Study (for GreenMined (Pty) Ltd).
- Audit of protected *Acacia erioloba* trees within the Assmang Wrenchville housing development footprint area – Botanical Audit (for Eco-Care Consultancy (Pty) Ltd).
- Rehabilitation of the N1 National Road between Sydenham and Glen Lyon – Peer Review of Ecological Report (for EKO Environmental (Pty) Ltd)
- Rehabilitation of the N6 National Road between Onze Rust and Bloemfontein – Peer Review of Ecological Report (for EKO Environmental (Pty) Ltd)
- Proposed expansion of the existing Scottburgh quarry near Amandawe – Botanical Study (for GreenMined (Pty) Ltd).
- Steelpoort Integration Project & Steelpoort to Wolwekraal 400kV Power Line – Botanical Walk Through Survey (for Savannah Environmental (Pty) Ltd).
- Proposed Transalloys circulating fluidised bed power station near Emalahleni – Ecological Impacts Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed Umbani circulating fluidised bed power station near Kriel – Scoping Ecological Impact Assessment & Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed Tshepong 5MW PV, Nyala 5MW and Eland 5MW facilities within Harmony Gold's mining rights areas between Odendaalsrus and Welkom – Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed Noupoort CSP Facility near Noupoort, Northern Cape Province –Ecological Scoping Assessment & Ecological Impacts Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed Buffels Solar 1 PV Facility near Orkney, North West Province – Ecological

Impact Assessment (for Savannah Environmental (Pty) Ltd.).

- Proposed Buffels Solar 2 PV Facility near Orkney, North West Province – Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Kalahari CSP Facility: 132kV Ferrum–Kalahari–UNTU & 132kV Kathu IPP–Kathu 1 Overhead Power Lines, Kathu, Northern Cape Province – Fauna and Flora Pre-Construction Walk Through Survey & Report (for Savannah Environmental (Pty) Ltd.).
- Kalahari CSP Facility: Access Roads, Kathu, Northern Cape Province – Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Karoshoek Solar Valley Development – Additional CSP Facility including tower infrastructure associated with authorised CSP Site 2 near Upington, Northern Cape Province – Ecological Scoping Report (for Savannah Environmental (Pty) Ltd.).
- Karoshoek Solar Valley Development – Proposed Ilanga CSP 7 and 8 Facilities near Upington, Northern Cape Province – Ecological Scoping Report (for Savannah Environmental (Pty) Ltd.).
- Karoshoek Solar Valley Development – Proposed Ilanga CSP 9 Facility near Upington, Northern Cape Province – Ecological Scoping Report (for Savannah Environmental (Pty) Ltd.).
- Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province): Invasive Plant Management Plan (for Savannah Environmental (Pty) Ltd.).
- Proposed Karusa Facility Substation and Ancillaries near Sutherland, Northern Cape Province – Ecological Basic Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed Eskom Karusa Switching Station and 132kV Double Circuit Overhead Power Line near Sutherland, Northern Cape Province - Ecological Basic Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province): Plant Search and Rescue and Rehabilitation Management Plan (for Savannah Environmental (Pty) Ltd.).
- Authorised Karusa Wind Energy Facility near Sutherland, Northern Cape Province – Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Proposed Soetwater Facility Substation, 132kV Overhead Power Line and Ancillaries, near Sutherland, Northern Cape Province - Ecological Basic Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near

Sutherland, Northern Cape Province): Invasive Plant Management Plan (for Savannah Environmental (Pty) Ltd.).

- Authorised Soetwater Wind Energy Facility near Sutherland, Northern Cape Province - Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province): Plant Search and Rescue and Rehabilitation Management Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius Phase 1 Solar PV Project near Upington, Northern Cape Province- Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Sirius Phase 2 Solar PV Project near Upington, Northern Cape Province- Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 1) Solar PV Facility near Upington, Northern Cape Province Invasive Plant Management Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 2) Solar PV Facility near Upington, Northern Cape Province - Invasive Plant Management Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 1) Solar PV Facility near Upington, Northern Cape Province – Rehabilitation and Revegetation Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 2) Solar PV Facility near Upington, Northern Cape Province – Rehabilitation and Revegetation Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 1) Solar PV Facility near Upington, Northern Cape Province - Plant Rescue and Protection Plan (for Savannah Environmental (Pty) Ltd.).
- Sirius (Phase 2) Solar PV Facility near Upington, Northern Cape Province - Plant Rescue and Protection Plan (for Savannah Environmental (Pty) Ltd.).
- Proposed Expansion of the existing Komsberg Main Transmission Substation near Sutherland, Northern Cape Province - Ecological Basic Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed Semonkong Wind Energy Facility near Semonkong, Maseru District, Lesotho – Ecological Pre-Feasibility Study (for Savannah Environmental (Pty) Ltd.).
- Proposed Metal Industrial Cluster and Associated Infrastructure near Kuruman, Northern Cape Province – Ecological Scoping Report (for Savannah Environmental (Pty) Ltd.).
- Proposed Woodhouse 1 and Woodhouse 2 PV Facilities near Vryburg, North West Province – Ecological Scoping Report & Ecological Impact Assessment (for Savannah

Environmental (Pty) Ltd.).

- Proposed CAMCO Clean Energy 100kW PV Solar Facility, Thaba Eco Lodge near Johannesburg, Gauteng Province: Ecological and Ridge Basic Assessment Report (for Savannah Environmental (Pty) Ltd.).
- Proposed Orkney Solar PV Facility near Orkney, North West Province - Ecological Scoping Report & Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed 132kV Power Line and On-Site Substation for the Authorised Golden Valley II Wind Energy Facility near Bedford, Eastern Cape Province - Ecological Basic Assessment Report (for Savannah Environmental (Pty) Ltd.).
- S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province – Ecological Assessment Report (for Savannah Environmental (Pty) Ltd.)
- Soetwater Wind Farm (Phase 2 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province): Re-assessment of Impacts and Ecological Sensitivities Following a Proposed Amendment in Turbine Specifications and Facility Layout (for Savannah Environmental (Pty) Ltd.).
- Karusa Wind Farm (Phase 1 of the Hidden Valley Wind Energy Facility near Sutherland, Northern Cape Province): Re-assessment of Impacts and Ecological Sensitivities Following a Proposed Amendment in Turbine Specifications and Facility Layout (for Savannah Environmental (Pty) Ltd.).
- Msenge Wind Farm near Bedford, Eastern Cape Province): Re-assessment of Impacts and Ecological Sensitivities Following a Proposed Amendment in Turbine Specifications and Facility Layout (for Savannah Environmental (Pty) Ltd.).
- Iziduli Emoyeni Wind Farm near Bedford, Eastern Cape Province: Re-assessment of Impacts and Ecological Sensitivities Following a Proposed Amendment in Turbine Specifications and Facility Layout (for Savannah Environmental (Pty) Ltd.).
- Proposed H2 Energy Power Station near Kwamhlanga, Mpumalanga Province - Ecological Scoping Report & Ecological Impact Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed Clayville Thermal Plant within the Clayville Industrial Area, Gauteng Province: Ecological Comments Letter (for Savannah Environmental (Pty) Ltd.).
- Proposed 100MW Moeding Solar PV Facility near Vryburg, North West Province – Ecological Basic Assessment (for Savannah Environmental (Pty) Ltd.)
- Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province – Ecological Basic Assessment (for Eskom

Distribution)

- Proposed Kruisvallei Hydroelectric Power Generation Scheme in the Ash River, Free State Province – Ecological Basic Assessment (for Savannah Environmental (Pty) Ltd.)
- Sirius Phase 1 Solar PV Project near Upington, Northern Cape Province - Fauna and Flora Pre-Construction Walk-Through Assessment & Report (for Savannah Environmental (Pty) Ltd.).
- Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province - Pre-Construction Fauna and Flora Walk-Through Investigation (for Savannah Environmental (Pty) Ltd.).
- Kruisvallei Hydroelectric 22kV Overhead Power Line, Clarens, Free State Province - Plant Rescue and Protection Plan (for Savannah Environmental (Pty) Ltd.).

WETLAND DELINEATION AND HYDROLOGICAL ASSESSMENTS

- Proposed Nyala 5MW PV facility within Harmony Gold's mining rights areas between Odendaalsrus and Welkom – Wetland Assessment & Delineation (for Savannah Environmental (Pty) Ltd).
- Proposed Eland 5MW PV facility within Harmony Gold's mining rights areas between Odendaalsrus and Welkom – Wetland Assessment & Delineation (for Savannah Environmental (Pty) Ltd).
- Proposed BlueWave 75MW PV Plant near Welkom Free State Province – Wetland Delineation and compilation of Map (for BlueWave Capital)
- Proposed Wolmaransstad Municipality 75MW PV Solar Energy Facility in the North West Province – Wetland Delineation Assessment (for Savannah Environmental (Pty) Ltd.).
- Proposed expansion of the Elandspruit Quarry near Ladysmith, KwaZulu-Natal Province – Wetland Assessment & Delineation (for GreenMined Environmental (Pty) Ltd.).
- Proposed new Olifantshoek 10MVA 132/11kV Substation and 31km Power Line – Surface Water & Hydrological Assessment (for Savannah Environmental (Pty) Ltd.)
- S24G for the unlawful commencement or continuation of activities within a watercourse, Honeydew, Gauteng Province – Aquatic Assessment Report and Delineation of Floodplains and/or Flood Lines (for Savannah Environmental (Pty) Ltd.)
- Proposed 100MW Moeding Solar PV Facility near Vryburg, North West Province – Wetland Delineation Assessment (for Savannah Environmental (Pty) Ltd.)

- Kruisvallei Hydroelectric 22kV Overhead Power Line (Amended Sections), Clarens, Free State Province – Wetland Delineation Assessment (for Savannah Environmental (Pty).Ltd.)
- Harmony (Nyala, Eland & Tsepong) Solar Energy Facilities: Amendment of Pipeline and Overhead Power Line Route – Wetland Delineation Assessment (for Savannah Environmental (Pty).Ltd.)

AVIFAUNAL ASSESSMENTS

- Proposed TEWA Solar 1 Facility, east of Upington, Northern Cape Province – Avifaunal Impact Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed TEWA Solar 2 Facility, east of Upington, Northern Cape Province – Avifaunal Impact Assessment (for Savannah Environmental (Pty) Ltd).
- Proposed new Olifantshoek 10MVA 132/11kV Substation and 31km Power Line – Avifaunal Impact Assessment (for Savannah Environmental (Pty) Ltd.)
- Proposed 100MW Moeding Solar PV Facility near Vryburg, North West Province – Avifuana Impact Assessment (for Savannah Environmental (Pty) Ltd.)
- Proposed Zonnebloem Switching Station (132/22kV) and 2X Loop-in Loop-out Power Lines (132kV), Mpumalanga Province – Avifauna Impact Assessment (for Eskom Distribution)

ENVIRONMENTAL IMPACT ASSESSMENT

- Barcelona 88/11kV substation and 88kV loop-in lines – BA (for Eskom).
- Thabong Bulk 132kV sub-transmission inter-connector line – EIA (for Eskom).
- Groenwater 45 000 unit chicken broiler farm – BA (for Areemeng Mmogo Cooperative).
- Optic Fibre Infrastructure Network, City of Cape Town Municipality – BA (for Dark Fibre Africa (Pty) Ltd).
- Optic Fibre Infrastructure Network, Swartland Municipality – BA (for Dark Fibre Africa).
- Construction and refurbishment of the existing 66kV network between Ruigtevallei Substation and Reddersburg Substation – EMP (for Eskom).
- Lower Kruisvallei Hydroelectric Power Scheme (Ash river) – EIA (for Kruisvallei Hydro (Pty) Ltd).
- Construction of egg hatchery and associated infrastructure – BA (For Supreme Poultry).
- Construction of the Klipplaatdrif flow gauging (Vaal river) – EMP (DWAF).

ENVIRONMENTAL COMPLIANCE AUDITING AND ECO

- National long haul optic fibre infrastructure network project, Bloemfontein to Laingsburg – ECO (for Enviroworks (Pty) Ltd.).
- National long haul optic fibre infrastructure network project, Wolmaransstad to Klerksdorp – ECO (for Enviroworks (Pty) Ltd.).
- Construction and refurbishment of the existing 66kV network between Ruigtevallei Substation and Reddersburg Substation – ECO (for Enviroworks (Pty) Ltd.).
- Construction and refurbishment of the Vredefort/Nooitgedacht 11kV power line – ECO (for Enviroworks (Pty) Ltd.).
- Mining of Dolerite (Stone Aggregate) by Raumix (Pty) Ltd. on a portion of Portion 0 of the farm Hillside 2830, Bloemfontein – ECO (for GreenMined Environmental (Pty) Ltd.).
- Construction of an Egg Production Facility by Bainsvlei Poultry (Pty) Ltd on Portions 9 & 10 of the farm, Mooivlakte, Bloemfontein – ECO (for Enviro-Niche Consulting (Pty) Ltd.).
- Environmental compliance audit and botanical account of Afrisam's premises in Bloemfontein – Environmental Compliance Auditing (for Enviroworks (Pty) Ltd.).

OTHER PROJECTS:

- Keeping and breeding of lions (*Panthera leo*) on the farm Maxico 135, Ficksburg – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Keeping and breeding of lions (*Panthera leo*) on the farm Mooihoek 292, Theunissen – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Keeping and breeding of wild dogs (*Lycaon pictus*) on the farm Mooihoek 292, Theunissen – Management and Business Plan (for Enviroworks (Pty) Ltd.)
- Existing underground and aboveground fuel storage tanks, TWK AGRI: Pongola – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks on Erf 171, TWK AGRI: Amsterdam – Environmental Management Plan (for TWK Agricultural Ltd).
- Proposed storage of 14 000 L of fuel (diesel) aboveground on Erf 32, TWK AGRI: Carolina – Environmental Management Plan (for TWK Agricultural Ltd).
- Proposed storage of 23 000 L of fuel (diesel) above ground on Portion 10 of the Farm Oude Bosch, Humansdorp – Environmental Management Plan (for TWK Agricultural Ltd).

- Proposed storage of 16 000 L of fuel (diesel) aboveground at Panbult Depot – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks, TWK AGRI: Mechanisation and Engineering, Piet Retief – Environmental Management Plan (for TWK Agricultural Ltd).
- Existing underground fuel storage tanks on Portion 38 of the Farm Lothair, TWK AGRI: Lothair – Environmental Management Plan (for TWK Agricultural Ltd).

CURRICULUM VITAE

A. Personal Details

Last name: **Pienaar**
First name: **Mariné**
Nationality: **South African**
Employment: **Self-employed (Consultant)**

B. Contact Details

Email address: mpienaar@terraafrica.co.za
Website: **www.terraafrica.co.za**
Mailing address: **PO Box 433, Ottosdal, 2610**
Telephone: **+27828283587**
Address: **57 Kruger Street, Wolmaransstad, 2630, Republic of South Africa**
Current Job: **Lead Consultant and Owner of Terra Africa Consult**

C. Concise biography

Mariné Pienaar is a professionally registered soil- and agricultural scientist (SACNASP) who has consulted extensively for the past eleven years in the fields of soil, land use and agriculture in several African countries. These countries include South Africa, Liberia, Ghana, DRC, Mozambique, Botswana, Angola, Swaziland and Malawi. She has worked with mining houses, environmental consulting companies, Eskom, government departments as well as legal and engineering firms. She conducted more than three hundred specialist studies that included baseline soil assessment and rehabilitation planning for new projects or expansion of existing projects, soil quality monitoring, land rehabilitation assessment and monitoring, natural resource assessment as part of agricultural project planning, evaluation and development of sustainable agriculture practices, land use assessment and livelihood restoration planning as part of resettlement projects and land contamination risk assessments. She holds a BSc. Agriculture degree with specialisation in Plant Production and Soil Science from the University of Pretoria and a MSc in Environmental Science from the University of the Witwatersrand. In addition to this, she has attended a number of

courses in Europe, the USA and Israel in addition to those attended in South Africa. Mariné is a contributing author of a report on the balance of natural resources between the mining industry and agriculture in South Africa (published by the Bureau for Food and Agricultural Policy, 2015).

D. Qualifications

Academic Qualifications:

- **MSc Environmental Science**; University of Witwatersrand, South Africa, 2018
- **BSc (Agric) Plant Production and Soil Science;** University of Pretoria, South Africa, 2004
- **Senior Certificate / Matric;** Wolmaransstad High School, South Africa, 2000

Courses Completed:

- **World Soils and their Assessment;** ISRIC – World Soil Information, Wageningen, 2015
- **Intensive Agriculture in Arid- and Semi-Arid Environments** – Gilat Research Centre, Israel, 2015
- **Hydrus Modelling of Soil-Water-Leachate Movement;** University of KwaZulu-Natal, South Africa, 2010
- **Global Sustainability Summer School 2012;** Institute for Advanced Sustainability Studies, Potsdam, Germany, 2012
- **Wetland Rehabilitation;** University of Pretoria, South Africa, 2008
- **Enviropreneurship Institute;** Property and Environment Research Centre [PERC], Montana, U.S.A., 2011
- **Youth Encounter on Sustainability;** ACTIS Education [official spin-off of ETH Zürich], Switzerland, 2011
- **Environmental Impact Assessment │Environmental Management Systems – ISO 14001:2004 │Environmental Law;** University of Potchefstroom, South Africa, 2008
- **Carbon Footprint Analyst Level 1;** Global Carbon Exchange Assessed, 2011
- **Negotiation of Financial Transactions;** United Nations Institute for Training and Research, 2011
- **Food Security: Can Trade and Investment Improve it?** United Nations Institute for Training and Research, 2011

E. Language ability

Perfectly fluent in English and Afrikaans (native speaker of both) and conversant in French.

F. Professional Experience

Name of firm	Terra Africa Environmental Consultants
Designation	Owner | Principal Consultant
Period of work	December 2008 to Date

G. Prior Tenures

Integrated Development Expertise (Pty) Ltd; **Junior Land Use Consultant** [July 2006 to October 2008]
Omnia Fertilizer (Pty) Ltd; **Horticulturist and Extension Specialist** [January 2005 to June 2006]

H. Professional Affiliations

- South African Council for Natural Scientific Professions [SACNASP]
- Soil Science Society of South Africa [SSSA]
- Soil Science Society of America
- South African Soil Surveyors' Organisation [SASSO]
- International Society for Sustainability Professionals [ISSP]

Summary of a selected number of projects completed successfully:

[Comprehensive project dossier available on request]

- *Sekoko Railway Alignment and Siding Soil, Land Use and Capability Study* in close proximity to the Medupi Power Station in the Lephalale area, Limpopo Province.

- *Italthai Rail and Port Projects, Mozambique* – The study included a thorough assessment of the current land use practices in the proposed development areas including subsistence crop production and fishing as well as livestock farming and forestry activities. All the land uses were mapped and intrinsically linked to the different soil

types and associated land capabilities. This study was used to develop Livelihood Restoration Planning from.

- *Bomi Hills Railway Alignment Project, Liberia:* soil, land use and agricultural scientist for field survey and reporting of soil potential, current land use activities and existing soil pollution levels, as well as associated infrastructure upgrades of the port, road and railway.

- *Kingston Vale Waste Facility, Mpumalanga Province, South Africa*: Soil and vegetation monitoring to determine the risk of manganese pollution resulting from activities at the waste facility.

- *Keaton Mining's Vanggatfontein Colliery, Mpumalanga*: Assessment of soil contamination levels in the mining area, stockpiles as well as surrounding areas as part of a long-term monitoring strategy and rehabilitation plan.

- *Richards Bay Minerals, KwaZulu-Natal*: Contaminated land assessment of community vegetable gardens outside Richards Bay as a result of spillages from pipelines of Rio Tinto's Richards Bay Minerals Mine.

- *Buffelsfontein Gold Mine, Northwest Province, South Africa:* Soil and land contamination risk assessment for as part of a mine closure application. Propose soil restoration strategies.

- Glenover Phosphate Mining Project near Steenbokpan in the Lephalale area – Soil, Land Use and Land Capability Study as part of the environmental authorisation process.

- *Waterberg Coal 3 and 4 Soil, Land Use and Land Capability Study* on 23 000 ha of land around Steenbokpan in the Lephalale area.

- *Lesotho Highlands Development Agency, development of Phase II (Polihali Dam and associated infrastructure)*: External review and editing of the initial Soil, Land Use and Land Capability Assessment as requested by ERM Southern Africa.

- *Tina Falls Hydropower Project, Eastern Cape , South Africa*: Soil, land use and land capability assessment as part of the ESIA for the construction of a hydropower plant at the Tina Falls.

- *Graveyard relocation as part of Exxaro Coal's Belfast Resettlement Action Plan*: Soil assessment to determine pedohydrological properties of the relocation area in order to minimise soil pollution caused by graveyards.

- *Rhino Oil Resources: Strategic high-level soil, land use and land capability assessment of five proposed regions to be explored for shale gas resources in the KwaZulu-Natal, Eastern Cape, North-West and Free State provinces of South Africa.*

- *Eskom Kimberley Strengthening Phase 4 Projec*t, Northern Cape & Free State, South Africa: soil, agricultural potential and land capability assessment.

- *Mocuba Solar Project, Mozambique* – The study included a land use assessment together with that of the soil and land capabilities of the study area. All current land uses were documented and mapped and the land productivity was determined. This study advocated the resettlement and livelihood restoration planning.

- *Botswana (Limpopo-Lipadi Game Reserve).*Soil research study on 36 000 ha on the banks of the Limpopo River. This soil study forms part of an environmental management plan for the Limpopo-Lipadi Game Reserve situated here as well as the basis for the Environmental Impact Assessment for the development of lodges and Land Use Management in this area.

- *TFM Mining Operations [proposed] Integrated Development Zone, Katanga, DRC* [part of mining concession between Tenke and Fungurume]: soil and agricultural impact assessment study.

- *Closure Strategy Development for Techmina Mining Company – Lucapa, Angola.* Conducted an analysis of the natural resources (soil, water) to determine the existing environmental conditions on an opencast diamond mine in Angola. The mine currently experience severe problems with kimberlite sediment flowing into the river. A plan is currently being developed to change the mining area into a sustainable bamboo farming operation.

- *Closure of sand mining operations, Zeerust District.* Succesfully conducted the closure application of the Roos Family Sand Mine in the Zeerust District. Land Use

Management Plans for rehabilitated soil were developed. The mine has closed now and the financial provision has been paid out to the applicant.

- *ESIA for [proposed] Musonoi Mine, Kolwezi area, Katanga, DRC:* soil, land use and land capability assessment.

- *Bauba A Hlabirwa Moeijelik Platinum mine [proposed] project, Mpumalanga, South Africa:* soil, land use and land capability assessment and impact on agricultural potential of soil.

- *Commissiekraal Coal Mine [proposed] project, KwaZulu*-Natal, South Africa: sustainable soil management plans, assessment of natural resource and agricultural potential and study of the possible impacts of the proposed project on current land use. Soil conservation strategies included in soil management plan.

- *Cronimet Chrome Mine [proposed] project, Limpopo Province, South Africa:* soil, land use and land capability of project area and assessment of the impacts of the proposed project.
- *Moonlight Iron Ore Land Use Assessment, South Africa* – Conducted a comprehensive land use assessment that included interviews with land users in the direct and indirect project zones of influence. The study considered all other anticipated social and environmental impacts such as water, air quality and noise and this was incorporated into a sensitivity analysis of all land users to the proposed project.

- *Project Fairway Land Use Assessment, South Africa* – The study included an analysis of all land users that will directly and indirectly be influenced by the project. It analysed the components of their land uses and how this components will be affected by the proposed project. Part of the study was to develop mitigation measures to reduce the impact on the land users.

- *Bekkersdal Urban Renewal Project – Farmer Support Programme,* Independent consultation on the farmer support programme that forms part of Bekkersdal Renewal Project. This entailed the production of short and long term business plans based on soil and water research conducted. Part of responsibilities were the evaluation of current irrigation systems and calculation of potential water needs, etc. as well as determining quantities and prices of all project items to facilitate the formalisation of tender documents.

- *Area-based agricultural business plans for municipalities in Dr. Kenneth Kaunda Municipal District.* Evaluation of the agricultural and environmental status of the total district as well as for each municipality within the district. This included the critical evaluation of current agricultural projects in the area. The writing of sustainable, executable agricultural business plans for different agricultural enterprises to form part of the land reform plans of each Municipality within the district.

- *Batsamaya Mmogo, Hartswater.* Conducted a soil and water assessment for the farm and compiled management and farming plans for boergoats grazing on *Sericea lespedeza* with pecan nuts and lucerne under irrigation.

- *Anglo Platinum Twickenham Mine – Irrigated Cotton Project.* Project management of an irrigated cotton production project for Twickenham Platinum Mine. This project will ensure that the community benefit from the excess water that is available from the mine activities.

- *Grasvally Chrome (Pty) Ltd Sylvania Platinum [proposed] Project, Limpopo Province, South Africa:* Soil, land use and agricultural potential assessment.

- *Jeanette Gold mine project [reviving of historical mine], Free State, South Africa:* Soil, land use and agricultural potential assessment.

- *Kangra Coal Project, Mpumalanga, South Africa:* Soil conservation strategies proposed to mitigate the impact of the project on the soil and agricultural potential.

- *Richards Bay Integrated Development Zone Project, South Africa* [future development includes an additional 1500 ha of land into industrial areas on the fringes of Richards Bay]: natural resource and agricultural potential assessment, including soil, water and vegetation.

- *Exxaro Belfast Coal Mine [proposed] infrastructure development projects* [linear: road and railway upgrade | site-specific coal loading facilities]: soil, land capability and agricultural potential assessment.

- *Marikana In-Pit Rehabilitation Project of Aquarius Platinum, South Africa:* soil, land capability and land use assessment.

- *Eskom Bighorn Substation proposed upgrades, South Africa:* soil, land capability and agricultural potential assessment.

- *Exxaro Leeuwpan Coal Mining Right Area, South Africa:* consolidation of all existing soil and agricultural potential data. Conducted new surveys and identified and updated gaps in historic data sets.

- *Banro Namoya Mining Operation, DRC:* soil, land use and agricultural scientist for field survey and reporting of soil potential, current land use activities and existing soil pollution levels, including proposed project extension areas and progressive soil and land use rehabilitation plan.

- *Kumba Iron Ore's Sishen Mine, Northern Cape, South Africa: soil, land use and agricultural scientist* | *Western Waste Rock Dumps [proposed] Project:* soil, land use and agricultural potential assessment, including recommendations regarding stripping/stockpiling and alternative uses for the large calcrete resources available.

- *Vetlaagte Solar Development Project, De Aar, South Africa:* soil, land use and agricultural scientist. Soil, land use and agricultural potential assessment for proposed new 1500 ha solar development project, including soil management plan.

CURRICULUM VITAE

ELIZE BUTLER

PROFESSION: Palaeontologist

YEARS' EXPERIENCE: 24 years in Palaeontology

EDUCATION: B.Sc Botany and Zoology, 1988

University of the Orange Free State

B.Sc (Hons) Zoology, 1991

University of the Orange Free State

Management Course, 1991

University of the Orange Free State

M. Sc. *Cum laude* (Zoology), 2009
University of the Free State

Dissertation title: The postcranial skeleton of the Early Triassic non-mammalian Cynodont *Galesaurus planiceps*: implications for biology and lifestyle

Registered as a PhD fellow at the Zoology Department of the UFS

2013 to current

Dissertation title: A new gorgonopsian from the uppermost D*aptocephalus Assemblage Zone*, in the Karoo Basin of South Africa

MEMBERSHIP

Palaeontological Society of South Africa (PSSA) 2006-currently

EMPLOYMENT HISTORY

Part time Laboratory assistant	Department of Zoology & Entomology University of the Free State Zoology 1989-1992
Part time laboratory assistant	Department of Virology University of the Free State Zoology 1992
Research Assistant	National Museum, Bloemfontein 1993 – 1997
Principal Research Assistant and Collection Manager	National Museum, Bloemfontein 1998 – currently

TECHNICAL REPORTS

1. **PIA desktop:** Palaeontological Impact Assessment of the proposed development of private dwellings on portion 5 of farm 304 Matjesfontein Keurboomstrand, Knysna District, Western Cape Province. 2014.
2. **PAI site visit and report:** Palaeontological Impact Assessment for the proposed upgrade of existing water supply infrastructure at Noupoort, Northern Cape Province. 2014.
3. **PIA desktop:** Palaeontological impact assessment of the proposed consolidation, re-division and development of 250 serviced erven in Nieu-Bethesda, Camdeboo local municipality, Eastern Cape. 2015.
4. **PAI site visit and report:** Palaeontological impact assessment of the proposed mixed land developments at Rooikraal 454, Vrede, Free State. 2015.
5. **PIA exemption report:** Palaeontological exemption report of the proposed truck stop development at Palmiet 585, Vrede, Free State. 2015.
6. **PAI site visit and report:** Palaeontological impact assessment of the proposed Orange Grove 3500 residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape. 2015
7. **PAI site visit and report:** Palaeontological Impact Assessment of the proposed Gonubie residential development, Buffalo City Metropolitan Municipality East London, Eastern Cape Province. 2015.
8. **PAI site visit and report:** Palaeontological Impact Assessment of the proposed Ficksburg raw water pipeline. 2015
9. **PAI site visit and report:** Palaeontological Heritage Impact Assessment report on the establishment of the 65 mw Majuba Solar Photovoltaic facility and associated infrastructure on portion 1, 2 and 6 of the farm Witkoppies 81 HS, Mpumalanga Province. 2015.
10. **PAI site visit and report**: Palaeontological Impact Assessment of the proposed township establishment on the remainder of portion 6 and 7 of the farm Sunnyside 2620, Bloemfontein, Mangaung metropolitan municipality, Free State, Bloemfontein. 2015.

11. **PIA desktop**: Palaeontological Impact Assessment of the proposed Woodhouse 1 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse729, near Vryburg, North West Province. 2015.
12. **PIA desktop**: Palaeontological Impact Assessment of the proposed Woodhouse 2 photovoltaic solar energy facilities and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2015.
13. **PIA desktop**:Palaeontological Impact Assessment of the proposed Orkney solar energy farm and associated infrastructure on the remaining extent of Portions 7 and 21 of the farm Wolvehuis 114, near Orkney, North West Province. 2015.
14. **PIA desktop**: Palaeontological Impact Assessment of the proposed Spectra foods broiler houses and abattoir on the farm Maiden Manor 170 and Ashby Manor 171, Lukhanji Municipality, Queenstown, Eastern Cape Province. 2015.
15. **PIA desktop**: Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoort concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoort, Northern Cape. Prepared for Savannah Environmental. 2016.
16. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed Woodhouse 1 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2016.
17. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed Woodhouse 2 Photovoltaic Solar Energy facility and associated infrastructure on the farm Woodhouse 729, near Vryburg, North West Province. 2016.
18. **PIA Desktop**: Proposed 132kV overhead power line and switchyard station for the authorised Solis Power 1 CSP project near Upington, Northern Cape. 2016.
19. **PIA site visit and report:** of The Proposed Senqu Pedestrian Bridges in Ward 5 of Senqu Local Municipality, Eastern Cape Province. 2016.
20. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Modderfontein Filling Station On Erf 28 Portion 30, Founders Hill, City Of Johannesburg, Gauteng Province. 2016.
21. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Modikwa Filling Station On A Portion Of Portion 2 Of Mooihoek 255 Kt, Greater Tubatse Local Municipality, Limpopo Province. 2016.

22. **Recommended Exemption** From Further Palaeontological Studies: Proposed Construction Of The Heidedal Filling Station On Erf 16603, Heidedal Extension 24, Mangaung Local Municipality, Bloemfontein, Free State Province. 2016.
23. **Recommended Exemption** from further Palaeontological studies: Proposed Construction of the Gunstfontein Switching Station, 132kv Overhead Power Line (Single Or Double Circuit) and ancillary infrastructure for the Gunstfontein Wind Farm Near Sutherland, Northern Cape Province. 2016.
24. **PIA site visit and report** of the proposed Galla Hills Quarry on the remainder of the farm Roode Krantz 203, in the Lukhanji Municipality, division of Queenstown, Eastern Cape Province. 2016.
25. **PIA monitoring**: Chris Hani District Municipality Cluster 9 water backlog project phases 3a and 3b: Palaeontology inspection at Tsomo WTW. 2016.
26. **PIA Site visit and Report**: Palaeontological Impact Assessment of the proposed construction of the 150 MW Noupoort concentrated solar power facility and associated infrastructure on portion 1 and 4 of the farm Carolus Poort 167 and the remainder of Farm 207, near Noupoort, Northern Cape. 2016.
27. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed upgrading of the main road MR450 (R335) from the Motherwell to Addo within the Nelson Mandela Bay Municipality and Sunday's river valley Local Municipality, Eastern Cape Province. 2016.
28. **PIA site visit and report**: Palaeontological Impact Assessment construction of the proposed Metals Industrial Cluster and associated infrastructure near Kuruman, Northern Cape province. 2016.
29. **PIA site visit and report**: Palaeontological Impact Assessment for the proposed construction of up to a 132kv power line and associated infrastructure for the proposed Kalkaar Solar Thermal Power Plant near Kimberley, Free State and Northern Cape Provinces. 2016.
30. **PIA site visit and report**: Palaeontological Impact Assessment of the proposed development of two burrow pits (DR02625 and DR02614) in the Enoch Mgijima Municipality, Chris Hani District, Eastern Cape. 2016.
31. **PIA desktop:** Ezibeleni waste Buy-Back Centre (near Queenstown), Enoch Mgijima Local Municipality, Eastern Cape. 2016

32. **PIA desktop:** Palaeontological Impact Assessment for the proposed construction of two 5 Mw Solar Photovoltaic Power Plants on Farm Wildebeestkuil 59 and Farm Leeuwbosch 44, Leeudoringstad, North West Province. 2016.
33. **PIA desktop:**Palaeontological Impact Assessment for the proposed development of four Leeuwberg Wind farms and basic assessments for the associated grid connection near Loeriesfontein, Northern Cape Province. 2016.
34. **PIA desktop**: Palaeontological impact assessment for the proposed Aggeneys south prospecting right project, Northern Cape Province. 2016.
35. **PIA desktop**: Palaeontological impact assessment of the proposed Motuoane Ladysmith Exploration right application, Kwazulu Natal. 2016.
36. **PIA desktop** : Palaeontological impact assessment for the proposed construction of two 5 MW solar photovoltaic power plants on farm Wildebeestkuil 59 and farm Leeuwbosch 44, Leeudoringstad, North West Province. 2016.
37. **PIA desktop**: Palaeontological desktop assessment of the establishment of the proposed residential and mixed use development on the remainder of portion 7 and portion 898 of the farm Knopjeslaagte 385 jr, located near Centurion within the Tshwane Metropolitan Municipality of Gauteng Province. 2016.
38. **PIA desktop**: Palaeontological impact assessment for the proposed development of a new cemetery, near Kathu, Gamagara local municipality and John Taolo Gaetsewe district municipality, Northern Cape. 2017.
39. **PIA desktop**: Palaeontological Impact Assessment Of The Proposed Development Of The New Open Cast Mining Operations On The Remaining Portions Of 6, 7, 8 And 10 Of The Farm Kwaggafontein 8 In The Carolina Magisterial District, Mpumalanga Province. 2017.
40. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Development of a Wastewater Treatment Works at Lanseria, Gauteng Province. 2017.
41. **PIA desktop:** Palaeontological Scoping Report for the Proposed Construction of a Warehouse and Associated Infrastructure at Perseverance in Port Elizabeth, Eastern Cape Province. 2017.
42. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Establishment of a Diesel Farm and a Haul Road for the Tshipi Borwa mine

Near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. 2017.

43. **PIA desktop:** Palaeontological Desktop Assessment for the Proposed Changes to Operations at the UMK Mine near Hotazel, In the John Taolo Gaetsewe District Municipality in the Northern Cape Province. 2017.
44. **PIA site visit and report:** Palaeontological Impact Assessment for the Development of the Proposed Ventersburg Project-An Underground Mining Operation near Ventersburg and Henneman, Free State Province. 2017.
45. **PIA desktop:** Palaeontological desktop assessment of the proposed development of a 3000 mw combined cycle gas turbine (CCGT) in Richards Bay, Kwazulu-Natal. 2017**.**
46. **PIA site visit and report:** Palaeontological Impact Assessment for the Development of the Proposed Revalidation of the lapsed General Plans for Elliotdale, Mbhashe Local Municipality. 2017.
47. **PIA site visit and Report:** Palaeontological assessment of the proposed development of a 3000 MW Combined Cycle Gas Turbine (CCGT) in Richards Bay, Kwazulu-Natal. 2017**.**
48. **PIA site visit and Report:** Palaeontological Impact Assessment of the proposed development of the new open cast mining operations on the remaining portions of 6, 7, 8 and 10 of the farm Kwaggafontein 8 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. 2017.
49. **PIA site visit and Report**:: Palaeontological Impact Assessment of the proposed mining of the farm Zandvoort 10 in the Albert Luthuli Local Municipality, Gert Sibande District Municipality, Mpumalanga Province. 2017.
50. **PIA desktop:** Palaeontological Desktop Assessment for the proposed Lanseria outfall sewer pipeline in Johannesburg, Gauteng Province. 2017.
51. **PIA desktop:** Palaeontological Desktop Assessment of the proposed development of open pit mining at Pit 36W (New Pit) and 62E (Dishaba) Amandelbult Mine Complex, Thabazimbi, Limpopo Province. 2017.
52. **PIA site visit and Report:** Palaeontological impact assessment of the proposed development of the sport precinct and associated infrastructure at Merrifield Preparatory school and college, Amathole Municipality, East London. 2017.

53. **PIA site visit and Report:** Palaeontological impact assessment of the proposed construction of the Lehae training and fire station, Lenasia, Gauteng Province. 2017.

CONFERENCE CONTRIBUTIONS

NATIONAL

PRESENTATION

Butler, E., Botha-Brink, J., and F. Abdala. A new gorgonopsian from the uppermost *Dicynodon Assemblage Zone*, Karoo Basin of South Africa.18 the Biennial conference of the PSSA 2014.Wits, Johannesburg, South Africa.

INTERNATIONAL

Attended the Society of Vertebrate Palaeontology 73th Conference in Los Angeles, America. October 2012.

CONFERENCES: POSTER PRESENTATION

NATIONAL

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle. University of the Free State Seminar Day, Bloemfontein. South Africa. November 2007.

Butler, E., and J. Botha-Brink. Cranial skeleton of *Galesaurus planiceps*, implications for biology and lifestyle.14th Conference of the PSSA, Matjesfontein, South Africa. September 2008:

Butler, E., and J. Botha-Brink. The biology of the South African non-mammaliaform cynodont *Galesaurus planiceps*.15th Conference of the PSSA, Howick, South Africa. August 2008.

INTERNATIONAL VISITS

Natural History Museum, London July 2008

Paleontological Institute, Russian Academy of Science, Moscow November 2014

PROFESSIONAL CURRICULUM
FOR WOUTER FOURIE

Name:	Wouter Fourie
Profession:	Archaeologist
Date of birth:	1974-04-30
Parent Firm:	PGS Heritage (Pty) Ltd
Position at Firm:	Director
Years with firm:	15
Years of experience:	20
Nationality:	South African
HDI Status:	White

EDUCATION:

Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA
Major subjects	**:**	Archaeology, Geography and Anthropology
Year	**:**	1996
Name of University or Institution	**:**	University of Pretoria
Degree obtained	**:**	BA [Hons] (Cum laude)
Major subjects	**:**	Archaeology and Geography
Year	**:**	1997
Name of University or Institution	**:**	National Nuclear Regulator
Certificate obtained	**:**	Radiation Protection Officer Certificate
Year	**:**	1999
Name of University or Institution	**:**	University of Cape Town
Certificate obtained	**:**	Project Management Foundations short course
Year	**:**	2015
Name of University or Institution	:	University of Cape Town
Certificate obtained	:	MPhil – Conservation of Built Environment
Year	:	2016-Current

Professional Qualifications:
Professional Heritage Practitioner – Association of Professional Heritage Practitioners (APHP)
Professional Archaeologist - Association of Southern African Professional Archaeologists - Professional Member – No 043

CRM Accreditation
Principal Investigator - Grave Relocations
Field Director – Iron Age
Field Supervisor – Colonial Period and Stone Age
Accredited with Amafa KZN

Languages:
Afrikaans
English – Speaking (Good) Reading (Good), Writing (Good)

KEY QUALIFICATIONS

Archaeological Mitigation and excavations, Cultural Resource Management and Heritage Impact Assessment Management, Project management, Archaeology, Anthropology, Applicable survey methods, Fieldwork and project management, Geographic Information Systems

CONFERENCE PAPERS AND PUBLICATIONS

- 2008 - Archaeological Impact Assessments within South African legislation. *South African Archaeological Bulletin 63 (187): 77–85, 2008*
- 2011 - Archaeology, Physical Anthropology and DNA analysis – The case of Queen Thomo Jezangani Ndwandwe. *Association of Southern African Professional Archaeologists – Conference, Swaziland*
- 2011 – POSTER – H.S. Steyn, W. Fourie and M. Hutten. Kappa Omega Transmission Line: Findings from an Archaeological Walk Down. Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2011 – POSTER – W. Fourie and J. van der Walt. Sterkspruit: Micro-layout of Late Iron Age stone walling, Lydenburg, Mpumalanga. . Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2011 – POSTER – P.D. Birkholtz, W. Fourie and W.C. Nienaber. Onverwacht: Archaeological and Historical Analysis of Swazi settlement layout. Association of Southern African Professional Archaeologists – Conference, Swazi Land
- 2012 - Heritage management: compliance or just a nuisance during the Environmental Management Programme implementation. 17th annual IAIAsa conference, Somerset West, Western Cape.
- 2016 - Implementing Responsible Grave Relocation – The case for Comprehensive Grave Relocation Action Plan for Integrated Project Management. 21st annual IAIAsa conference, Port Elizabeth, Eastern Cape.

INTERNATIONAL PROJECTS

- 2016 – 2017 – **Position:** Heritage Specialist and Project Manager - Anadarko International – Grave Relocation Action Plan and implementation for the Afungi Liquid Natural Gas Project, Palma, Northern Mozambique – **Project Value:** R 2,5 mil
- 2013 – 2016 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Manica Gold Project, Manica Province, Mozambique - **Project Value:** R 80 000
- 2012 - **Position:** Heritage Specialist and Project Manager - SLR Consulting - Heritage Impact Assessment, Namoya SALR – Gold Mine, Maniema Province in the eastern Democratic Republic of Congo (DRC) - **Project Value:** R 120 000
- 2012 - **Position:** Heritage Specialist and Project Manager - Consolidated Contractors Group S.A.L. -Mitigation and Grave Relocation at Site 37-A3-16 on the Mahalpye to Kudumatse Road Construction Project Central District, Botswana - **Project Value:** R 90 000
- 2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Grave Relocation Procedures and Consultation – RAP Process, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo - **Project Value:** R 85 000
- 2010 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Archaeological Study, Kibali Gold Mine, Watsa, Oriental Province, Democratic Republic of the Congo - **Project Value:** R 50 000
- 2008 - **Position:** Heritage Specialist and Project Manager - Digby Wells & Associates - Mmamabula Mining Project CIC, Botswana - **Project Value:** R 60 000

HERITAGE IMPACT ASSESSMENTS

South African

Below a selected list of over 400 heritage studies completed

2017

- Ilima Colliery, Heritage Impact Assessment. Carolina, Mpumalanga. – **Position:** Heritage Specialist. **Project Value:** R 110 000.
- Clanwilliam Dam Heritage Project (2014-2017). Clanwilliam, Western Cape. Department of Water and Sanitation – **Position:** Heritage Specialist. **Project Value:** R 7,5 mil
- Leeuwberg Wind Energy Project. Loeriesfontein, Northern Cape. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 120 000.
- Leeudoringstad Solar Energy Project. North West Province. SiVEST. – **Position:** Heritage Specialist. **Project Value:** R 50 000.
- Lephalale Combined Power Project, Limpopo Province. Kongiwe Environmental. – **Position:** Heritage Specialist. **Project Value:** R 100 000.

2016

- Gautrain Management Agency (SiVEST Environmental) – Gautrain Rapid Rail Link – Feasibility Study – **Position:** Heritage Specialist
- Pilgrim's Rest Housing Development – Heritage Impact Assessment, Mpumalanga. Aurecon. – **Position:** Heritage Specialist. **Project Value:** R 60 000.
- Era Brickworks, Delmas, Mpumalanga. Heritage Impact Assessment. Jones and Wagerner. – **Position:** Heritage Specialist. **Project Value:** R 40 000.
- Daggaskaal Road Upgrade, Mpumalanga. Heritage Impact Assessment. NCC Environmental. – **Position:** Heritage Specialist. **Project Value:** R40 000.
- Eureka and Aletta Wind Energy Projects. Copperton, Northern Cape. – **Position:** Heritage Specialist. **Project Value:** R 95 000.
- Sendawo Solar Project, Vryburg, Northern Cape. Heritage Impact Assessment. SiVEST – **Position:** Heritage Specialist. **Project Value:** R 90 000.
- Tlisitseng Solar Project, Lichtenburg, North West Province. Heritage Impact Assessment. – **Position:** Heritage Specialist. **Project Value:** R 80 000.
- Kuruman 66kV Project. Kuruman, Northern Cape. Zitholele. – **Position:** Heritage Specialist. **Project Value:** R 85 000.
- Goodwood Housing Scheme, WC – Heritage Scoping – **Position:** Heritage Specialist
- Vereeniging Gymnasium, Heritage assessment and Guidelines, Meyerton, Gauteng. – **Position:** Heritage Specialist
- Victoria West, Wind Energy Project. CSIR. – **Position:** Heritage Specialist. **Project Value:** R 120 000.
- Kloof and Driefontein Sibanye Gold. Heritage Management Plan. Carletonville, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 430 000.

2015

- AEL Detonator Campus, Heritage Impact Assessment. Modderfontein, Gauteng. – **Position:** Heritage Specialist and Project Manager. **Project Value:** R 240 000.
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Humansrus Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist
- Kappa-Sterrekus 765kV Project. ACER Africa. Heritage Walkdown. Western Cape. – **Position:** Heritage Specialist. **Project Value:** R 140 000.
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Rooipunt Solar Park, Upington, Northern Cape – **Position:** Heritage Specialist
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Arriesfontein Solar Park, Daniëlskuil, Northern Cape – **Position:** Heritage Specialist
- Solar Reserve (Worley Parson RSA), Heritage Impact Assessment, Slypklip Solar Park, Kimberley, Northen Cape – **Position:** Heritage Specialist
- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment,

Loeriesfontein Solar Park, Northern Cape - – **Position:** Heritage Specialist

- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, De Aar Solar Park, Northern Cape – **Position:** Heritage Specialist
- Mainstream Renewable Power South Africa (SiVest), Heritage Impact Assessment, Droogefontein
- GRAP103 – Heritage Register for the Ekurhuleni Metropolitain Municipality, Aurecon – **Position:** Heritage Specialist
- Fleurhof Hostel Redevelopment. Florida, Gauteng. Heritage Impact Assessment. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 430 000.
- Mkuze Biomassa Incinerator. Mkuze, KZN. Heritage Impact Assessment. CSIR. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 50 000.
- Transnet Overvaal Tunnel, Ermelo, Mpumalanga. EIMS. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 60 000.
- De Aar 132kv Powerline. De Aar, Northern Cape. Heritage Impact Assessment. Holland and Associates. **Position:** Heritage Specialist and Project Manager. **Project Value:** R 60 000.

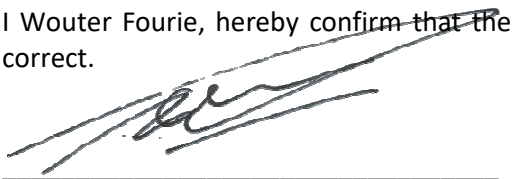
2014

- Solar Park, Kimberley, Northern Cape – **Position:** Heritage Specialist
- Kumba Iron Ore (Synergistics), Heritage Impact Assessment, Shishen Relocation Project, Northern Cape - – **Position:** Heritage Specialist
- Kappa-Sterrekus 765kV Project. ACER Africa. Heritage Walkdown. Western Cape. – **Position:** Heritage Specialist. **Project Value:** R 140 000.
- Strategic Environmental Assessment for Independent Energy. CSIR. – **Position:** Heritage Specialist. **Project Value:** R 150 000.
- New Kathu Cemetery. Kathu, Northern Cape. Heritage Impact Assessment. SLR Consulting. – **Position:** Heritage Specialist. **Project Value:** R 50 000.

POSITIONS HELD

- **2003 – 2017:** Director - PGS Heritage (Pty) Ltd
- **2006 – 2008:** Project Manager – Matakoma-ARM, Heritage Contracts Unit, University of the Witwatersrand
- **2005-2007:** Director – Matakoma Heritage Consultants (Pty) Ltd
- **2000-2004:** CEO– Matakoma Consultants
- **1998-2000:** Environmental Coordinator – Randfontein Estates Limited. Randfontein, Gauteng
- **1997-1998:** Environmental Officer – Department of Minerals and Energy. Johannesburg, Gauteng

I Wouter Fourie, hereby confirm that the above information contained in my CV is true and correct.



_____ 10 September 2017

W Fourie Date

ENVIRONMENTAL PLANNING AND DESIGN

Name	JONATHAN MARSHALL
Nationality	British
Year of Birth	1956
Specialisation	Landscape Architecture / Landscape & Visual Impact Assessment / Environmental Planning / Environmental Impact Assessment.

Qualifications

Education	Diploma in Landscape Architecture, Gloucestershire College of Art and Design, UK (1979)
	Environmental Law, University of KZN (1997)
Professional	Registered Professional Landscape Architect (South Africa)
	Chartered Member of the Landscape Institute (UK)
	Certified Environmental Assessment Practitioner of South Africa.
	Member of the International Association of Impact Assessment, South Africa

Languages	English	- Speaking	-	Excellent
		- Reading	-	Excellent
		- Writing	-	Excellent

Contact Details

Post: PO Box 2122
Westville
3630
Republic of South Africa

Phone: +27 31 2668241, Cell: +27 83 7032995

Key Experience

Jon qualified as a Landscape Architect at Cheltenham (UK) in 1979. He has been a Chartered Member of the Landscape Institute (UK) since 1986. He is also a registered Landscape Architect and Environmental Assessment Practitioner of South Africa.

During the early part of his career (1981 – 1990) he worked with Clouston (now RPS) in Hong Kong and Australia. During this period he was called on to undertake visual impact assessment input to numerous environmental assessment processes for major infrastructure projects. This work was generally based on photography with line drawing superimposed to illustrate the extent of development visible.

He worked in the United Kingdom (1990 – 1995) for major supermarket chains including Sainsbury's and prepared CAD based visual impact assessments for public enquiry for new store development. He also prepared the VIA input to the environmental statement for the Cardiff Bay Barrage for consideration by the UK Parliament in the passing of the Barrage Bill.

His more recent VIA work in Africa (1995 to present) includes a combination of CAD and GIS based work for a new international airport to the north of Durban, new heavy industrial operations, overhead electrical transmission lines, mining operations, a number of commercial and residential developments as well as numerous renewable energy projects.

VIA work undertaken during the last twelve months includes assessments for several proposed Eskom power lines / substations and numerous solar and wind energy projects.

Relevant Landscape & Visual Impact Assessment (LVIA) Projects

1. **Paulputs CSP Power Tower project** – LVIA for a 200MW CSP power tower facility near Pofadder in the Northern Cape.
2. **Karoshoek Solar Valley** – LVIA for nine CSP projects including power tower and parabolic trough projects in the Karoshoek Solar Valley near Upington in the Northern Cape.
3. **Noupoort CSP** – LVIA for two CSP parabolic trough facilities close to Noupoort in the Northern Cape.
4. **Sol Invictus Solar** – LVIA for four 150MW photovoltaic solar arrays near Aggeneys in the Northern Cape for a private client
5. **Tshivhaso Power Station** – LVIA for a proposed new 600MW power station including associated infrastructure and dumps near Lephalale in the Limpopo Province for a private client.
6. **Woodhouse Solar** – LVIA for two 100MW photovoltaic solar arrays near Vryburg in the North West Province for a private client.
7. **Saldanha Eskom Network Strengthening Project** – LVIA for major improvements to Eskom's electrical infrastructure between Langebaan and Saldanha in the Western Cape for Eskom.
8. **Albany Solar Array** – LVIA for two 75MW photovoltaic solar arrays near Upington in the Northern Cape.
9. **Mpophomeni Shopping Centre** – LVIA for a proposed new shopping center to the south of Midmar Dam in KwaZulu Natal for a private client.
10. **Gunstfontein Wind Farm** – LVIA for a 200MWnd farm near Sutherland in the Northern Cape for a orivate client.
11. **Hennenman Solar Array** – LVIA for a proposed solar array in the Free State for a private client.
12. **Moorreesburg Wind Farm** – LVIA for a proposed wind energy project in the Western Cape for a private client.
13. **Lethabo Solar Array** – LVIA for a proposed solar array at the Lethabo Power Station in the Free State for Eskom.
14. **Tutuka Solar Array** – LVIA for a proposed solar array at the Tutuka Power Station in Mpumalanga for Eskom.
15. **Majuba Solar Array** – LVIA for a proposed solar array at the Majuba Power Station in Mpumalanga for Eskom.
16. **Isundu 765 / 400Kv Sub Station** - LVIA for a proposed major substation in KwaZulu Natal for Eskom.
17. **Bhangazi Lake Tourism Development** – Visual impact assessment for a proposed lodge development within the Isimangaliso Wetland Park World Heritage Site. This work is ongoing.
18. **Quarry Development for the Upgrade of Sani Pass –** Visual Impact Assessments for two proposed quarry developments on the edge of the uKhalamba-Drakensburg World Heritage Site.
19. **Mtubatuba to St Lucia Overhead Power Line** – Visual Impact Assessment for a proposed power line bordering on the Isimangaliiso Wetland Park World Heritage Site for

Eskom.

20. **St Faiths 400/132 kV Sub-Station and Associated Power Lines** - Visual Impact Assessment for a proposed new major sub-station and approximately 15km of overhead power line for Eskom.
21. **Clocolan to Ficksburg Overhead Power Line** – Visual Impact Assessment for a proposed power line for Eskom.
22. **Solar Plant Projects including Photovoltaic and Concentrating Solar Power Plants** – Numerous projects for Eskom and private clients in the Northern Cape, Limpopo, Mpumalanga and the Free State.
23. **Moorreesburg Wind Farm.** Visual impact assessment for a proposed new wind farm in the Western Cape.
24. **AngloGold Ashanti, Dokyiwa (Ghana)** – Visual Impact Assessment for proposed new Tailings Storage Facility at a mine site working with SGS as part of their EIA team.
25. **Camperdown Industrial Development** - Visual Impact Assessment for proposed new light industrial area to the north o Camperdown for a private client.
26. **Wild Coast N2 Toll Highway** – Peer review of VIA undertaken by another consultant.
27. **Gamma to Grass Ridge 765kv transmission line** – Peer review of LVIA undertaken by another consultant.
28. **Gateway Shopping Centre Extension (Durban)** – Visual Impact Assessment for a proposed shopping centre extension in Umhlanga, Durban.
29. **Kouroussa Gold Mine (Guinea)** – Visual impact assessment for a proposed new mine in Guinea working with SGS as part of their EIA team.
30. **Mampon Gold Mine (Ghana)** - Visual impact assessment for a proposed new mine in Ghana working with SGS as part of their EIA team.
31. **Telkom Towers** – Visual impact assessments for numerous Telkom masts in KwaZulu Natal
32. **Dube Trade Port, Durban International Airport** – Visual Impact Assessment for a new international airport.
33. **Sibaya Precinct Plan** – Visual Impact Assessment as part of Environmental Impact Assessment for a major new development area to the north of Durban.
34. **Umdloti Housing** – Visual Impact Assessment as part of Environmental Impact Assessment for a residential development beside the Umdloti Lagoon to the north of Durban.
35. **Tata Steel Ferrochrome Smelter** - Visual impact assessment of proposed new Ferrochrome Smelter in Richards Bay as part of EIA undertaken by the CSIR.
36. **Diamond Mine at Rooipoort Nature Reserve near Kimberley** – Visual impact assessment for a proposed diamond mine within an existing nature reserve for De Beers.
37. **Durban Solid Waste Large Landfill Sites –** Visual Impact Assessment of proposed development sites to the North and South of the Durban Metropolitan Area. The project utilised 3d computer visualisation techniques.
38. **Hillside Aluminium Smelter, Richards Bay -** Visual Impact Assessment of proposed extension of the existing smelter. The project utilised 3d computer visualisation techniques.
39. **Estuaries of KwaZulu Natal Phase 1 and Phase 2 –** Visual character assessment and GIS mapping as part of a review of the condition and development capacity of eight

estuary landscapes for the Town and Regional Planning Commission. The project was extended to include all estuaries in KwaZulu Natal.

40. **Signage Assessments** – Numerous impact assessments for proposed signage developments for Blast Media.
41. **Signage Strategy** – Preparation of an environmental strategy report for a national advertising campaign on National Roads for Visual Image Placements.
42. **Zeekoegatt, Durban** - Computer aided visual impact assessment. Acted as advisor to the Province of KwaZulu Natal in an appeal brought about by a developer to extend a light industrial development within a 60 metre building line from the National N3 Highway.
43. **La Lucia Mall Extension** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed extension to shopping mall for public consultation exercise.
44. **Redhill Industrial Development** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed new industrial area for public consultation exercise.
45. **Avondale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
46. **Hammersdale Reservoir** - Visual impact assessment using three dimensional computer modelling / photo realistic rendering and montage techniques for proposed hilltop reservoir as part of Environmental Impact Assessment for Umgeni Water.
47. **Southgate Industrial Park, Durban** - Computer Aided Visual Impact Assessment and Landscape Design for AECI.
48. **Sainsbury's Bryn Rhos (UK)** - Computer Aided Visual Impact Assessment/ Planning Application for the development of a new store within the Green Wedge North of Swansea.
49. **Ynyston Farm Access (UK)** - Computer Aided Impact Assessment of visual intrusion of access road to proposed development in Cardiff for the Land Authority for Wales.
50. **Cardiff Bay Barrage (UK)** - Concept Design, Detail Design, Documentation, and Visual Input to Environmental Statement for consideration by Parliament in the debate prior to the passing of the Cardiff Bay Barrage Bill. The work was undertaken for Cardiff Bay Development Corporation.
51. **A470, Cefn Coed to Pentrebach (UK)** - Preparation of frameworks for the assessment of the impact of the proposed alignment on the landscape for The Welsh Office.
52. **Sparkford to Illchester Bye Pass (UK)** - The preparation of the landscape framework and the draft landscape plan for the Department of Transport.
53. **Green Island Reclamation Study (Hong Kong)** - Visual Impact Assessment of building massing, Urban Design Guidelines and Masterplanning for a New Town extension to Hong Kong Island.
54. **Route 3 (Hong Kong)** - Visual Impact Assessment for alternative road alignments between Hong Kong Island and the Chinese Border.
55. **China Border Link (Hong Kong)** - Visual Impact Assessment and initial Landscape Design for a new border crossing at Lok Ma Chau.
56. **Route 81, Aberdeen Tunnel to Stanley (Hong Kong)** - Visual Impact Assessment for alternative highway alignments on the South side of Hong Kong Island.

APPENDIX K(M):
KEY LEGISLATION

APPLICABLE LEGISLATION

Table 1: Applicable Legislation, Policies and/or Guidelines associated with the development of the Moeding Solar PV Facility

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
		National Legislation	
National Environmental Management Act (Act No. 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. A BA process is required to be undertaken for the Moeding Solar PV Facility in accordance with GN114, as formally gazetted on 16 February 2018, due to the location of the project site within the REDZ.	» National Department of Environmental Affairs (DEA). » North West Department of Rural, Environment and Agricultural Development (READ) - commenting authority.	The listed activities triggered by the proposed project have been identified and assessed in the BA process being undertaken. This BA Report will be submitted to the competent and commenting authority in support of the application for authorisation.
National Environmental Management Act (Act No. 107 of 1998)	In terms of the Duty of Care provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with a project is avoided, stopped or minimised.	» National Department of Environmental Affairs (DEA).	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section is applicable during the BA process) and will continue to apply throughout the life cycle of the project.
National Environmental Management: Biodiversity Act (Act No. 10 of 2004)	Section 53 of NEM:BA provides for the MEC / Minister to identify any process or activity in such a listed ecosystem as a threatening process.	» National Department of Environmental Affairs (DEA). » North West Department of	Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	Three government notices have been published in terms of Section 56(1) of NEM:BA as follows: » Commencement of TOPS Regulations, 2007 (GNR 150). » Lists of critically endangered, vulnerable and protected species (GNR 151). » TOPS Regulations (GNR 152). It provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), and vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (NEM:BA: National list of ecosystems that are threatened and in need of protection, (Government Gazette 37596, GNR 324), 29 April 2014).	Rural, Environment and Agricultural Development (READ).	An ecological impact assessment has been undertaken as part of the BA Report (refer to **Appendix D**). As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered. A permit may be required should any listed plant species be disturbed or destroyed as a result of the proposed solar energy facility. No species of conservation concert under this Act have been identified on site.
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the *Gazette* publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by –	» National Department of Environmental Affairs (DEA). » North West Department of Rural, Environment and Agricultural Development (READ).	As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	» Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.		the Act, as detailed in the EMPr (refer to **Appendix K**).
National Environmental	Measures in respect of dust control (section 32) and	» National Department of	No permitting or licensing requirements arise from

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
Management: Air Quality Act (Act No. 39 of 2004)	National Dust Control Regulations of November 2013. GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas	Environmental Affairs (DEA). » Naledi Local Municipality.	this legislation. The EMPr however makes provision for managing and mitigating potential dust impacts (refer to **Appendix K**).
National Water Act (Act No. 36 of 1998)	Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	» Department of Water and Sanitation (DWS).	A water use license (WUL) is required in terms of sections 21(c) and 21 (i) of the National Water Act, if wetlands or drainage lines are impacted on, or the regulated area of a watercourse (being the riparian zone or the 1:100yr floodline whichever is greatest). Should water be extracted from groundwater/a borehole on site for use within the solar energy facility, a water use license will be required in terms of sections 21(a) and 21 (b) of the National Water Act.
Environment Conservation Act (Act No. 73 of 1989)	In terms of section 25 of the ECA, the national noise-control regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) were promulgated. The NCRs were revised under Government Notice Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996, legislative responsibility for administering the noise control regulations was devolved to provincial and local authorities. Provincial Noise Control Regulations exist in the Free State, Western Cape and Gauteng	» National Department of Environmental Affairs (DEA). » North West Department of Rural, Environment and Agricultural Development (READ). » Naledi Local Municipality.	Noise impacts are expected to be associated with the construction phase of the solar energy facility and are not likely to present a significant intrusion to the local community. There is no requirement for a noise permit in terms of the legislation.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	provinces, but the Northern Cape province have not yet adopted provincial regulations in this regard. Allows the Minister of Environmental Affairs to make regulations regarding noise, among other concerns.		
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	An Environmental Authorisation and mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. Section 53 of the MPRDA states that any person who intends to use the surface of any land in any way which may be contrary to any object of the Act, or which is likely to impede any such object must apply to the Minister for approval in the prescribed manner.	» Department of Mineral Resources (DMR).	As no borrow pits are expected to be required for project, no mining permit or Environmental Authorisation is required to be obtained for borrow pits. In terms of Section 53 of the MPRDA approval is required from the Minister of Mineral Resources to ensure that the proposed development does not sterilise a mineral resource that might occur on site.

National Heritage Resources Act (Act No. 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including
	  » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;
	  » Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent
	» The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site
		» SAHRA – National heritage sites (grade 1 sites) as well as all historic graves and human remains.
		» North West Provincial Heritage Resources Agency (NWPHRA).
			An Archaeological Impact Assessment was undertaken as part of the BA process to identify heritage sites (refer to **Appendix H**) as per the requirements of the National Heritage Resources Act.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.		
National Forests Act (Act No. 84 of 1998)	According to this Act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. Notice of the List of Protected Tree Species under the National Forests Act (No. 84 of 1998) was published in GNR 536. The prohibitions provide that "no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, 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".	» Department of Agriculture, Forestry and Fisheries (DAFF). » North West Department of Rural, Environment and Agricultural Development (READ).	A permit or license is required for the destruction of protected tree species and/or indigenous tree species within a natural forest. *Acacia erioloba* (Declining and protected within the National Forest Act) was identified within the project site.
National Veld and Forest Fire Act (Act 101 of 1998)	Chapter 4 of the NVFFA places a duty on owners to prepare and maintain firebreaks, the procedure in this regard, and the role of adjoining owners and the fire protection association. Provision is also made for the making of firebreaks on the international boundary of the Republic of South Africa. The applicant must ensure that firebreaks are wide and	» Department of Agriculture, Forestry and Fisheries (DAFF).	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operation phase of the solar energy facility. The relevant management and mitigation measures have been included in the EMPr (refer to **Appendix K**).

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	long enough to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land, it does not cause soil erosion, and it is reasonably free of inflammable material capable of carrying a veldfire across it. Chapter 5 of the Act places a duty on all owners to acquire equipment and have available personnel to fight fires. Every owner on whose land a veldfire may start or burn or from whose land it may spread must have such equipment, protective clothing and trained personnel for extinguishing fires; and ensure that in his or her absence responsible persons are present on or near his or her land who, in the event of fire, will extinguish the fire or assist in doing so, and take all reasonable steps to alert the owners of adjoining land and the relevant fire protection association, if any.		
Conservation of Agricultural Resources Act (CARA) (Act No 43 of 1983)	Regulation 15 of GN R1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GN R1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories: » Category 1 plants: are prohibited and must be controlled. » Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread. » Category 3 plants: (ornamentally used plants)	» Department of Agriculture, Forestry and Fisheries (DAFF).	While no permitting or licensing requirements arise from this legislation, this Act is applicable during the BA process and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. The EMPr provides mitigation for soil erosion and weed control and management (refer to **Appendix K**). The permission of agricultural authorities will be required if the development of the solar energy

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	may no longer be planted; existing plants may re-main, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands. These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.		facility requires the draining of vleis, marshes or water sponges on land outside urban areas.
Hazardous Substances Act (Act No. 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising, or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc., nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared to be Group I or Group II hazardous substance; » Group IV: any electronic product; » Group V: any radioactive material.	» Department of Health.	It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license could be required to be obtained from the Department of Health.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Road Traffic Act (Act No 93 of 1996)	The technical recommendations for highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outline 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 are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts. The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.	» Provincial Department of Transport (provincial roads). » South African National Roads Agency Limited (national roads).	An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include: » Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. » Transport vehicles exceeding the dimensional limitations (length) of 22m. » Depending on the trailer configuration and height when loaded, some of the project components may not meet specified dimensional limitations (height and width).
Astronomy Geographic Advantage Act (Act No. 21 of 2007)	The Astronomy Geographic Advantage Act (No. 21 of 2007) provides for the preservation and protection of areas within South Africa that are uniquely suited for optical and radio astronomy; for	» Department of Science and Technology.	The site falls outside of the Northern Cape and the area governed by the AGA.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	intergovernmental co-operation and public consultation on matters concerning nationally significant astronomy advantage areas and for matters connected thereto. Chapter 2 of the Act allows for the declaration of astronomy advantage areas whilst Chapter 3 pertains to the management and control of astronomy advantage areas. Management and control of astronomy advantage areas include, amongst others, the following: * Restrictions on use of radio frequency spectrum in astronomy advantage areas * Declared activities in core or central astronomy advantage area * Identified activities in coordinated astronomy advantage area; and * Authorisation to undertake identified activities.		
Provincial Policies / Legislation			
Transvaal Nature Conservation Ordinance (No. 12 of 1983) (TNCO)	The Nature Conservation Ordinance accompanied by all amendments is regarded by the North West Department of Rural, Environment and Agricultural Development as the legal binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna and the destruction of problematic species. In its entirety, with special reference to: » Schedule 2: Protected Game	» North West Department of Rural, Environment and Agricultural Development (READ).	Approval from READ will be required in terms of the protection and conservation of fauna and flora in the North West Province. The following species have been confirmed within the development footprint that are listed within the TNCO: » *Acacia erioloba* » *Babiana hypogea* » *Nerine laticoma* » *Ammocharis coranica*

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	» Schedule 3: Specially Protected Game » Schedule 4: Protected Wild Animals » Schedule 5: Wild Animals » Schedule 7: Invertebrates » Schedule 11: Protected Plants » Schedule 12: Specially Protected Plants		» *Aloe greatheadii*
Bophuthatswana Nature Conservation Act (Act 3 of 1973) (BNCA)	The Nature Conservation Act accompanied by all amendments is regarded by the North West Department of Rural, Environment and Agricultural Development as the legal binding, provincial documents, providing regulations, guidelines and procedures with the aim of protecting game and fish, the conservation of flora and fauna and the destruction of problematic species. In its entirety, with special reference to: » Schedule 1: Protected Game » Schedule 1A: Specially Protected Game » Schedule 2: Ordinary Game » Schedule 3: Wild Animals In Respect Of Which The Provision Of Section 3 (a) (ii) Apply » Schedule 4: Wild Animals To Which The Provisions Of Section 4 (1) (b) Do Not Apply » Schedule 7: Protected Plants » Schedule 7: Specially Protected Plants	» North West Department of Rural, Environment and Agricultural Development (READ).	Approval from READ will be required in terms of the protection and conservation of fauna and flora in the North West Province. The following species have been confirmed within the development footprint that are listed within the BNCA: » *Acacia erioloba* » *Babiana hypogea* » *Nerine laticoma* » *Ammocharis coranica* » *Aloe greatheadii*
North West Biodiversity Sector Plan	The Biodiversity Sector Plan informs land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity.	» North West Department of Rural, Environment and Agricultural Development (READ).	Approval from READ will be required for the development of the Moeding Solar PV Facility.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	This is done by providing information of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), with accompanying land use planning and decision making guidelines.		