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Environmental Management

Programme for proposed Concentrated Solar Power Plant (Central Receiver) on the farm Sand Draai 391, Northern Cape

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Drafted by: Johan Blignaut

Checked by: Prashika Reddy

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Glossary

Accident	A road vehicle accident.
Activity (Development)	An action either planned or existing that may result in environmental impacts through pollution or resource use. For the purpose of this report, the terms 'activity' and 'development' are freely interchanged.
Alien Species	A species that is not an indigenous species; or an indigenous species translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention.
Alternatives	Different means of meeting the general purpose and requirements of the activity, which may include site or location alternatives; alternatives to the type of activity being undertaken; the design or layout of the activity; the technology to be used in the activity and the operational aspects of the activity.
Applicant	The project proponent or Developers responsible for submitting applications (Environmental Authorisation, Waste Management Licence, Water Use Licence etc.) to the relevant environmental authority
Biodiversity	The diversity of animals, plants and other organisms found within and between ecosystems, habitats, and the ecological complexes.
Buffer	A buffer is seen as an area that protects adjacent communities from unfavourable conditions. A buffer zone is usually an artificially imposed zone included in a management plan.
Building and Demolition Waste	Building and demolition waste means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition which include (a) discarded concrete, bricks, tiles and ceramics; (b) discarded wood, glass and plastic; (c) discarded metals; (d) discarded soil, stones and dredging spoil; (e) other discarded building and demolition waste.
Construction	The building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint.
Contractor	Companies appointed on behalf of the Client to undertake activities, as well as their sub-contractors and suppliers.
Cumulative Impact	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	The demolition of a building, facility, structure or infrastructure.
Degradation	The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.
Demolition	Demolition is the tearing-down of buildings and other structures, the opposite of

	construction. Demolition contrasts with deconstruction, which involves taking a building apart while carefully preserving valuable elements for re-use.
Direct Impact	Impacts that are caused directly by the activity and generally occur at the same time and at the same place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally quantifiable.
Domestic Waste	Domestic waste means waste, excluding hazardous waste that emanates from premises that are used wholly or mainly for residential, educational, health care, sport or recreation purposes, which include (a) garden and park waste; (b) municipal waste and (c) food waste.
Emergency	An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local or provincial authority.
Environment	In terms of the National Environmental Management Act (NEMA) (No 107 of 1998)(as amended), "Environment" means the surroundings within which humans exist and that are made up of: i. the land, water and atmosphere of the earth; ii. micro-organisms, plants and animal life; iii. any part or combination of (i) of (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 wellbeing.
Environmental Control Officer	An individual nominated through the Client to be present on site to act on behalf of the Client in matters concerning the implementation and day to day monitoring of the EMPr and conditions stipulated by the authorities.
Environmental Impact	A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.
Environmental Assessment	The generic term for all forms of environmental assessment for projects, plans, programmes or policies and includes methodologies or tools such as environmental impact assessments, strategic environmental assessments and risk assessments.
Environmental Authorisation	An authorisation issued by the competent authority in respect of a listed activity, or an activity which takes place within a sensitive environment.
Environmental Assessment Practitioner (EAP)	The individual responsible for planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instrument introduced through the EIA Regulations.
Environmental Impact	Change to the environment (biophysical, social and/ or economic), whether adverse or beneficial, wholly or partially, resulting from an organisation's activities, products or services.
Environmental Impact Assessment (EIA)	In relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application as defined in NEMA.
Environmental	Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the

Management	carrying capacity of the environment.
Environmental Management Programme (EMPr)	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive impacts and limiting or preventing negative environmental impacts are implemented during the life cycle of a project. This EMPr focuses on the construction phase, operation phase and decommissioning phase of the proposed project.
Fatal Flaw	An event or condition that could cause an unanticipated problem and/or conflict which will could result in a development being rejected or stopped.
General Waste	General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes – i. domestic waste; ii. building and demolition waste; iii. business waste; and iv. inert waste.
General Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.
Hazardous Waste	Hazardous waste means 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.
Hazardous Waste Landfill Site	A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.
Human Waste	Excrement, faeces or other waste material discharged from the human body.
Impact	A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.
Incident	An undesired event which may result in a significant environmental impact but can be managed through internal response.
Indirect Impacts	Indirect or induced changes that may occur as a result of the activity. These types if impacts include all of the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.
Integrated Environmental Management	A philosophy that prescribes a code of practice for ensuring that environmental considerations are fully integrated into all stages of the development and decision-making process. The IEM philosophy (and principles) is interpreted as applying to the planning, assessment, implementation and management of any proposal (project, plan, programme or policy) or activity - at local, national and international level - that has a potentially significant effect on the environment. Implementation of this philosophy relies on the selection and application of appropriate tools for a particular proposal or activity. These may include environmental assessment tools (such as strategic environmental assessment and risk assessment), environmental management tools (such as monitoring, auditing and reporting) and decision-making tools (such as multi-criteria decision support systems or advisory councils).
Interested and Affected	Any person, group of persons or organisation interested in or affected by an activity; and any organ of state that may have jurisdiction over any aspect of

Party (I&AP)	the activity.
Invasive Species	Any species whose establishment and spread outside of its natural distribution range.
Method Statement	A method statement is a written submission by the Contractor to the Engineer in response to the specification or a request by the Engineer, setting out the plant, materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting a Method Statement. It contains sufficient detail to enable the Engineer to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.
Mitigate	The implementation of practical measures designed to avoid, reduce or remedy adverse impacts or enhance beneficial impacts of an action.
Pollution	The National Environmental Management Act, No. 107 of 1998 defined pollution to mean any change in the environment caused by – substances; radioactive or other waves; or noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.
Rehabilitation	Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (wherever possible) which it was before disruption. Rehabilitation for the purposes of this Environmental Management Programme is aimed at post-reinstatement re-vegetation of disturbed areas and the stability of the land surface. In attempt to achieve this purpose, disturbed areas should be rehabilitated with the establishment of suitable indigenous vegetation. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.
Sensitive Environments	Any environment identified as being sensitive to the impacts of the development.
Topsoil	The A-horizon of the soil profile. Topsoil is the upper layer of soil from which plants obtain their nutrients for growth. It is often darker in colour, due to the organic (humus) fraction. Where topsoil is referred to, it is deemed to be the soil and grass / ground cover fraction. For the purposes of this management programme, where: topsoil is deemed as the layer of soil from the surface (approximately 300 mm) to the specified depth required for excavation.
Waste	Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered - i. that is surplus, unwanted, rejected, discarded, abandoned or disposed of; ii. which the generator has no further use of for the purposes of production; iii. that must be treated or disposed of; or iv. that is identified as a waste by the Minister by notice in the Gazette, and includes waste generated by the mining, medical or other sector, but— v. a by-product is not considered waste; and vi. vi. any portion of waste, once re-used, recycled and recovered, ceases to

	be waste.
Waste Disposal Facility	Waste disposal facility means any site or premise used for the accumulation of waste with the purpose of disposing of that waste at that site or on that premises.
Watercourse	Defined as: i. a river or spring; ii. a natural channel or depression in which water flows regularly or intermittently; iii. a wetland, lake or dam into which, or from which, water flows; and iv. any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (No 36 of 1998) and a reference to a watercourse includes, where relevant, its bed and banks.
Water Pollution	The National Water Act, 36 of 1998 defined water pollution to be the direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it – less fit for any beneficial purpose for which it may reasonably be expected to be used; or harmful or potentially harmful (aa) to the welfare, health or safety of human beings; (bb) to any aquatic or non-aquatic organisms; (cc) to the resource quality; or (dd) to property".
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.
Workforce	The entire project team including people employed by the Developers or the Contractor, persons involved in activities related to the project, or person present at or visiting the construction area, including permanent contactors and casual labour.

Acronyms

CER – Certified Emission Reduction

CDM – Clean Development Mechanism

CSP – Concentrated Solar Power

DEA – Department of Environmental Affairs

DOE – Department of Energy

DWS – Department of Water and Sanitation

EAP – Environmental Assessment Practitioner

EIA - Environmental Impact Assessment

EIAR – Environmental Impact Assessment Report

EMPr - Environmental Management Programme

ESR - Environmental Scoping Report

ESS - Environmental Scoping Study

GHG – Greenhouse Gas

GN – Government Notice

I&AP – Interested and Affected Party

IRP – Integrated Resource Plan

kWh – Kilowatt Hour

MW – Megawatts

NCDENC – Northern Cape Department of Environment and Nature Conservation

NDP – National Development Plan

NEMA – National Environmental Management Act (No 107 of 1998)

NERSA - National Energy Regulator of South Africa

PV – Photovoltaic

REIPPPP – Renewable Energy Independent Power Producer Programme

SADC – Southern Africa Development Community

SIP – Strategic Infrastructure Project

1 Introduction

Increasing economic growth and social development within South Africa is placing a growing demand on energy supply. Coupled with the rapid advancement in economic and social development, is the growing awareness of environmental impact, climate change and the need for sustainable development.

Whilst South Africa relies heavily on coal to meet its energy needs, the country is well endowed with renewable energy resources that offer sustainable alternatives to fossil fuels. Renewable energy harnesses naturally occurring non-depletable sources of energy, such as solar, wind, biomass, hydro, tidal, wave, ocean current and geothermal, to produce electricity, gaseous and liquid fuels, heat or a combination of these energy types[1]. The successful use of renewable energy technology in South Africa still requires extensive investigation, however, Concentrating Solar Power (CSP) technologies have been demonstrated to be economically and environmentally viable and capable of being employed on a large scale.

Solafrica Energy (Pty) Ltd (Solafrica) is currently assessing the feasibility of constructing a CSP plant based on Central Receiver technology including all associated infrastructure with a maximum generation capacity of 150 MW on the farm Sand Draai 391. The proposed plant is required to be sited on a technically and environmentally feasible site and to this end, Solafrica has considered land availability, land use capability, fuel availability and costs, grid connection proximity, capacity and strengthening, and other aspects related to the feasibility of solar power sites.

The CSP plant using central receiver technology will consist of the following components:

- A solar collection field of heliostats;
- A heat transfer fluid system with thermal storage option; and
- A power block (incl. steam cycle, steam generator, cooling system).

In addition to the power plant, associated infrastructure such as roads, water pipelines, electricity distribution lines, storerooms and temporary waste storage facilities will be required.

**** It is important to note that Solafrica serves as the Applicant for the proposed project. However, after the completion of the EIA and when Environmental Authorisation has been obtained, all licenses for the construction of the project will be sold to a Developer. Therefore the holder of the Authorisation and all licenses will be deemed responsible for the implication of the EMPr and all relevant documentation.**

1.1 Sand Draai Central Receiver Plant

1.1.1 Site Locality

Solafrica intends constructing a CSP plant using central receiver technology and associated infrastructure with a maximum generation capacity of 150 MW on the farm Sand Draai 391. The footprint of the proposed plant is approximately 1000 ha in total. The facility will also include ancillary infrastructure in support of the power plants including water abstraction systems, waste management systems, power lines, roads, storage facilities, administration and operation buildings, construction laydown areas and temporary housing facilities. The site locality map is included below.

[1] Department of Minerals and Energy. 2003. *White Paper on Renewable Energy.*

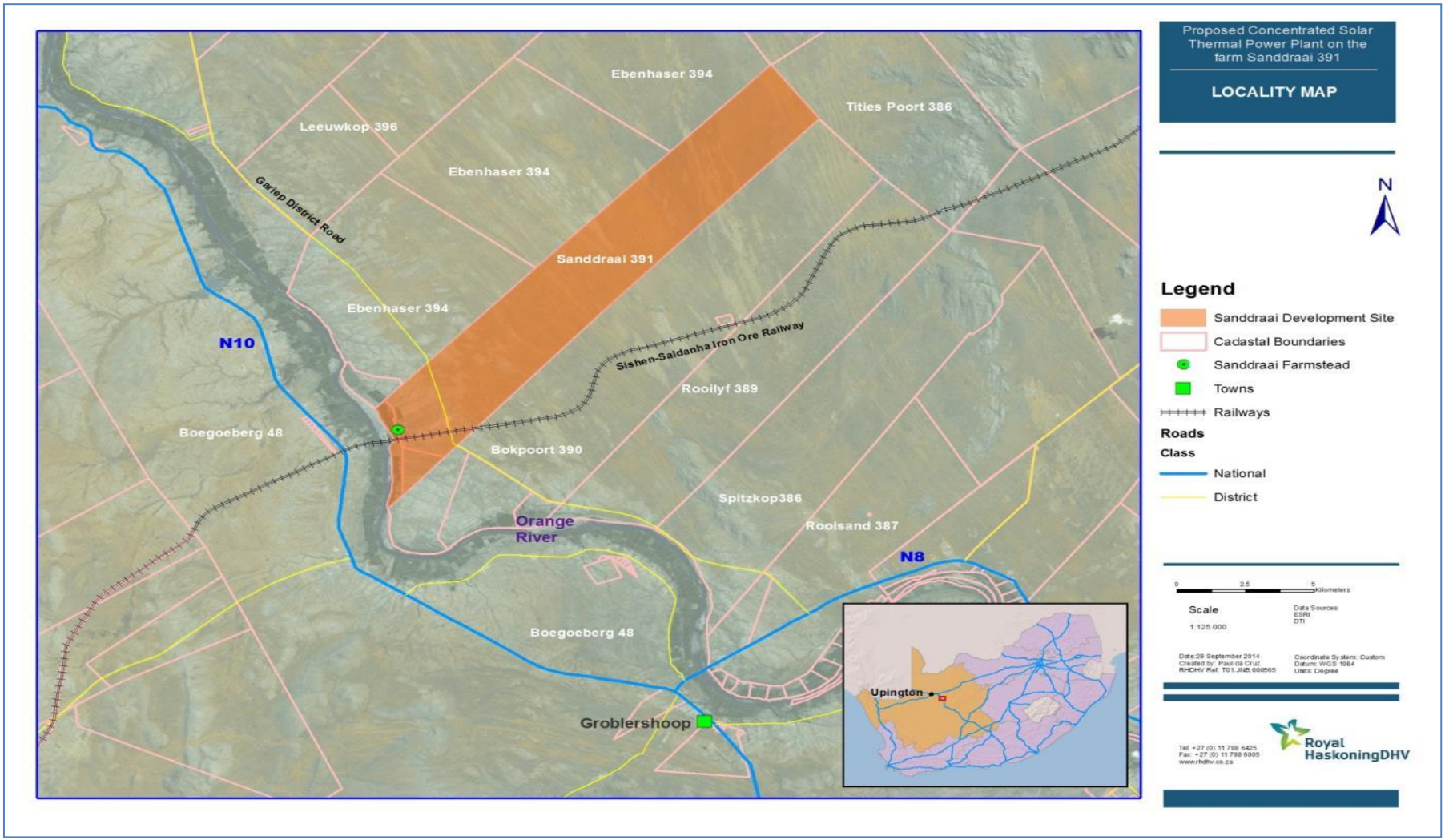

Figure 1: Locality map

1.1.2 Electricity Generation using Concentrating Solar Power (CSP) Technology

The fundamental principle of CSP technologies is to collect the energy carried by sunrays, allowing a heat transfer fluid (HTF) to absorb the collected energy and thereby converting the thermal energy into further useful forms such as electricity.

The process of energy conversion in a CSP plant is illustrated in Figure 2. Since a thermal intermediary is always involved, a conventional steam power turbine generator can be coupled for power generation. Energy storage is possible either in thermal form (e.g.: steam, molten salt) or as electrical energy (e.g. batteries). Losses occur throughout the energy conversion process.

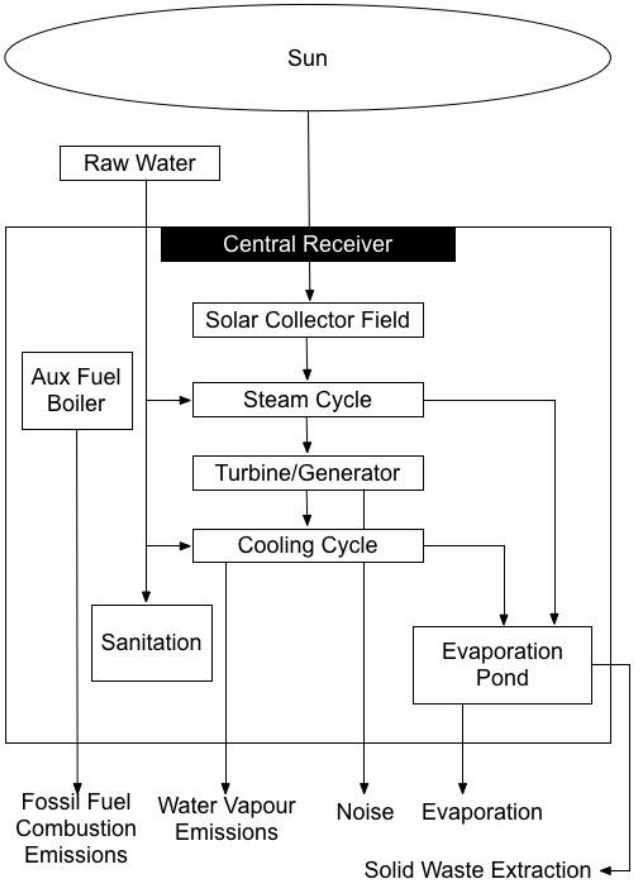

Figure 2: Overview of the central receiver technology

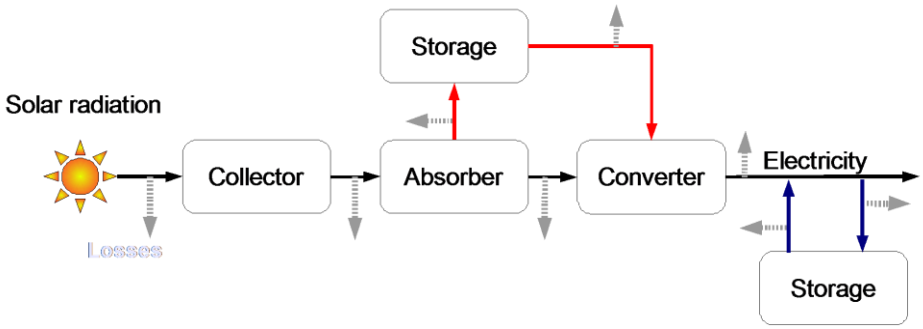

Figure 3: Schematic of the energy conversion in a CSP plant. Storage is optional (Red – thermal energy; Blue – electrical energy; Grey - losses)

1.1.3 Applicable Documentation

The following environmental documentation is applicable for the project, and will be read in conjunction with this Environmental Management Programme (EMPr):

- Environmental Impact Assessment Report for the proposed construction of the CSP plant based on central receiver technology.
- Integrated Environmental Authorisation (IEA) from the Department of Environmental Affairs (once issued).
- Integrated Water Use Licence from the Department of Water Affairs (once issued).

1.2 Purpose of the EMPr

In terms of The Constitution of the Republic of South Africa (1996), everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for benefit of present and future generations, through reasonable legislation and other measures that prevent pollution and ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (Section 24). The needs of the environment as well as affected parties should thus be integrated into overall project management.

The Constitution is underpinned by the suite of Specific Environmental Management Acts (SEMAs) – including the National Environmental Management Act (No 107 of 1998 - NEMA), National Environmental Management: Waste Act (No 59 of 2008 - NEM:WA), National Environmental Management: Air Quality Act (No 39 of 2004 - NEM:AQA), National Environmental Management Biodiversity Act (No 10 of 2004 - NEM:BA), National Environmental Management Protected Areas Act (No 57 of 2003 - NEM:PAA), and the National Water Act (No 36 of 1998 - NWA) – which combined, serve to control all relevant facets of the environment so as to ensure that Section 24 of the Constitution is upheld.

This EMPr is developed in terms of the SEMAs and ensures that construction activities meet the requirements of existing environmental legislation and good environmental practice in terms of international norms and standards. This is achieved by identifying those activities for the proposed development that may have a negative impact on the environment; outlining the mitigation measures that will need to be taken and the steps necessary for their implementation and describing the reporting system to be undertaken during construction.

1.3 Objectives of the EMPr

The EMPr has the following objectives:

- To ensure compliance with regulatory authority stipulations and guidelines; which may be local, provincial, national, and/or, international.
- To outline functions and responsibilities of responsible persons;
- To state standards and guidelines, which are required to be achieved in terms of environmental legislation;
- To outline mitigation measures and environmental specifications, which are required to be implemented for all phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts;
- To prevent long-term or permanent environmental degradation.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that all workers, subcontractors and other involved in the project meet legal and other requirements with regard to environmental management;

- Incorporate environmental management into project design and operating procedures; and
- Address concerns and issues addressed in the EIA's stakeholder consultation process and those that will likely to continue to arise during the project's lifetime.

An independent Environmental Control Officer (ECO) must be appointed (by the proponent) to ensure compliance with the EMPr. The EMPr will be considered an extension of the Conditions of Approval as set forth by the Department of Environmental Affairs (DEA). Non-compliance with the EMPr will constitute non-compliance with the said Conditions.

1.4 Structure of the EMPr

The EMPr provides mitigation and management measures for the following key phases of the project:

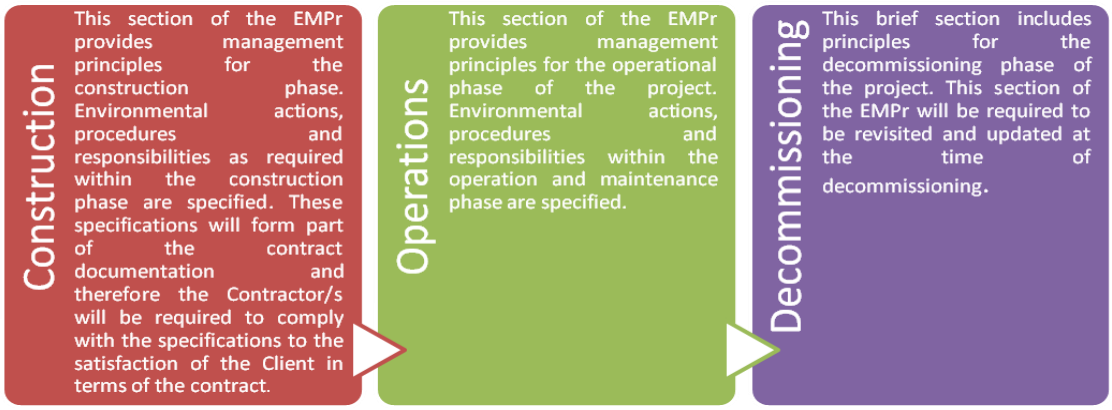

Figure 4: Different phases of the project life-cycle

1.5 The EMPr as a 'living' Document

The approach adopted for this EMPr is derived from the Deming Cycle, a cycle of continuous improvement that entails the reiterative actions of plan, do, check, act, and critically to then return to the planning phase.

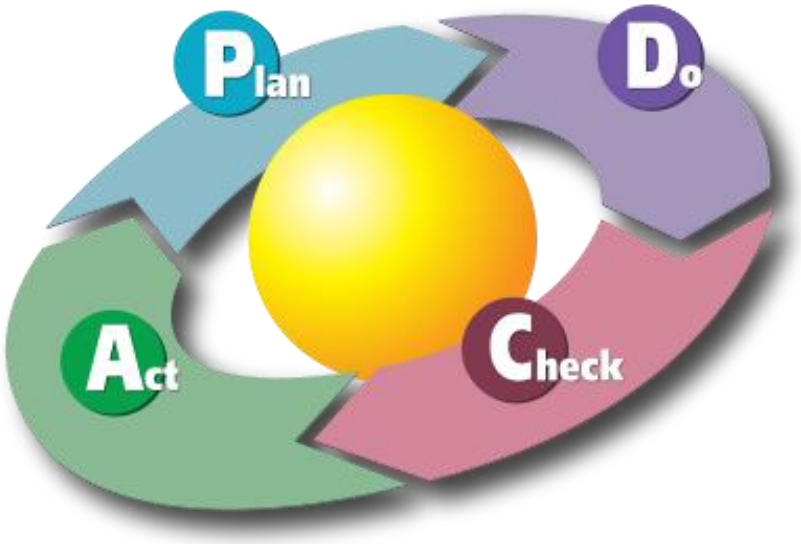

Figure 5: Deming cycle of continuing improvement

1.5.1 Plan

Project-specific planning for the proposed project involves consideration of the legal triggers, the specifics of the proposed development, and the nature of the receiving environment. This provides a starting point for targeted environmental management objectives. Environmental performance indicators are then determined with measurable targets prescribed to monitor the environmental performance of the project. Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

1.5.2 Do

Throughout the development's life-span, the Developer and Operator will be required to develop and maintain a Quality Management System – designed to ensure that best management practices are implemented in day-to-day management. Such a QMS should at least include the following information:

- Location and extent of associated infrastructure;
- Associated activities, such as the transportation of people and equipment;
- Resources and experience required (staffing);
- Materials and equipment to be used;
- Management actions;
- Human resources used;
- Construction-monitoring activities;
- Emergency / disaster incident and reaction procedures; and
- Rehabilitation procedures for the impacted environment.

These topics will be cross-linked into the contracts related to the development and operational phases of the project.

1.5.3 Check

A system of assessing monitoring results has been developed to check the environmental management performance. Continuous assessment facilitates proactive management of the environmental issues. Mitigation measures can then be successfully implemented on an ongoing basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr. Regular auditing of environmental performance is prescribed to prove and preserve accountability.

1.5.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting system. Precautionary mitigation measures and corrective actions will be prescribed and instructions will be given in order to implement these in the field. The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and should be updated regularly to address the changing circumstances of the project.

1.6 Details of the Environmental Assessment Practitioner

The particulars of the EAPs responsible for the compilation of this document are presented in Table 1 below:

Table 1: Details of the EAPs

Details	
Consultant:	Royal HaskoningDHV
Contact Persons:	Johan Blignaut and Malcolm Roods
Postal Address	PO Box 867 Gallo Manor 2052
Telephone:	011 798 6000
Facsimile:	011 798 6010
E-mail:	johan.blignaut@rhdhv.com / malcolm.roods@rhdhv.com
Expertise:	Malcolm Roods is a Principal at Royal HaskoningDHV specialising in Environmental Impact Assessments (EIA) for electricity supply (generation, transmission and distribution), road infrastructure, residential developments as well as water management projects. This builds on a broad government background, which has made him particularly flexible. His past experience includes 6 years public service which included policy development, environmental law reform and EIA reviews. His experience also includes 8 years of environmental consulting in the field of Impact Assessment and Authorisation Applications, with a focus on legislative requirements and business management. He has a HeD and a BA (Hons) in Geography and Environmental Management. Johan Blignaut is a Junior Environmental Consultant who is responsible for a number of duties, including monitoring the implementation of Environmental Authorisations (EAs) and the Environmental Management Programme (EMPr) during the construction phase of projects, serving as a liaison between property owners and contractors, writing of ECO, BA, EIA and EMPr reports and conducting public participation processes. He has a BSc in Zoology, Geography and Tourism as well as a BSc (Hons) in Environmental Management.

2 Environmental Legislation, Policies and Guidelines

All relevant environmental legislation pertaining to the project from cradle to grave is listed within Table 2 below. The Contractor is required to comply with this legislation for all phases of the project. This list is intended to serve as a guideline only for the Contractor and is not exhaustive. Additional aspects should be added once the Integrated Environmental Authorisation is obtained and amended as construction commences.

Table 2: Relevant environmental legislation, guidelines and policies applicable to the project

Legislation	Section	Relates to
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (No 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment.
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The Developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care.
National Environmental Management: Waste Act (No. 59 of 2008)	Section 19	A list of waste management activities (GN 921) which have, or are likely to have a detrimental effect on the environmental have been published.
	Government Notice 921 – Category A	Activities requiring a Basic Assessment study to be undertaken as part of the waste management licence application.
	Government Notice 921 – Category B	Activities requiring a Scoping and Impact Assessment study to be undertaken as part of the waste management licence application.
	Government Notice Regulation 634	Waste Classification and Management Regulations.
	Government Notice Regulation 635	National Norms and Standards for the assessment of Waste for Landfill Disposal.
	Government Notice Regulation 635	National Norms and Standards for Disposal of Waste to Landfill.
Environment Conservation Act (No 73 of 1989) and Regulations	Sections 19 and 19A	Prevention of littering by employees and subcontractors during construction and the maintenance phases of the proposed project.
National Water Act (No 36 of 1998)	Section 21	General principles for regulating water use.
National Heritage Resources Act (No 25 of 1999) and Regulations	Section 34	No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.
	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise

Legislation	Section	Relates to
		disturb any archaeological or palaeontological site.
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such place.
	Section 38	This section provides for Heritage Impact Assessments (HIAs), which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The Heritage Impact Assessment (HIA) will be approved by the authorising body of the provincial directorate of environmental affairs, which is required to take the provincial heritage resources authorities' comments into account prior to making a decision on the HIA.
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust.
	Section 34	Control of noise.
	Section 35	Control of offensive odours.
National Dust Control Regulations (2013)		The purpose of the Regulations is to prescribe general measures for the control of dust in all areas. A standard for the acceptable dust fall rate is prescribed for residential and non-residential areas. Failure to comply with the standard for dust fall may result in an air quality officer directing the person in question to undertake a dust fall monitoring programme, submission of dust fall monitoring reports and dust fall management plans as well as the undertaking of continuous ambient air quality monitoring.
National Environmental Management Biodiversity Act (Act No. 10 of 2004) and regulations: ▪ **Threatened or protected species (GN 388)** ▪ **Lists of species that are threatened or protected (GN 389)** ▪ **Alien and invasive species regulations (GNR 506)** ▪ **Publication of exempted alien species (GNR 509)** ▪ **Publication of National list of invasive species (GNR 507)** ▪ **Publication of prohibited alien species (GNR 508)**		Provide for the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.
National Forests Act (No 84 of 1998) and Regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the Gazette.

Legislation	Section	Relates to
	Sections12-16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a group of trees, a particular woodland, or trees belonging to a certain species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire of dispose of any protected tree, except under a licence granted by the Minister.
National Veld and Forest Fire Act (No 101 of 1998) Regulation 9		The application of control measures regarding the utilisation and protection of veld.
Occupational Health and Safety Act (No 85 of 1993)	Section 8	General duties of employers to their employees.
	Section 9	General duties of employers and self employed persons to persons other than their employees.
Hazardous Substances Act (No 15 of 1973) and Regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances.
Fencing Act (No 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 meters on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.
Construction Regulations 2014		Contractors must comply with the Construction Regulations which lay out the framework for construction related activities.
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication.
Road Transportation Act (No 74 of 1977)		
!Kheis Local Municipality Integrated Development Plan (2014-2019)		
!Kheis Local Municipality Spatial Development Framework (2014)		

3 Management and Monitoring Procedures

3.1 Organisational Structure and Responsibilities

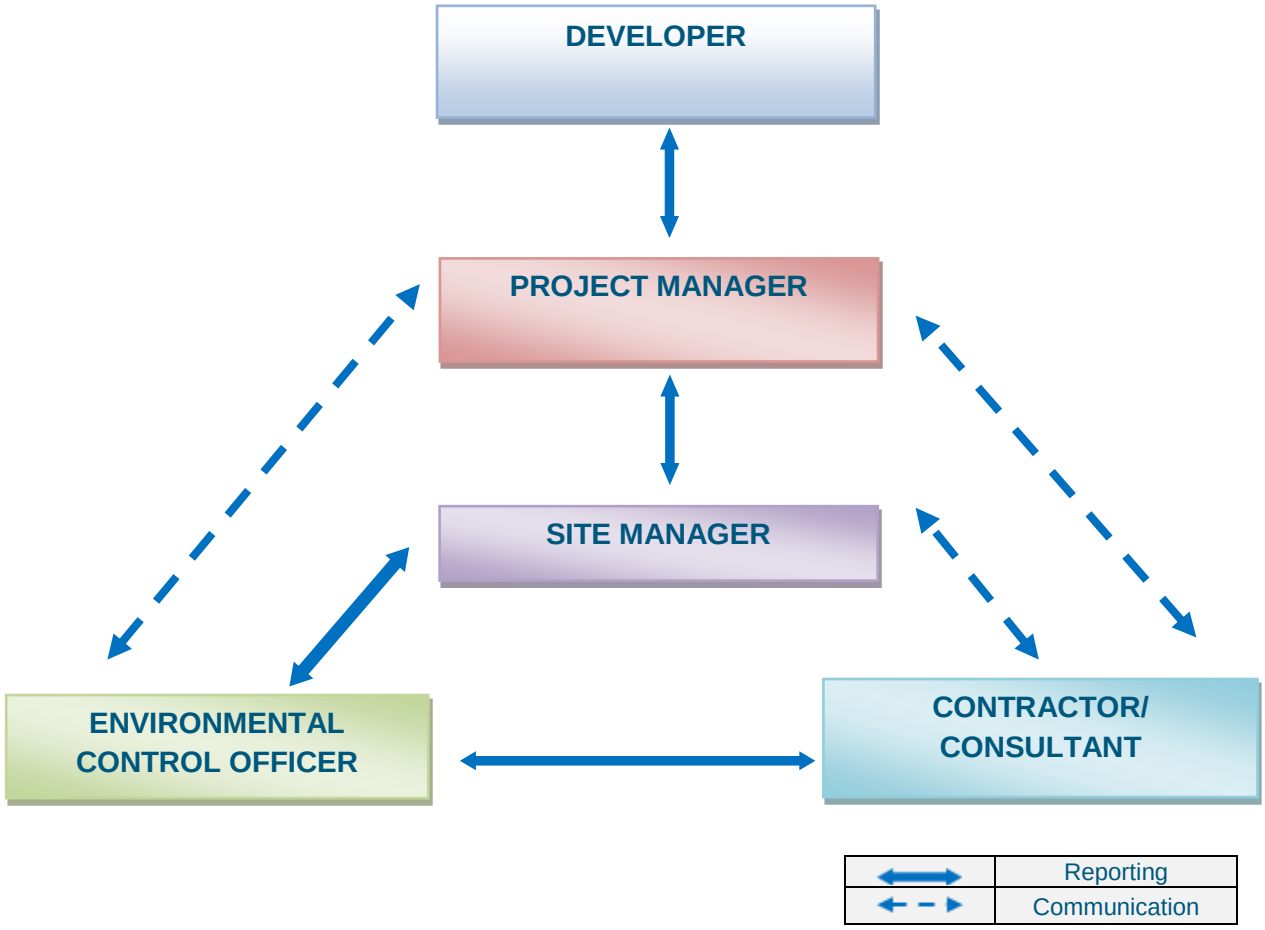

Figure 6: Organogram

Table 3: Roles and Responsibilities of Key Members

Developer
The Developer will: ▪ Ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. ▪ Ensure that the Contractor/s is aware of all specifications, legal constraints and standards and procedures pertaining to the project specifically with regards to the environment. ▪ Ensure that all stipulations within the EMPr are communicated and adhered to by its appointed Contractor(s). **The Developer is responsible for the implementation of the EMP during the operational and decommissioning phases of the project. Decommissioning will however entail the appointment of a new professional team and responsibilities will**

be similar to those during the design, pre-construction and construction phases

Project Manager

The Project Manager is responsible for the implementation of the EMP on the site during the pre-construction and construction phases of the project

Contractor

All contractors (including subcontractors and staff) and service providers are

ultimately responsible for:

- Ensure the implementation and compliance with recommendations and conditions of the EMP.
- Submitting an obligatory Methods Statement for approval by the ECO before any work is undertaken.
- Adhering to any instructions issued by the Engineer/Project Manager on the advice of the ECO.
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting.
- Ensuring that the list of transgressions issued by the ECO in the site office is available on request.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - **Public involvement / complaints.**
  - **Health and safety incidents.**
  - **Incidents involving hazardous materials stored on site.**
  - **Non compliance incidents.**
- Arrange that all his employees and those of his subcontractors receive training before the commencement of construction

Environmental Control Officer (ECO)

The Environmental Control Officer will:

- Monitor the implementation of the EMPr during construction activities and shall remain employed until the site is handed over to the Client by the Contractor.
- Be familiar with the recommendations and mitigation measures of the associated EMPr for the project.
- Ensure site protection measures are implemented on site.
- Ensure that the Principal Contractor, sub-contractors, construction teams and the Principal Agent are in compliance with the EMPr at all times.
- Monitor all site activities for compliance.
- Conduct monthly audits of the site according to the EMPr, and report findings to the Principal Agent/Contractor.
- Recommend corrective action for any environmental non-compliance at the site.
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions. These monthly reports are to be submitted to the Client and the Principal Agent.
- Conduct once-off training with the Contractor on the EMPr and general environmental awareness.
- Submission of an environmental audit report to the Client and Principal Agent upon completion of the project.
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of the Principal Agent and the SHE Officer.

Environmental Liaison Officer

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

3.2 Monitoring

A monitoring programme will be in place not only to ensure compliance with the EMPr through the contract/work instruction specifications, 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.

A monitoring programme will be implemented for the duration of the construction phase of the project. This programme will include:

- Monthly audits will be conducted by the ECO/s for the duration of the construction phase – the ECO shall undertake this environmental monitoring with the audits considering compliance with the EMPr, the IEA conditions, as well as the conditions of any permits and/or licences.
- On-going monitoring is to be undertaken by the Contractors' Environmental Manager/Officer – this will include notification to the ECO and proponent ELO should an incident take place.
- External auditing may take place at unspecified times by the authorities and/or other relevant authorities.
- An independent, suitably qualified, auditor will need to be contracted to conduct an audit once the construction phase of the project is completed according to the provisions of the EMPr.
- The Contractor's Environmental Officer must undertake regular site inspections (at least twice a week) to ensure all legislative requirements are adhered to. Proof of such inspections shall be kept on file for ease of reference or for audit purposes. .

3.3 Training and Environmental Awareness

It is important to ensure that the Contractor has the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm.

Training needs should be identified based on the available and existing capacity of site personnel (including all Contractors and sub-contractors) to undertake the required management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard.

The environmental training is aimed at:

- promoting environmental awareness;
- informing the main Contractor of all environmental procedures, policies and programmes applicable;
- providing generic training on the implementation of environmental management specifications; and
- providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

Training will be done in a verbal format. The training will be a once-off event; however the main Contractor should make provision for weekly training or "Toolbox Talks".

In addition to training, general environmental awareness must be fostered among the project's workforce to encourage the implementation of environmentally sound practices throughout its duration. This ensures that environmental accidents are minimised and environmental compliance maximized.

3.4 Reporting Procedures

3.4.1 Documentation

The following documentation must be kept on site in order to record compliance with the EMPr:

- An Environmental File which includes:

- Copy of the EMPr;
- Copy of the IEA;
- Copy of the WUL;
- Copy of all other licences/permits;
- Copy of all rehabilitation plans;
- Copy of the Stormwater Management Plan;
- Environmental Policy of the Main Contractor;
- Environmental Method Statements compiled by the Contractor;
- Non-conformance Reports;
- Environmental register, which shall include:
  - Communications Register – including records of complaints.
  - Monitoring Results – including environmental monitoring reports, register of audits, non-conformance reports.
  - Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record.

- Waste Documentation such as, but not necessarily limited to: Waste Manifest Documents, Safe Disposal Certificates (SDCs) and Sewerage Disposal Receipts;
- Material Safety Data Sheets (MSDSs) for all hazardous substances;
- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions;
- Notification of Emergencies and Incidents; and
- Minutes and attendance registers of all environmental meetings.

3.4.2 Environmental Register

The Developers will put in place an Environmental Register. The Contractor will ensure that the following information is recorded for all complaints / incidents:

- Nature of complaint / incident.
- Causes of complaint / incident.
- Party/parties responsible for causing complaint / incident.
- Immediate actions undertaken to stop / reduce / contain the causes of the complaint / incident.
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint / incident.
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions.
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented.
- Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the Contractors' Records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the Developers.

3.4.3 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the Contractor in writing. Preceding the issuing of an NCR, the Contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR.

The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects;
- Nature of the risk;
- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account;
- Agreed timeframe by which the actions documented in the NCR must be carried out; and
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and Contractor should sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

3.4.4 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure appropriate responses to unexpected / accidental actions / incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, heat transfer fluid, petrol, and diesel);
- Accidental damage to existing utilities e.g. sewer and water pipelines;
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding specifically to environmental incidents and must ensure and include the following:

- Construction employees shall be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (i.e. manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. the fire department / on-site fire detail, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor and their sub-contractor(s) must comply with the environmental emergency preparedness and incident and accident-reporting requirements as per the relevant legal requirements.

3.4.5 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and the environment. To allow the mitigation measures in this document to be implemented, task-specific method statements should be developed for each set of tasks. A Method Statement details how and when a process will be carried out, detailing possible dangers/risks, and the methods of control required.

The Contractor will be accountable for all actions taken in non-compliance of the approved Method Statements. The Contractor shall keep all the Method Statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

As a minimum the following Method Statements will be required to be generated:

- Bunding;
- Construction site and office/yard establishment;

- Cement mixing / concrete batching / bentonite mixing (if necessary);
- Contaminated water;
- Dust management;
- Environmental awareness course(s);
- Environmental monitoring;
- Erosion control;
- Fire, hazardous and/or poisonous substances;
- Fuels and fuel spills (may form part of the item above);
- Storage, handling and decanting of diesel (may form part of the item above);
- Personnel, public and animal safety;
- Rehabilitation of modified environment(s);
- Solid and liquid (general and hazardous) waste management;
- Sources of materials (including MSDSs);
- Topsoil management;
- Haulage, stockpiling and management of surplus fill material;
- Stormwater Management; and
- Wash-bay areas (if necessary).

3.4.6 Public Communication and Liaison with I&APs

The Developers must ensure that the adjacent landowners are informed and updated throughout the construction phases.

Sufficient signage should be erected around the site (including at the entrance), informing the public of the construction activities taking place. The signboards should include the following information:

- The name of the Contractor; and
- The name and contact details of the site representative to be contacted in the event of emergencies or complaint registration.

4 Environmental Awareness Plan

The Developer is committed to promoting and implementing sustainability throughout their operations. As part of this commitment, the team recognises the importance of making all employees aware of the potential environmental impacts that could result from conducting their jobs and how this potential can be minimised through effective training. Environmental awareness to the employees of the project will be provided by implementing environmental awareness training in the following forums:

- SHEQ Meetings (Monthly)
- Daily meeting (SHE talks/Toolbox Talks)
- SHE Inductions courses (Annually)
- Info sessions
- Open Days (*ad hoc*)
- Bulletins
- Environmental Awareness Courses (Ad hoc)
- EMPr Awareness (Annually)

The above mentioned awareness activities will be used to share information and to ensure that all personnel are aware of the environment in which they operate and what environmental aspects require attention during their daily operations/activities/tasks. Additionally, personnel awareness training will be undertaken if and when required to strengthen the personnel's understanding of environmental issues.

The method and medium of communication during the environmental meetings will be determined by the site manager facilitating the meetings. The topics discussed in meetings will be recorded, with all employees present signing an attendance register.

As potential environmental impacts differ in each department of the operation, the environmental topics selected for discussion can either be:

- General topics that are applicable to the entire operation/activity;
- Area specific topics as identified in the impacts assessment section of the EIA report, or
- Topics that can be "taken home" and implemented off-site.

4.1 General Topics

There are a number of environmental impacts resulting from the proposed CSP plant that are applicable throughout the project. These topics should be discussed at all areas. General topics include, but are not limited to, the following:

- Water consumption and conservation;
- Potential for water pollution and the related impacts (including health related);
- Dust generation related impacts (including health-related) ;
- Noise generation and related impact (including health-related);
- Waste minimisation and recycling;
- Practical training regarding the clean-up of major and minor hydrocarbon spills/use of spill management kit;
- Practical training on using a fire extinguisher;
- Alien vegetation identification and removal, and the importance of indigenous vegetation; and
- Importance of wildlife, snakes and other reptiles in support of ecosystem.

4.2 Activity Specific Topics

Some activities may have environmental impacts that are unique to each area. These must be addressed in the SHEQ meetings. Area specific topics include, but are not limited to those impacts which are ranked as having a negative “medium” to “high significance” as determined in the EIA study. Some of these topics may be a repeat of those covered under general topics.

- Impact on fauna, flora and avifauna;
- Biodiversity interaction awareness;
- Impact on watercourse and Orange River riparian corridor;
- Stormwater management;
- Identification and management of erosion;
- Water consumption and conservation;
- Vehicle emissions and related impacts (including health related)
- Practical training regarding the clean-up of major and minor hydrocarbon spills;
- The importance of the waste management system and implementing good housekeeping;
- Dust generation and why and how to reduce dust; and
- Traffic.

4.3 Take-home Topics

Environmental awareness should not stop at the work place. Many of the concepts learned at work can be applied to employees’ life style at home. Topics that can be covered under “take home topics” include, but are not limited to:

- Water consumption and conservation;
- Energy consumption and conservation; and
- Waste minimisation and recycling - “Reduce, Reuse and Recycle”.

5 Issues Trail

All issues, comments and concerns raised during the public participation process to date are included in the EIA report. A summary of the issues raised to date is presented in Table 5 below.

Table 4: Summary of issues raised to date

Issue/s	Response
▪ Noise impacts on animals.	▪ In review of the results calculated from the propagation model, it indicates that the cumulative effects of the operations are minimal on the surrounding environment and the majority of noise will be localised to the source.
▪ Dust generation through the cleaning of panels and mirrors.	▪ The mirrors require periodic cleaning, varying typically between fortnightly to weekly, depending on the local conditions which affect the rate of dust deposition on the mirrors. The water used for mirror cleaning will be demineralised, it is crucial that the cleaning water be pure, to avoid abrasion of the front surfaces of the mirrors while using the high pressure cleaning equipment. Water abstraction, treatment and usage will need to be authorised through a WUL and WML.
▪ Phasing of construction.	▪ The projects comprising the solar farm are likely to be phased. As far as possible infrastructure will be shared between the plants within the solar farm.
▪ Traffic impacts and irresponsible use of the roads.	▪ Traffic control measures will be incorporated into the EMPr. A complaints register will also be maintained during the construction and operational phase of the project.
▪ Issues relating to the state of roads in terms of: ○ Dust generated through traffic on the gravel road between the N8 & N14. ○ Increased wear and tear on existing roads.	▪ The Air Quality Assessment indicated that the use of southern Gariep Road would be preferred as it has less of an impact during the generation of dust. ▪ The access route to the plant site will consist of 3 distinct sections from the N8 turn-off into the Gariep road: 1. the stretch of Gariep Road extending from the N8 to the end of the Transnet bridge (Section 1); 2. the stretch of Gariep Road extending from the end of the Transnet bridge to the Sand Draai road entry point (Section 2); and 3. a new road to be constructed through the Sand Draai farm (Section 3). Section 1 is the same route that was used by the Bokpoort CSP project during its construction phase and will continue to be used by Bokpoort CSP through the 20-year operation phase. The Applicant is of the view that the current gravel surface of Section 1 is not suitable for the construction and operation requirement of the project. The Applicant understands that Bokpoort CSP will consider implementing measures in the short-term that may improve the quality of Section 1. In addition to Bokpoort CSP, multiple other project developers are actively pursuing solar power and potentially other large-scale infrastructure developments in the vicinity of the project and for their purposes will be traversing Section 1 as well. A coordinated approach will therefore be required to ensure that any short-term and/or permanent solutions that will be implemented on Section 1 will be suitable for the planned infrastructure as well as other stakeholders including Eskom, Transnet, the Department of Roads and Public Works, local farmers, and citizens that regularly travel this route. The Applicant will engage with all stakeholders towards identifying feasible solutions that are suitable to all stakeholder groups. Certain improvements may

Issue/s	Response
	require the commitment of all stakeholders; in these cases the entire burden cannot reasonably be undertaken by the Applicant on it's own.The Applicant is aware of, and will continue to participate in, a Basic Assessment process being undertaken by Environmental Impact Management Services to assess the need for improvement of Section 1 and make recommendations towards the most appropriate and necessary measures that will be required for the road. Section 2 will receive the same treatment as Section 1. Section 3 represents a new private road that will be constructed for the sole purpose of access to the plant across the Sand Draai farm. This road will be constructed according to a specification that will be developed by the EPC contractor as adequate for construction and long-term operational purposes.
▪ A detailed Climatological study must be conducted in the EIA study. The impact that the new CSP plant would have on the climate or the micro-climate of the surrounding area needs to be investigated. The possibility of all the solar plants generating a 'heat island" must also be investigated.	▪ It is expected that during the day at a height of 2.5 m above the array, an increase in temperature is noted to reach up to 1.9°C warmer than the surrounding ambient air, with the thermal increase having completely dissipated 11.5 m above the array. It is likely that by a distance of 300 m from the edge of the array, the temperature is approximately 0.3°C above ambient temperature. It is foreseen that the proposed project will not have any effect on the micro-climate of the surrounding area.
▪ Visual impacts and the direct/indirect effect on tourism.	▪ The sheer height of the central receiver tower (250 m) would result in the upper parts of the tower, and importantly the brilliantly illuminated receiver at the top of the tower being visible from a very wide radius around the development site. Analysis of the viewsheds indicate that under both alternative scenarios the top of the tower (receiver) would be visible from the vast majority of receptor locations in the study area, including from most of the receptor locations within the lower-lying elevation of the Orange River valley. The height of the upper part of the tower entails that the intervening (higher-lying) topography between these receptors in the valley bottom of the river (even for many of the receptors on the eastern side of the river) does not shield the upper part of the tower from view.
▪ Impact on avifauna.	▪ The negative impact of the proposed Sand Draai central receiver facility on local priority avifauna will be medium to high, depending on the nature of the impact and the level of mitigation which is applied. ▪ The cumulative impact of the facility on regional priority avifauna will range from medium to low, depending on the level mitigation which is applied.
▪ Removal and relocation of protected tree species.	▪ DAFF permits will be applied for and will specify the procedures to be followed when protected trees need to be removed and relocated. The floral specialist will also be requested to identify any best practice methods to ensure successful relocation of protected trees. These methods will form part of the application process.
▪ Impact on value of farms in the study area.	▪ In the short term, and based on an unsurfaced Gariep Road, the economic assessment revealed that the land values of neighbouring farms, and some of the farms alongside the Gariep Road will be negatively impacted because any rational buyer will want a discount for perceived inconvenience. ▪ The economic assessment also indicated that farm values in the study area will recover if the Gariep Road had been surfaced, or the

Issue/s	Response
	construction phases of all the potential projects had been completed, whichever comes first.
▪ Negative social impacts (crime, alcohol and substance abuse, woman abuse HIV/AIDs etc.)	▪ Has been taken into consideration during Social Impact Assessment and mitigation measures and recommendations have been incorporated into the EMPr.
▪ Impact on service delivery.	▪ The project will include significant budgets for Socio-Economic Development initiatives as well as Enterprise Development initiatives. These budgets will fund initiatives that benefit communities within a 50km radius of the project. The ultimate committee appointed to manage these budgets can work with the Municipality to identify Municipal projects that may be included as supported initiatives.
▪ Is there a way to assure financial accountability can be monitored to foresee better outcomes for South African solar farms?	▪ The South African Department of Energy has been careful to limit and monitor the deployment of solar power projects over the first 5 years of the DOE Renewable Energy IPP programme. This cautious approach allows the DOE to monitor progress and the merits of solar power as well as ensuring that they do not overcommit to long-term procurement in terms of their financial capabilities.
▪ Should the project be abandoned due to financial shortfalls, what measures are available to ensure no further environmental degradation takes place? Who would be responsible?	▪ A cease in the project would result in decommissioning and rehabilitation activities being fast-tracked. The Proponent would still be responsible to ensure that the decommissioning and rehabilitation activities are carried out in compliance with the approved EMPr and Integrated Environmental Authorisation.

6 Environmental Management Programme: Pre-construction

Requirements for the pre-construction phase include:

- Proper, timeous, and continuous liaison between the Developer, the Contractor and landowners to ensure all parties are appropriately informed at all times.
- The adjacent landowners must be informed of the starting date of construction as well as the phases in which the construction shall take place.
- The Contractor must adhere to all conditions of contract including the EMPr and Integrated Environmental Authorisation conditions.
- Adequate planning of the construction programme to allow for disruptions due to rain and wet conditions.
- Proper stormwater management must be planned and implemented to ensure that erosion does not take place or run-off does not accumulate in one point.
- All manmade as well as natural (vegetation) structures outside the boundary of the development footprint shall be protected against damage at all times and any damage shall be reported and rectified immediately.
- Proper documentation and record keeping of all complaints and actions taken.
- A formal communications protocol should be set up during this phase. The aim of the protocol is to ensure that effective communication on key issues that may arise during construction is maintained between key parties such as the ECO, PM, Environmental Liaising Officer (ELO) and Contractor. The protocol should also ensure that concerns / issues raised by I&APs are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. This could be done through an Environmental

Monitoring Committee that would meet on a regular basis. The communications protocol should be maintained throughout the construction phase.

Table 5: Pre-construction – general activities

Activity	Environmental Measures and Controls	Frequency	Responsible Person/s
Pre-construction.	• The developer must ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. Local labour and contractors must be used wherever possible. • Appoint an independent ECO.	Once-off	PM & ELO
Pre-construction.	• Confirm with ECO, a suitable area for site offices and areas for the storage of equipment, materials and batching etc. • Efforts should be made to draw unskilled labourers from the local market. • Site staff should be trained. Knowledge and skills necessary to achieve environmental objectives shall be identified and incorporated in the SHE Training Matrix. The matrix shall consider personnel responsible for implementing such objectives, training needs, development of appropriate skills and ongoing environmental education and awareness required to perform duties in an effective and competent manner. • Environmental awareness training should be conducted for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. • Continuous awareness and training programmes shall be implemented and updated. • The PM shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. • Staff in charge of operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. • No operator shall be permitted to operate critical mechanical equipment without having been trained by the Contractor and certified competent by the Engineer/PM. • Staff should be educated on the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary	Once-off	PM; ELO; Contractor

Activity	Environmental Measures and Controls	Frequency	Responsible Person/s
	safety training. • Staff should be trained on reporting of environmental incidents.		
Pre-Construction	• A bat specialist is to be appointed to do a site visit (walk-through) prior to construction. • If bat roosts are found, construction activities in that area will halt until a suitable mitigation has been discussed with the bat specialist and agreed upon by the Proponent. • Mitigation measures for bat impacts are to be incorporated into the EMPr.	Once-off	Developer, ECO, ELO, Specialist
Protected Tree Species Survey	• A pre-construction site walkthrough must be undertaken by a specialist where all protected trees that will be affected and destroyed, be counted and applied for permitting at the Department of Agriculture, Forestry and Fisheries (DAFF).	Once-off	Developer, ECO, ELO, Specialist
Excess materials and recyclables (Wood, Steel etc.)	• Agreeement must be reached between the Developer, surrounding farmers and I&APs and the Local Municipality on the distribution of excess materials that will not be used on site.	Monthly	Developer; IAPs and Local Municipality

7 Environmental Management Programme – Construction

7.1 Site Preparation, Site Offices, Storage of Materials and Health & Safety

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Site preparation activities.	• Site clearing must take place in a phased manner (within the footprint), as and when required. • Areas which are not planned to be constructed within two (2) months must not be cleared so as to reduce risk of erosion. • The area to be cleared must be clearly demarcated and this footprint strictly maintained. • Topsoil obtained from site preparation activities will be stored until it can be used for rehabilitation. The ELO and ECO will identify a suitable area for the storage of topsoil. • The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include watercourses where applicable.	Weekly	Contractor
Establishment of the site offices and storage areas.	• Choice of site for the Contractor's site offices and storage areas requires the PM and ECO's permission and must take into account ecologically sensitive areas (wetlands), including flood and drainage lines. A site plan/layout (indicating areas for storage of hazardous chemicals, ablution facilities, waste yards, etc.) must be submitted to the PM for approval. • The site offices may not be situated within the 1:100 year flood line. • The size of the site offices should be minimized (especially where natural vegetation or grassland has to be cleared for its construction).	Monthly	Contractor
Storage of materials including hazardous materials: improper storage of material has the potential to pollute groundwater and surface water resources as well as soils.	• The location of storage areas must take into account prevailing winds, distances to water bodies, general on site topography and water erosion potential of the soil. Impervious surfaces must be provided. • Storage areas must be designated, demarcated and fenced. • Storage areas should be secure so as to minimize the risk of theft. • Fire prevention facilities/equipment must be present at all storage facilities. • Proper storage facilities for the storage of oils, paints, grease,	Weekly - Biweekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	fuel, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillages into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be situated away from drainage lines in a site selected with the approval of the PM, ELO and ECO. • Any water that collects in the bund must not be allowed to stand and must be removed and disposed of immediately in accordance with the stormwater management plan that will be created during the WULA process • Contaminated stormwater must be drained from bunds and disposed of as liquid hazardous waste. • All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, National codes, Local Authority approval for storage of ≥5000 ℓ and other relevant requirements. • Areas for storage of fuel and other flammable materials must comply with standard fire safety regulations and may require the approval of the relevant Fire Officer. • Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire. • Symbolic safety signs depicting “No Smoking”, “No Naked Flames” and “Danger” are to be prominently displayed in and around the fuel storage area. • The capacity and content of the tank must be clearly displayed and identified. • There must be adequate fire-fighting equipment at the fuel storage and dispensing area(s). • The rated capacity of the tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage. • Any electrical or petrol-driven pumps must be positioned so as not to cause any danger of ignition of the product. • If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used. The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage		

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	tank must be stored in a waterproof container when not in use. • All waste fuel and chemical soiled rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site. • These storage facilities (including any tanks) must be on an impermeable surface in order to ensure that accidental spillage does not pollute local soil or water resources. The facilities must also be protected from the ingress of stormwater from surrounding areas. • Clear signage must be placed at all storage areas containing hazardous substances / materials. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Storage areas containing hazardous substances / materials must be clearly signed. • Staff dealing with these hazardous materials / substances must be aware of their potential impacts and follow the appropriate safety measures. • A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at a licenced landfill site designed to handle hazardous wastes. • The Contractor must ensure that its workers are made aware of the health risks associated with any hazardous substances used and that the workers are provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training. • All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site at a licenced hazardous waste site. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEA as stipulated in the conditions of the Integrated Environmental Authorisation.		

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Keep written records detailing: the type of spill; the corrective and remedial measures implemented in the stopping or reduction of the spill; and the clean-up of the spill. Such progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes in an effort to prevent similar future occurrences.		
Construction: Health and Safety of construction workers and site staff.	• A Health and Safety Plan needs to be developed for the project in respect of construction worker safety and this plan must be adhered to at all times. • The Contractor must adhere to the prescriptions of the relevant health and safety legislation and standards. The contractor must familiarise himself and his employees with the contents of the aforementioned legislation. • Suitably stocked First Aid facilities must be on hand at all times in accordance with international practice. All staff must be aware of its location. • The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the construction. Such safety measures and work procedures/instructions must be communicated to all construction workers. • The wearing of PPE on site is mandatory for all personnel and construction workers. Minimum requirements must include the wearing of an approved safety helmet, safety boots, high visibility vests, dust masks, ear plugs, etc. where appropriate. • PPE signs should be erected on site at the areas where it is required and the integrity and availability of the signs must be maintained. • All personnel must be trained in basic site safety procedures. • Construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. • The Contractor must design, test / exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; fires etc. • Smoking will only be allowed at designated areas.	Weekly	Contractor; ECO; SH Officer

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Overloading of equipment and construction vehicles is strictly prohibited to avoid accidents. • Safety files must be compiled and signed of by the SH Officer prior to commencement of construction. • Adequate ablutions must be provided for construction workers.		
Access control.	• Access onto the site (from the Gariep Road) will be provided through a gravel access road that will be constructed adjacent to the perimeter (and within the boundaries) of the Sand Draai property. • The Sand Draai access road (leading from the Gariep Road) will be maintained, as far as periodical grading and shaping is concerned. • Existing strict access control procedures will be implemented. • Record all who enter and exit the facility in a log book. • Ensure only legitimate entry takes place onto the site. • Use of the Gariep Road will only be allowed through the southern entrance (leading from the N8 road). • Access from the northern Gariep Road (N14 or N10) must be restricted.	Daily	PM

7.2 Soils

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Soil stripping and removal.	• Prior to the commencement of earthworks, the Contractor should determine the average depth of topsoil, and agree on this with the ECO. • The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks (including the building footprints, working areas and storage areas). • Topsoil must be reused where possible to rehabilitate disturbed areas in order to facilitate re-growth of species that occur naturally in the area. • Removed polluted topsoil should be transported to a licenced landfill site.	Weekly	Contractor & ECO
Vehicle and machinery operation on site: spillage of lubricants, fuel, and	• Limit vehicle movement to absolute minimum or construct proper roads for access.	Weekly	Contractor

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
cement and other petroleum products.	• Limit vehicle movement on unpaved areas and vehicle speeds should be restricted on site. • Vehicles and machinery to be properly maintained to keep oil and diesel leaks in check. • Depending on the nature and extent of the spill, contaminated soil to be excavated / treated on-site. • Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.		

7.3 Erosion Management Plan

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Vegetation removal and exposed soils.	• Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Erosion control measures that can be implemented in areas that are susceptible to erosion include: – Use of silt fences and sand bags. – Brush packing with cleared vegetation. – Mulch, stone chip packing. – Planting of vegetation. – Hydroseeding / hand sowing. • Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. • All erosion control mechanisms need to be regularly maintained. • Removal of vegetation/ plants should be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • Remove and store topsoil separately in areas where excavation/ degradation takes place. Removal of topsoil should be done to a depth of at least 1 m. • Stockpiled topsoil should be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious	Weekly initially – Bi-monthly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	weeds, which would adversely affect its suitability for planting. • Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. • Vehicle movement should be restricted to an absolute minimum that is required for the construction. Unnecessary movement of vehicles will increase the degradation of paths and dirt roads leading to an increased erosion risk.		

7.4 Fauna and Flora

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Construction impacts on conservation important flora and faunal species.	• Prevent contamination of natural habitat and nearby wetlands from any source of pollution. • Provide an adequate buffer between areas of development and surrounding natural habitat. • Demarcate construction areas by semi-permanent means/ material, in order to control movement of personnel, vehicles, providing boundaries for construction and operational sites. • No painting or marking of rocks or vegetation to identify locality or other information shall be allowed, as it will disfigure the natural setting. Marking shall be done by steel stakes with tags, if required. • Provide demarcated fire-safe zones, facilities and suitable fire control measures. • Access is to be established by vehicles passing over the same track on natural ground. Multiple tracks are not permitted. • Dust control on all roads should be prioritised. • Conduct a protected species survey. Results of this survey will guide permitting requirements for the removal of protected trees from the selected property. • The applicant must immediately take steps to remove alien vegetation. The size of areas subjected to land clearance will be kept to a minimum. • Only areas as instructed by the Project Manager must be cleared and grubbed. • Cleared vegetation and debris that has not been utilised will be collected and disposed of to a suitable waste disposal site. It	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	must not be burned on site. • All vegetation not required to be removed will be protected against damage. • Removal of vegetation/ plants shall be avoided until such time as soil stripping is required and similarly exposed surfaces must be re-vegetated or stabilised as soon as is practically possible. • Remove and store topsoil separately in areas where excavation/ degradation takes place. Removal of topsoil should be done to a depth of at least 1 m. • Stored topsoil will be free of deleterious matter such as large roots, stones, refuse, stiff or heavy clay and noxious weeds, which would adversely affect its suitability for planting. • No spoil material will be dumped outside the defined site. • Disturbance of vegetation must be limited to areas of construction. • The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged or tampered with unless agreed to by the ECO. • No killing or harming of animals		
Habitat destruction with transformation of natural vegetation and habitats (including red listed species) within the proposed CSP site.	• Workers must be limited to areas under construction within the Sand Draai farm. • Employees must be educated about the value of wild animals and plants and the importance of their conservation. • No unnecessary destruction to surrounding vegetation especially in the adjacent natural areas situated in close proximity to the CSP site and linear infrastructure servitudes. • Minimal disturbance to vegetation where such vegetation does not interfere with the CSP plant and the linear infrastructure servitudes. • Permits will be required for the removal of the protected tree species Camel Thorn (*Vachellia erioloba*), Grey Camel Thorn (*Vachellia haematoxylon*) and Shepherd's Tree (*Boscia albitrunca*) have been identified and declared as protected. The Department of Agriculture, Forestry and Fisheries (DAFF) will have to be approached to obtain the required permits for the removal of any protected tree species. • A rescue, recovery and relocation programme to be undertaken	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	by Botanist, especially geophytes and Aloes, before construction is undertaken. • Rehabilitation of disturbed areas to be undertaken. • Vegetation clearing of the CSP plant must be kept to the site. • Implementation of erosion prevention mitigation measures like sand bags etc. must be used on site.		
Increased levels of road fatalities of dispersing animals.	• Speed limits should be imposed on the proposed access roads • Fences should be erected adjacent to the access road preventing animals entering onto the road.	Weekly	Contractor & ECO
Collisions with structures and possible burning on receiver tubes.	• Appropriate measures, like bird flappers, to be implemented to prevent collisions with structures and possible burning of tubes.	Weekly	Contractor & ECO

7.5 Avifauna

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Displacement of priority species due to disturbance associated with the construction of the solar plant: • Preparation of solar panel areas for installation, including vegetation clearing, grading, cut and fill; • Excavation/trenching for water pipelines, cables, fibre-optic lines, and the septic system; • Construction of piers and building foundations; • Construction of new dirt or gravel roads and improvement of existing roads; • Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes; • Soil compaction, dust, and water run-off from construction sites; • Increased vehicle traffic; • Short-term construction-related	• Construction activity should be restricted to the immediate footprint of the infrastructure. • Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. • Measures to control noise and dust should be applied according to current best practice in the industry. • Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. • The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of disturbed areas is concerned.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
noise (from equipment) and visual disturbance; • Maintenance of fire breaks and roads; and • Weed removal, brush clearing, and similar land management activities related to the ongoing operation of the project. Displacement of priority species due to disturbance associated with the construction of the pipeline and access road: ▪ Excavation/trenching for water pipeline; ▪ Construction of new dirt or gravel road; ▪ Temporary stockpiling and side-casting of soil, construction materials, or other construction wastes; ▪ Soil compaction, dust, and water run-off from construction sites; ▪ Increased vehicle traffic; and ▪ Short-term construction-related noise (from equipment) and visual disturbance. Displacement of priority species due to disturbance associated with the construction of the powerline: ▪ The powerline servitude is cleared of vegetation to allow operation of a line according to the established standards. ▪ Temporary access roads are used to build the line. ▪ The various pole parts are			

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
manufactured and delivered by type. ▪ The steel parts needed for the placement of the foundations are delivered. ▪ A work crew excavates the foundations using bulldozers and hydraulic shovels. Depending on the nature of the soil, the foundation may be made of fill delivered by truck or crawler carrier, or of concrete, which may be delivered or prepared on-site. Once the foundation is in place, the excavation is backfilled. ▪ A crew assembles the poles using cranes and bulldozers. The pole is then erected by means of a telescopic crane. ▪ The conductor stringing is done segment by segment. The conductor is paid out from a cable drum at one end of the segment and run through stringing blocks at the tops of the poles. At the other end of the segment are a puller and a take-up.			

7.6 Hydrogeology

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Construction activities related to groundwater contamination: • Spillage of fuel, lubricants and other chemicals; • Construction equipment and vehicles, workshop and wash bay areas will be a likely source of	• Chemicals must be stored in bunded areas. • Adequate ablutions must be provided for construction employees. • Ensure clean up protocols are in place and followed. • Clean-up spills as soon as they occur and maintain an incident register. • Any spillage, which may occur, shall be investigated and	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
pollution as a non-point source; and • Lack of provision of ablutions may lead to the creation of informal ablutions.	immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEA as stipulated in the conditions of the Integrated Environmental Authorisation. • Keep MSDS records of chemicals in use up to date. • Accurate oil records must be kept (purchased, disposal, and recycled). • Implement appropriate actions and measures to reduce or prevent contamination of the ground and surface water as a result of a spill of potentially hazardous substances. • Keep written records detailing the type of spill, the corrective and remedial measures implemented in the stopping or reduction of the spill, and the clean-up of the spill. These reports may afterwards be used for training purposes in an effort to prevent similar future occurrences.		
Hydrocarbon contamination associated with heavy machinery on site and fuel storage.	• The mitigation measures would include secondary containment for all fuel stored on site.	Weekly	Contractor & ECO
Contamination from the Heat Transfer Fluid (HTF).	• Mitigation measures would include regular inspection of the infrastructure to ensure no losses occur through the receiver tube. • All records of HTF stored on site must be kept (purchased, disposal, and recycled, etc.). • All HTF stored on site (both unused and used) must be stored in the appropriate containers and the area must be marked accordingly and fully bunded.	Weekly	Contractor & ECO

7.7 Surface Water

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Construction activities within wetlands and drainage lines: • Irresponsible construction practices could lead to the pollution of wetlands (e.g. pollution of surface water through hydrocarbons). • Poor stormwater management could lead to the siltation (pollution)	• No temporary construction accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity. These areas must be demarcated as no-go areas. • No construction should occur on the drainage lines and their associated riparian zones. • No batching, parking area, ablution facilities, road construction	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
of surface waters. • Temporary accesses across wetlands could cause hydrological and morphological impacts and degrade the resource quality.	or chemical / fuel storage areas should be located within any surface water feature or within 100 m of a surface water feature. • Construction of temporary soil berms should be erected at the edge of the cleared area to ensure that no stormwater carrying any pollutants leaves the active area. • The dumping of construction material, including fill or excavated material into, or close to surface water features that may then be washed into these features is prohibited. • Clean-up of spills must be done as soon as they occur. • Bunded areas should be used to store hazardous materials and chemicals so that if a spill occurs the chemical will be contained. • Construction to be monitored by an ECO according to the stipulations of the EMPr.		
Temporary accesses across watercourses could cause hydrological and morphological impacts and degrade the resource quality.	• No temporary construction accesses (other than the construction right of way) to be constructed through any surface water feature and no machinery to enter any surface water feature unless authorised under the EMPr by the ECO as part of a construction activity. • Watercourse channels and other parts of the surface water feature must be restored to as close a pre-construction state as possible. • Watercourse crossing structures along the road must allow flow to bypass or underpass the structure through culverts that must be included in the design of the crossing structure. • All embankments and other sloping ground associated with the road must be properly rehabilitated with vegetation or waste rock / rip rap in order to stabilise these areas and prevent sedimentation into adjacent watercourses. • Stormwater management measures must be included in the design of the road, in order to prevent erosion, and to discharge stormwater off the road into the surrounding environment, especially surface water features, in a manner that does not result in erosion and scouring. In sections of the road located adjacent to or which cross watercourses, it is recommended that stormwater not be discharged directly into the channel of the surface water feature, but be passed through a detention area or infiltration area first. • The pipeline-road route must be aligned out of the Orange River	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	riparian corridor, and the construction footprint must in no way encroach into this riparian corridor. If this is not possible, a WUL application must be applied for.		

7.8 Aquatic Ecology

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Construction within the riparian areas of the Orange River will impact on an ecologically sensitive habitat unit as well as impinge on an area regarded as a Critical Biodiversity Area.	• Limit the effects of erosion by utilizing silt traps and silt fencing, which should be in place before site disturbances occur. This is applicable to areas of steeper slopes, which is typical of riparian zones as well as dune crests. • Vehicular access should be limited to a single access roadway to limit the unnecessary compaction of soils within the riparian zones. Vehicles should be serviced regularly to ensure that no fluid leaks (oils and fuels) can occur that would contaminate soils and the watercourse. Oil and fuel leaks must be cleared immediately and the contaminated soils removed to an appropriate waste site. • Riparian zones and their associated conservation buffer should be demarcated as ecologically sensitive areas and access limited. • Any recruitment of exotic vegetation to be managed on an ongoing basis until indigenous pioneering vegetation has dominated the disturbed areas. These species should be limited to naturally-occurring species representative of the vegetation type for the locality. Ongoing monitoring of exotic vegetation recruitment should be undertaken and any recruitment controlled. • Undue destruction of riparian vegetation is to be avoided and larger, more established tree species should be accommodated with a shift in location of the pumping infrastructure (if possible). • No construction material, vehicles or equipment should be stored within the riparian zones and designated buffers zones; • Excess building material is to be stored within designated areas (outside of the riparian zones and conservation buffer zones). • Upon completion of the construction phase, the surrounding riparian zones should be re-landscaped to resemble their original contours and any existing or potential erosion should be	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	rehabilitated and managed. Areas outside of the construction footprint that were stripped of vegetation should be re-vegetated with a similar species community structure than that was removed. This does not apply to exotic species (much of the riparian vegetation within the area was dominated by exotic species). • Construction should also take place during the dry season to avoid soil erosion aggravation brought about by surface run-off during rainstorms. The effects of riverine floodwaters on disturbed soils and the coupled impact of soil erosion can then also be avoided.		
• Instream infrastructure development will destroy localised aquatic habitat and potentially alter hydraulic functioning at a local scale. This could lead to displacement of species. • Altered hydraulic functioning could lead to bank erosion.	• Limit the construction footprint. • Stabilise river banks to abate impacts of bank erosion.	Weekly	Contractor & ECO

7.9 Socio – Economic

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Potential loss of cultivated areas due to pipeline and road routing • Restricted access (residents and workers) to currently utilised roads • Sourcing of equipment and machinery locally • Influx of Migrant Labour • Perceived preferential access to a finite number of jobs	• The routing must allow for the possibility of adjustment should it be found to traverse cultivated land. • Access by residents and workers that are currently utilising a given (legal) route should not be hindered. • The sourcing of equipment from local regional sources is probable, specifically in the area of Upington. There should be a concerted effort made by engineers to draw up a procurement plan that will give first preference to local suppliers • Should the influx of labour become a very real, uncontrolled challenge, then it is suggested that a Migrant Labour Influx Control Plan be developed together with the local municipality • Establish and maintain management systems to ensure that thorough and regular communication of job opportunities occurs, particularly with hopeful locals in Groblershoop	Weekly	Contractor & ECO
• Inconvenience and danger to	• It is recommended that alternative routes be found at scheduled	Weekly	Developer, Contractor &

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
proximate residents through increased road traffic, dust and noise, including the development of new access roads through the development site.	times of the day - perhaps that would help keep the roads free when school children are returning home. • There should be strict speed limits on site roads to prevent the liberation of dust into the atmosphere • Dust must be suppressed during vehicle movement • Regular information sharing discussions with the Contractors must be pursued, giving farm labour residents an opportunity to voice concerns and grievances throughout the duration of project construction		ECO
Increased social ills in Groblershoop and surrounding small villages • The establishment of a labour camp that will probably house the majority of the non-regional labour will be accompanied by its own challenges. The most critical is related to alcohol consumption, abuse, prostitution, unintentional pregnancies within the local population and potentially, the spread of sexually transmitted diseases and HIV/AIDs. The local populations are at risk of exposure	• The management measure to be taken must ensure on-going work-shopping of appropriate behaviour from the labour population. This can be structured through a Construction Phase Code of Practice for Contractors. On site health and safety workshops are critical. The on-site clinic must be at the forefront of such issues. • Communication with local community leaders/ spokespeople is also an important tool that will assist in monitoring such a situation. The establishment of a Resident's Forum may be a vehicle that could help achieve collaboration. It may be practical to look at the Groblershoop Interest Group, as such a vehicle as it is already in existence. • Health policies must be extended which provides: – An HIV/AIDS programme. – Extension of the HIV/AIDS awareness programme to local communities. – Free condoms to employees. – Free testing for HIV/AIDS and counselling to immediate family members of employees. – HIV/AIDS programmes as a condition for contracting suppliers and service providers. – A TB programme – The establishment of a formal grievance management system – The establishment of a Resident's forum (or use current Groblershoop Interest Group) where HIV/AID's intervention strategies could be discussed – The establishment of a 24 hour clinic for construction staff (where monitoring and voluntary testing could occur) – Invitation to Government health representatives and local awareness building experts to render knowledge workshops to construction staff (and local communities)	Weekly	Developer, Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	– The development and implementation of a policy on Contractor Health and Safety – The development and implementation of a Contractor's Code of Conduct		
• Potential increase in criminal activity in the development footprint and nearby surrounding villages	• Management measures dealing with transferring and sharing information about criminal activities with the local community is recommended.	Weekly	Developer, Contractor & ECO
• Additional pressure on basic services provision (education, housing and healthcare)	• It is strongly advised that the Project Proponent and the applicable municipal government departments (perhaps even National government) liaise effectively on how to combat avoidable service delivery constraints	Monthly	Developer
• Impact on agricultural yields along Gariep Road • Impact on farm values of neighbouring farms • Impact on farm values of Gariep Road Farms • Grievance Channel Development	• It was foreseen that the surfacing of access roads will mitigate the impacts on surrounding farms. • Regular dust suppression must be undertaken • Implementation of an ethical and principled grievance system will serve to enhance the company's relationship with I&APs	Monthly/Weekly	Developer, Contractor & ECO
• Difference in water flow in the Orange River potentially affecting downstream farmers and potentially causing economic displacement	• A water flow study would be undertaken to assess the impact of abstraction on river	Annually	Developer

7.10 Visual

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• The total clearing of the site would be conducive to the creation of large clouds of dust that with the movement of machinery that would be visible from a wide area. • As the tower is constructed, the cranes used to construct it would be visible from a wide area due to their height, but would not be too visually intrusive due to the significant distance between the site and the	• Avoid complete clearing of the construction site, and only clear vegetation in a phased manner. • It is recommended that the Gariep Road be surfaced to avoid the creation of excessive dust by large numbers of construction vehicles. • Avoid unnecessary excavations / clearing of land and keep the construction footprint to a minimum. Limited clearing of vegetation on the development site unless required for construction facilities. This will retain the screening function of natural vegetation. • Rehabilitate cleared areas as soon as possible.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
majority of the receptors in the Orange River valley. • Heavy vehicles traveling to the site along the Gariep Road will create large dust clouds that will be able to be viewed from a relatively great distance.	• All rubble and cleared infrastructure should be cleared as soon as possible.		

7.11 Noise

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Noise generation during construction.	• Construction site yards and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development sites. • All construction vehicles and equipment are to be kept in good repair. • Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20 dBA. Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators). • Construction activities, and particularly the noisy ones, are to be contained to reasonable hours (06:00 – 18:00) during the day and early evening. • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the Contractor should liaise with local residents on how best to minimise the impact. • Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum. • In general, operations should meet the noise standard requirements of the Occupational Health and Safety Act (No 85 of 1993). • Construction staff working in areas where the 8-hour ambient noise levels exceed 75 dBA should wear ear protection equipment.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
The typical noise heavy machinery and impact noises from incidents (such as falling pipes, equipment, etc.).	• Control of noise – On site – Avoid unnecessary revving of engines and switch off equipment when not required (construction and operational phases). – Keep solar field access routes well maintained and avoid speeding; – Start up plant and vehicles sequentially rather than all together (including auxiliary heater operations) (construction and operations); – Fitment of additional or best available exhaust silencers or acoustic canopies on engines including auxiliary heater operations); – Where possible, attempt to enclose noise sources, if the sources enclose has a noise directivity ensure the noise is directed away from any sensitive areas; and – Regular and effective maintenance by trained personnel is essential and will do much to reduce noise from plant and machinery. • Controlling the propagation of noise – Minimise the length and magnitude of noise sources; – Screening of noise sources, if it is not possible to increase the distance, the alternative measure is to screen the noise source. Screening can make use of the natural environment, existing buildings and/or screens or earth berms. These screens should be placed in the direct line of sight to effectively reduce the noise received and the sensitive location. • Noise control targets – Monitoring of noise at sites where noise is an issue should be regarded as essential. Measurements may be carried out for a number of reasons, including the following: ○ To allow the performance of noise control measures to be assessed. ○ To ascertain noise form items of plant for planning purposes. ○ To provide confirmation that planning requirements	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	have been complied with. ○ Monitoring positions should reflect the purpose for which monitoring is carried out.		

7.12 Air Quality

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Dust and emissions generated due to construction activities such as debris handling, movement of vehicles and machines and general construction.	• Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water / watering or by use of environmentally acceptable / friendly binding chemicals. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • Dust fallout monitoring must be undertaken on site and at any access roads by the Contractor. Monitoring is to be undertaken throughout the construction period. • If logged in the complaints register, monitoring to be undertaken on surrounding properties or areas of complaint. • Loads on trucks should be covered to avoid loss of material in transport, especially if material is transported off site. • A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. • During the transfer of materials, drop heights should be minimised to control the dispersion of material being transferred. • Equipment and vehicles used by the contractor must be maintained in good working order to prevent smoke emissions. • Any temporary storage piles (cleared topsoil) should be maintained for as short a time as possible and should be enclosed by wind breaking enclosures of similar height to the storage pile. • Storage piles should be situated away from the water courses and nearby receptors and should take into account the predominant wind direction. • All site workers during construction will need to wear the appropriate PPE to avoid excessive exposure to dust particles. • The southern Gariep Road (leading from the N8 road) to be surfaced and maintained on a continual basis. • No access is allowed, from anywhere in regards to the northern	Daily	Contractor; PM & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	Gariep Road (N14 or N10).		

7.13 Traffic

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Potential deterioration of existing traffic conditions on the external road network • Reduction of existing road space available for pedestrian and cyclists • Deteriorating road safety conditions for all road users • Deterioration of the existing condition of the surrounding road network	• It is recommended that the existing gravel roads are re-bladed on a regular basis to ensure that this road remains operational and maintains an acceptable level of safety for the duration of the project. Furthermore, to reduce the dust that will be generated on the gravel roads it is recommended that these roads are watered down on a regular basis.	Monthly	Contractor & ECO

7.14 Waste

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
General waste generated on site.	• An adequate number of general waste receptacles, including bins must be arranged around the site to collect all domestic refuse, and to minimise littering. • Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. • A fenced area must be allocated for waste sorting and disposal on the site. The Developer must have a waste policy and waste management procedure and also engage a service provider who trains the operations staff on measures for implementing the plan as well as auditing. • General waste produced on site is to be collected in skips for disposal at the local municipal waste site. A waste disposal service provider must be appointed by the developer to carry out disposal of waste as required. Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Under no circumstances is waste to be burnt or buried on site. • Waste bins should be cleaned out on a weekly basis by an appointed service provider to prevent any windblown waste and/or visual disturbance. • All general waste must be removed from the site at regular intervals and disposed of in suitable waste receptacles.		
Hazardous waste generated on site	• A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous substance, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity. • The bins and skips are to be emptied on weekly basis. • Reporting of spills and mitigation done must be done in accordance with section 10 of the minimum requirements for the handling, classification and disposal of hazardous waste (3rd edition, 2005). Internal and external auditing must be carried on an annual basis. • Neighbouring river and stream systems as well as their associated buffer areas are to be fenced off preferably with palisade fencing. This erection of the fencing should take place prior to any construction activities taking place on site. • Vehicles are to be checked for leakage before and after entering the construction area. • Areas where fuels are either kept or transferred are to be bunded so as to contain spillage. • Cement mixing sites are to be strategically designated and at least 100 m away from the water resource or ecological systems. • An inventory should be made of substances which will be used on site (both temporarily during construction and during operation) that are potentially harmful to surface water and other water related systems/bodies.	Weekly	Contractor & ECO

7.15 Heritage

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Archaeological sites.	• If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately. • The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Client or ECO of such discovery. • Work may only resume once clearance is given in writing by the archaeologist. • If a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the specific site must be stopped and the Client or ECO informed of the discovery. A heritage expert will then need to be contacted for the way forward.	Weekly	Contractor; PM; ECO & Archaeologist

8 Environmental Management Programme – Operations

8.1 Site Offices, Storage of Materials and Health & Safety

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Site offices and storage areas.	• A site plan/layout (indicating areas for storage of hazardous chemicals, ablution facilities, waste yards, etc.) must be submitted to the PM for approval. • The site offices may not be situated within the 1:100 year flood line. • The size of the site offices should be minimized (especially where natural vegetation or grassland has to be cleared for its construction).	Monthly	Contractor
Storage of materials including hazardous materials: improper storage of material has the potential to pollute groundwater and surface water resources as well as soils.	• The location of storage areas must take into account prevailing winds, distances to water bodies, general on site topography and water erosion potential of the soil. Impervious surfaces must be provided. • Storage areas must be designated, demarcated and fenced. • Storage areas should be secure so as to minimize the risk of theft. • Fire prevention facilities/equipment must be present at all storage facilities. • Proper storage facilities for the storage of oils, paints, grease, fuel, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillages into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be situated away from drainage lines in a site selected with the approval of the PM, ELO and ECO. • Contaminated stormwater must be drained from bunds and disposed of as liquid hazardous waste. • All fuel storage tanks (temporary or permanent) and associated facilities must be designed and installed in accordance with the relevant oil industry standards, National codes, Local Authority approval for storage of ≥5000 ℓ and other relevant requirements. • Areas for storage of fuel and other flammable materials must comply with standard fire safety regulations and may require the	Weekly - Biweekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	approval of the relevant Fire Officer. • Flammable fuel and gas must be well separated from all welding workshops, assembly plants and loading bays where ignition of gas by an accidental spark may cause an explosion or fire. • Symbolic safety signs depicting “No Smoking”, “No Naked Flames” and “Danger” are to be prominently displayed in and around the fuel storage area. • The capacity and content of the tank must be clearly displayed and identified. • There must be adequate fire-fighting equipment at the fuel storage and dispensing area(s). • The rated capacity of the tanks must provide sufficient capacity to permit expansion of the product contained therein by the rise in temperature during storage. • Any electrical or petrol-driven pumps must be positioned so as not to cause any danger of ignition of the product. • If fuel is dispensed from 200 litre drums, the proper dispensing equipment must be used. The drum must not be tipped in order to dispense fuel. The dispensing mechanism of the fuel storage tank must be stored in a waterproof container when not in use. • All waste fuel and chemical soiled rags must be stored in leak-proof containers and disposed of at an approved hazardous waste site. • These storage facilities (including any tanks) must be on an impermeable surface in order to ensure that accidental spillage does not pollute local soil or water resources. The facilities must also be protected from the ingress of stormwater from surrounding areas. • Clear signage must be placed at all storage areas containing hazardous substances / materials. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible, the available MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes. • Storage areas containing hazardous substances / materials must be clearly signed.		

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Staff dealing with these hazardous materials / substances must be aware of their potential impacts and follow the appropriate safety measures. • A suitable Waste Disposal Contractor must be employed to remove waste oil. These wastes should only be disposed of at a licenced landfill site designed to handle hazardous wastes. • The Contractor must ensure that its workers are made aware of the health risks associated with any hazardous substances used and that the workers are provided with the appropriate protective clothing / equipment in case of spillages or accidents and have received the necessary training. • All excess cement and concrete mixes are to be contained on the construction site prior to disposal off site at a licenced hazardous waste site. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEA as stipulated in the conditions of the Integrated Environmental Authorisation. • Keep written records detailing: the type of spill; the corrective and remedial measures implemented in the stopping or reduction of the spill; and the clean-up of the spill. Such progress reporting is important for monitoring and auditing purposes and the written reports may afterwards be used for training purposes in an effort to prevent similar future occurrences.		
Construction: Health and Safety of construction workers and site staff.	• A Health and Safety Plan needs to be developed for the project in respect of construction worker safety and this plan must be adhered to at all times. • The Contractor must adhere to the prescriptions of the relevant health and safety legislation and standards. The contractor must familiarise himself and his employees with the contents of the aforementioned legislation. • Suitably stocked First Aid facilities must be on hand at all times in accordance with international practice. All staff must be aware of its location. • The Contractor must implement adequate and mandatory safety precautions relating to all aspects of the construction. Such	Weekly	Contractor; ECO; SH Officer

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	safety measures and work procedures/instructions must be communicated to all construction workers. • The wearing of PPE on site is mandatory for all personnel and construction workers. Minimum requirements must include the wearing of an approved safety helmet, safety boots, high visibility vests, dust masks, ear plugs, etc. where appropriate. • PPE signs should be erected on site at the areas where it is required and the integrity and availability of the signs must be maintained. • All personnel must be trained in basic site safety procedures. • Construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents. • The Contractor must design, test / exercise appropriate emergency preparedness programmes (plans, schedules, procedures and methods) for addressing environmental accidents, incidents and events such as spills of fuel, oil or lubricants; fires etc. • Smoking will only be allowed at designated areas. • Overloading of equipment and construction vehicles is strictly prohibited to avoid accidents. • Safety files must be compiled and signed of by the SH Officer prior to commencement of construction. • Adequate ablutions must be provided for construction workers.		
Access control.	• Access onto the site (from the Gariep Road) will be provided through a gravel access road that will be constructed adjacent to the perimeter (and within the boundaries) of the Sand Draai property. • The Sand Draai access road (leading from the Gariep Road) will be maintained, as far as periodical grading and shaping is concerned. • Existing strict access control procedures will be implemented. • Record all who enter and exit the facility in a log book. • Ensure only legitimate entry takes place onto the site. • Use of the Gariep Road will only be allowed through the southern entrance (leading from the N8 road). • Access from the northern Gariep Road (N14 or N10) must be restricted.	Daily	PM

8.2 Fauna and Flora

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Operational impacts on conservation important flora and faunal species.	• Dust control on all roads should be prioritised. • The applicant must immediately take steps to remove alien vegetation. The size of areas subjected to land clearance will be kept to a minimum. • Only areas as instructed by the Project Manager must be cleared and grubbed. • Disturbance of vegetation must be limited to areas of operation. • The removal or picking of any protected or unprotected plants shall not be permitted and no horticultural specimens (even within the demarcated working area) shall be removed, damaged or tampered with unless agreed to by the ECO. • No killing or harming of animals.	Weekly	Contractor & ECO
Habitat destruction with transformation of natural vegetation and habitats (including Red listed species) within the proposed CSP Site.	• During the operational phase workers must be limited to areas under construction within the CSP. • Employees must be educated about the value of wild animals and plants and the importance of their conservation. • No unnecessary destruction to surrounding vegetation especially in the adjacent natural areas situated in close proximity to the CSP site and linear infrastructure servitudes. • Minimal disturbance to vegetation where such vegetation does not interfere with the CSP plant and the linear infrastructure servitudes. • Vegetation clearing of the CSP plant must be kept to the site. • Implementation of erosion prevention mitigation measures like sand bags etc. must be used on site.	Weekly	Contractor & ECO
Increased levels of road fatalities of dispersing animals.	• Speed limits should be imposed on the proposed access roads. • Fences should be erected adjacent to the access road preventing animals entering onto the road.	Weekly	Contractor & ECO
Collisions with structures and possible burning on receiver tubes.	• Appropriate measures, like bird flappers, to be implemented to prevent collisions with structures and possible burning of tubes.	Weekly	Contractor & ECO

8.3 Avifauna

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Displacement of priority species due to habitat destruction associated with the operation of the solar plant; • Vegetation clearing, grading, cut and fill; and • Maintenance of fire breaks and roads; and weed removal, brush clearing, and similar land management activities related to the ongoing operation of the project.	• Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. • The recommendations of the ecological and botanical specialist studies must be strictly implemented, especially as far as limitation of the construction footprint and rehabilitation of transformed areas is concerned.	Weekly	Contractor & ECO
Mortality of priority species due to collisions with the heliostats: • The priority species that were recorded in the study area which could potentially be exposed to collision risk are listed in the Avifaunal Assessment. • Multiple mortalities could potentially result from this, which in turn could attract raptors e.g. Tawny Eagle, Southern Pale Chanting Goshawk, Lanner Falcon and Pygmy Falcon which will feed on dead and injured birds which could in turn expose them to collision risk, especially when pursuing injured birds.	• An avifaunal specialist must be appointed to oversee all aspects of operational phase monitoring (including carcass searches) and assist with the on-going management of bird impacts that may emerge as the monitoring programme progresses. Formal operational phase monitoring should be implemented once the solar arrays have been constructed. The purpose of this would be to establish to what extent displacement of priority species have taken place. The exact time when operational phase monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines have been finalised. • As an absolute minimum, operational phase monitoring should be undertaken for the first two years of operation, and then repeated again in year 5, and again every five years thereafter. This is necessary to account for inter-annual variations in avifaunal activity as the result of varying rainfall patterns which can be highly erratic in this arid habitat. The exact scope and nature of the operational phase monitoring will be informed by the results of the monitoring on an ongoing basis and the EMPr will be updated accordingly. • Carcass searches should be implemented to search the ground between arrays of troughs on a weekly basis (every two weeks at the longest) for at least one year to determine the magnitude of collision fatalities. Searches should be done on foot. Searches should be conducted randomly or at systematically selected arrays of troughs to the extent that equals 33% or more	Monthly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	of the project area. Detection trials should be integrated into the searches. • Depending on the results of the carcass searches, a range of mitigation measures will have to be considered if mortality levels turn out to be significant, including minor modifications of panel and mirror design to reduce the illusory characteristics of troughs. What is considered to be significant will have to be established on a species specific basis by the avifaunal specialist, in consultation with Birdlife South Africa. • The exact protocol to be followed for the carcass searches and operational phase monitoring must be compiled by the avifaunal specialist in consultation with the plant operator and ECO before the commencement of operations.		
Mortality of priority species due to burning associated with solar flux: • The priority species that were recorded in the study area which could potentially be exposed to solar flux are listed in the Avifaunal Assessment.	• The standby points must be spread over several hundred meters to reduce the peak flux to less than 4 kW/m^2 (4 suns). • An avifaunal specialist must be appointed to oversee all aspects of operational phase monitoring (including carcass searches) and assist with the on-going management of bird impacts that may emerge as the monitoring programme progresses. Formal operational phase monitoring should be implemented once the heliostats have been constructed. The purpose of this would be to establish to what extent mortality of priority species have taken place. The exact time when operational phase monitoring should commence, will depend on the construction schedule, and will be agreed upon with the site operator once these timelines have been finalised. • As an absolute minimum, operational phase monitoring should be undertaken for the first two years of operation, and then repeated again in year 5, and again every five years thereafter. This is necessary to account for inter-annual variations in avifaunal activity as the result of varying rainfall patterns which can be highly erratic in this arid habitat. The exact scope and nature of the operational phase monitoring will be informed by the results of the monitoring on an ongoing basis and the EMPr will be updated accordingly. • Carcass searches should be implemented to search the ground between arrays of troughs on a weekly basis (every two weeks at the longest) for at least one year to determine the magnitude	Monthly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	of collision fatalities. Searches should be done on foot. Searches should be conducted randomly or at systematically selected arrays of troughs to the extent that equals 33% or more of the project area. Detection trials should be integrated into the searches. • Depending on the results of the carcass searches, re-calibration of standby points will have to be implemented if mortality levels turn out to be significant. What is considered to be significant will have to be established on a species specific basis by the avifaunal specialist, in consultation with Birdlife South Africa. • The exact protocol to be followed for the carcass searches and operational phase monitoring must be compiled by the avifaunal specialist in consultation with the plant operator and Environmental Control Officer before the commencement of operations.		
Mortality of priority species due to collisions with the earthwire of the 132 kV power line: • The priority species that were recorded in the study area which could potentially be exposed to collision risk are listed in the Avifaunal Assessment. • The most likely priority species candidates for collision mortality on the proposed 132 kV power line are medium to large terrestrial species i.e. Karoo Korhaan, Kori Bustard, and Secretarybird which have all been recorded at the site.	• The 132 kV grid connection should be inspected at least once a quarter for a minimum of three years by the avifaunal specialist to establish if there is any significant collision mortality. Thereafter the frequency of inspections will be informed by the results of the first three years. • The detailed protocol to be followed for the inspections will be compiled by the avifaunal specialist prior to the first inspection. • The proposed transmission line for evacuation of the electricity generated by the PVs should be marked with Bird Flight Diverters (BFDs) for their entire length on the earth wire of the line, 5 m apart, alternating black and white.	Quarterly	Contractor & ECO

8.4 Hydrogeology

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Operational activities related to groundwater contamination: • Spillage of fuel, lubricants and other chemicals;	• Chemicals must be stored in bunded areas. • Adequate ablutions must be provided for construction employees. • Ensure clean up protocols are in place and followed.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Operational equipment and vehicles, workshop and wash bay areas will be a likely source of pollution as a non-point source; and • Lack of provision of ablutions may lead to the creation of informal ablutions.	• Clean-up spills as soon as they occur and maintain an incident register. • Any spillage, which may occur, shall be investigated and immediate action must be taken. This must also be reported to the ECO and depending on the severity reported to the DEA as stipulated in the conditions of the Integrated Environmental Authorisation. • Keep MSDS records of chemicals in use up to date. • Accurate oil records must be kept (purchased, disposal, and recycled). • Implement appropriate actions and measures to reduce or prevent contamination of the ground and surface water as a result of a spill of potentially hazardous substances. • Keep written records detailing the type of spill, the corrective and remedial measures implemented in the stopping or reduction of the spill, and the clean-up of the spill. These reports may afterwards be used for training purposes in an effort to prevent similar future occurrences.		
Hydrocarbon contamination associated with heavy machinery on site and fuel storage.	• The mitigation measures would include secondary containment for all fuel stored on site.	Weekly	Contractor & ECO
Contamination from the Heat Transfer Fluid (HTF).	• Mitigation measures would include regular inspection of the infrastructure to ensure no losses occur through the receiver tube. • All records of HTF stored on site must be kept (purchased, disposal, and recycled, etc.). • All HTF stored on site (both unused and used) must be stored in the appropriate containers and the area must be marked accordingly and fully bunded.	Weekly	Contractor & ECO

8.5 Surface Water

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Operational activities within wetlands and drainage lines: • Irresponsible operational practices could lead to the pollution of wetlands (e.g. pollution of surface	• No temporary operational accesses to be constructed through any surface water feature and no machinery to enter any wetland unless authorised under the EMPr by the ECO as part of a construction activity. These areas must be demarcated as no-go areas.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
water through hydrocarbons). • Poor stormwater management could lead to the siltation (pollution) of surface waters. • Temporary accesses across wetlands could cause hydrological and morphological impacts and degrade the resource quality.	• No operational activities should occur on the drainage lines and their associated riparian zones. • No batching, parking area, ablution facilities, road construction or chemical / fuel storage areas should be located within any surface water feature or within 100 m of a surface water feature. • The dumping of material, including fill or excavated material into, or close to surface water features that may then be washed into these features is prohibited. • Clean-up of spills must be done as soon as they occur. • Bunded areas should be used to store hazardous materials and chemicals so that if a spill occurs the chemical will be contained. • Operation activities to be monitored by an ECO according to the stipulations of the EMPr.		

8.6 Aquatic Ecology

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Erosion management should be ongoing throughout the life of the project. • Indiscriminate habitat destruction must be avoided.	• Encroachment of alien vegetation to be monitored for regularly and controlled. • The relevant mitigation measures proposed for the construction phase should be carried forward to operations, where potential environmental impacts may still occur. • Special conditions relating to operations, as stipulated in the Integrated Environmental Authorisation, need to be adhered to. • The contractor must perform appropriate maintenance functions, as required. Responsible parties must be competent in the necessary maintenance tasks. • Feedback must be provided to the ECO and project proponent on a frequent basis.	Weekly	Contractor & ECO

8.7 Socio – Economic

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Difference in water flow in the Orange River potentially affecting downstream farmers and potentially causing economic displacement	• A water flow study would be undertaken to assess the impact of abstraction on river (The water flow needs of downstream farmers needs to be factored into the solar plant's (all technologies) intake/ abstraction needs so as to create a	Annually	Contractor

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Potential loss of farm labourer jobs on neighbouring farms affected by differential water flow	balance for all water users)		
• Impact on Gariep road users and neighbours	• Upkeep of the access roads to site must be undertaken	Annually	Contractor
• Grievance Channel Continuation	• As with the pre-construction and construction phases, the grievance channel will serve to highlight the company's continued, sincere and firm commitment to finding practical resolutions to its local challenges	Monthly	Contractor

8.8 Visual

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• The central receiver tower will be a massively tall structure, and the receiver at the top of the tower will be brilliantly lit during the day, making it highly visible from a wide radius. • The heliostats could cause glint and glare, but the possibility of this is low as most of the receptor locations in the area would not be able to view the heliostats.	• Avoid complete clearing of the construction site, and only clear vegetation in a phased manner. • It is recommended that the Gariep Road be tarred to avoid the creation of excessive dust by large numbers of construction vehicles.	Weekly	Contractor & ECO

8.9 Noise

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Noise generation during operation.	• Operational site yards and other noisy fixed facilities should be located well away from noise sensitive areas adjacent to the development sites. • All construction vehicles and equipment are to be kept in good repair. • Where possible, stationary noisy equipment (for example compressors, pumps, pneumatic breakers,) should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20 dBA. Portable acoustic shields should be used in the case where noisy	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators). • Operational activities, and particularly the noisy ones, are to be contained to reasonable hours (06:00 – 18:00) during the day and early evening. • With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the power station should liaise with local residents on how best to minimise the impact. • Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum. • In general, operations should meet the noise standard requirements of the Occupational Health and Safety Act (No 85 of 1993). • Construction staff working in areas where the 8-hour ambient noise levels exceed 75 dBA should wear ear protection equipment.		
• The typical noise heavy machinery and impact noises from incidents (such as falling pipes, equipment, etc.).	• Control of noise – On site – Avoid unnecessary revving of engines and switch off equipment when not required; – Keep solar field access routes well maintained and avoid speeding; – Start-up plant and vehicles sequentially rather than all together (including auxiliary heater operations); – Fitment of additional or best available exhaust silencers or acoustic canopies on engines including auxiliary heater operations); – Where possible, attempt to enclose noise sources, if the sources enclose has a noise directivity ensure the noise is directed away from any sensitive areas; and – Regular and effective maintenance by trained personnel is essential and will do much to reduce noise from plant and machinery. • Controlling the propagation of noise – Minimise the length and magnitude of noise sources; – Screening of noise sources, if it is not possible to increase the distance, the alternative measure is to screen the noise	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	source. Screening can make use of the natural environment, existing buildings and/or screens or earth berms. These screens should be placed in the direct line of sight to effectively reduce the noise received and the sensitive location. • Noise control targets – Monitoring of noise at sites where noise is an issue should be regarded as essential. Measurements may be carried out for a number of reasons, including the following: ○ To allow the performance of noise control measures to be assessed; ○ To ascertain noise form items of plant for planning purposes; ○ To provide confirmation that planning requirements have been complied with; and ○ Monitoring positions should reflect the purpose for which monitoring is carried out.		

8.10 Air Quality

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Dust and emissions generated due to construction activities such as debris handling, movement of vehicles and machines and general construction.	• Dust must be suppressed on the construction site and during the transportation of material during dry periods by the regular application of water / watering or by use of environmentally acceptable / friendly binding chemicals. Water used for this purpose must be used in quantities that will not result in the generation of run-off. • If logged in the complaints register, dust monitoring to be undertaken on surrounding properties or areas of complaint. • A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas. • Equipment and vehicles used by the contractor must be maintained in good working order to prevent smoke emissions. • Any temporary storage piles (cleared topsoil) should be maintained for as short a time as possible and should be enclosed by wind breaking enclosures of similar height to the storage pile.	Daily	Contractor; PM & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Storage piles should be situated away from the water courses and nearby receptors and should take into account the predominant wind direction. • The southern Gariep Road (leading from the N8) to be surfaced and maintained on a regular basis. • No access is allowed, from anywhere in regards to the northern Gariep road (N14 or N10).		

8.11 Traffic

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
• Potential deterioration of existing traffic conditions on the external road network • Reduction of existing road space available for pedestrian and cyclists • Deteriorating road safety conditions for all road users • Deterioration of the existing condition of the surrounding road network	• It is recommended that the existing gravel roads are re-bladed on a regular basis to ensure that this road remains operational and maintains an acceptable level of safety for the duration of the project. Furthermore, to reduce the dust that will be generated on the gravel roads it is recommended that these roads are watered down on a regular basis.	Monthly	Contractor & ECO

8.12 Waste

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
General waste generated on site	• An adequate number of general waste receptacles, including bins must be arranged around the site to collect all domestic refuse, and to minimise littering. • Bins should be clearly marked and lined for efficient control and safe disposal of waste. • Different waste bins, for different waste streams must be provided to ensure correct waste separation. • A fenced area must be allocated for waste sorting and disposal on the site. The developer must have a waste policy and waste management procedure and also engage a service provider who trains the operations staff on measures for implementing the plan as well as auditing.	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• General waste produced on site is to be collected in skips for disposal at the local municipal waste site. A waste disposal service provider must be appointed by the developer to carry out disposal of waste as required. Hazardous waste is not to be mixed or combined with general waste earmarked for disposal at the municipal landfill site. • Under no circumstances is waste to be burnt or buried on site. • Waste bins should be cleaned out on a weekly basis by an appointed service provider to prevent any windblown waste and/or visual disturbance. • All general waste must be removed from the site at regular intervals and disposed of in suitable waste receptacles.		
Hazardous waste generated on site.	• A hazardous waste disposal certificate must be obtained from the waste removal company as evidence of correct disposal. • In the case of a spill of hydrocarbons, chemicals or bituminous substance, the spill should be contained and cleaned up and the material together with any contaminated soil collected and disposed of as hazardous waste to minimize pollution risk and reduce bunding capacity. • The bins and skips are to be emptied on weekly basis. • Reporting of spills and mitigation done must be done in accordance with section 10 of the minimum requirements for the handling, classification and disposal of hazardous waste (3rd edition, 2005). Internal and external auditing must be carried on an annual basis. • Neighbouring river and stream systems as well as their associated buffer areas are to be fenced off preferably with palisade fencing. This erection of the fencing should take place prior to any construction activities taking place on site. • Vehicles are to be checked for leakage before and after entering the construction area. • Areas where fuels are either kept or transferred are to be bunded so as to contain spillage. • Cement mixing sites are to be strategically designated and at least 100 m away from the water resource or ecological systems. • An inventory should be made of substances which will be used on site (both temporarily during construction and during	Weekly	Contractor & ECO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	operation) that are potentially harmful to surface water and other water related systems/bodies.		

8.13 Heritage

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Archaeological sites	• If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately. • The contractor must take reasonable precautions to prevent any person from removing or damaging any such article and must immediately, upon discovery thereof, inform the Client or ECO of such discovery. • Work may only resume once clearance is given in writing by the archaeologist. • If a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the specific site must be stopped and the Client or ECO informed of the discovery. A heritage expert will then need to be contacted for the way forward.	Weekly	Contractor; PM; ECO & Archaeologist

9 Environmental Management Programme – Rehabilitation and Decommissioning

9.1 Rehabilitation

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Road maintenance.	• Where necessary suitable measures shall be taken to rehabilitate damaged areas on private and public roads. • All rehabilitation work will be done to the original specifications of the private road • Road rehabilitation should take place during and once construction is completed.	Weekly	Contractor
Exposed soils and vegetation.	• The contractor should commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks. • All damaged areas shall be rehabilitated upon completion of the contract in accordance with design specifications. In accordance with the Conservation of Agricultural Resources Act (No 43 of 1983), slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. Extra seed shall be sown on disturbed areas as directed by the ECO (see below for specifications). Other methods of rehabilitating disturbed sites may also be used at the discretion of the Project Manager to comply with the conditions of the IEA and EMPr, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slopes. The type of soil shall also be taken into consideration • A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: – Annual and perennial species are chosen. – Pioneer species are included. – All the species shall not be edible. – Species chosen will grow in the area under natural conditions. – Root systems must have a binding effect on the soil. – The final product should not cause an ecological imbalance in the area. • To get the best results in a specific area, it is a good idea to consult with a vegetation specialist or the local Extension Officer of the Dept of Agriculture. Seed distributors can also give	Weekly/Monthly	Contractor

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	valuable advice as to the mixtures and amount of seed necessary to seed a certain area. • All natural areas impacted during construction must be rehabilitated with locally indigenous grasses. • Fragmentation must be kept to a minimum. Rehabilitation of the final servitude will ensure that fragmentation is kept to a minimum. • Rehabilitation must take place as soon as construction is complete to avoid the edge effect, the infiltration of alien species and soil erosion within the servitude. • Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. • Re-vegetated areas showing inadequate surface coverage (less than 30% within eight months after re-vegetation) should be prepared and re-vegetated from scratch. • Damage to re-vegetated areas should be repaired promptly. • Re-vegetated areas should be monitored every four months for the first 12 months and once a year thereafter for the maintenance period of two years.		
Environmental Monitoring Programme.	• Compile and implement environmental monitoring programme, the aim of which should be ensuring long-term success of rehabilitation and prevention of environmental degradation. Environmental monitoring should be conducted at least twice per year (summer, winter).	Weekly	Contractor
Topsoil management.	• Remove and store topsoil separately in areas where excavation/ degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate regrowth of species that occur naturally in the area	Weekly	Contractor
Sensitive Areas	• Rehabilitation to be undertaken as soon as possible after construction in sensitive area has been completed. The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase.	Weekly	Contractor
Stormwater management.	• Any rehabilitation undertaken or future development should ensure that stormwater flows do not cause erosion to water courses in close proximity to the CSP plant and associated infrastructure. Accordingly excessive stormwater flows should not be directed into watercourses.	Bi-Monthly	Contractor
Servitude rehabilitation and re-vegetation – pipeline and roads.	• The topsoil within the works area of the pipeline must be retained once excavation for the pipeline has been completed and must be reinstated over the pipeline as this will contain a natural seed bank that will assist with natural re-vegetation.		

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	• Once reinstatement of the pipeline has been completed and the rehabilitation of the servitude through riparian areas is underway, the riparian area must be reseeded with a grass species mix consisting of grasses found in the local area such as *Cenchrus ciliaris* and *Stipagrostis* spp. • It is important that a shrub layer be re-established over the pipeline servitude, with non-deep rooted species being re-established, as detailed below. • Bare areas, such as reinstated banks and terraces, and especially those areas vulnerable to erosion by water during flow events must be protected from erosion while re-vegetation is occurring. It is recommended that geotextile be used to cover such areas, staked into the ground to protect seedlings. Waste rock / rip rap could also be considered for this purpose in sloping areas. • Where possible (e.g. in the footprint of the construction right of way for the pipeline), the growth of shrubs and bushes, as well as grasses must be encouraged, as this will assist in the protection of the understorey. It is recommended that shrubs of species indigenous to the area with shallow root systems be sourced from local nurseries and established in such areas. • Monitoring of re-vegetated areas must be undertaken, and follow up re-vegetated measures undertaken if necessary. • It is critical that operational procedures for the rehabilitation and subsequent management of the pipeline servitude and road include measures to remediate any developing erosion and to remove and prevent proliferation of alien invasive vegetation. This should be undertaken at an interval of at least 6 months. Thus for a period after construction the servitude through riparian areas must be monitored for the development of erosion, as well as the growth of alien invasive plant species. • If erosion is noted to be developing, immediate measures must be taken to remediate the erosion. It is very important that the integrity of the riparian zone post-construction be checked. • In the case of alien invasive vegetation, all such species must be fully removed and measures taken to prevent further proliferation. In this context it is also very important that parts of the servitude adjacent to the watercourses (outside of riparian zones) also be subject to similar measures as without this the servitudes outside of the riparian zones would become 'springboards' for proliferation into the riparian area.		

9.2 Decommissioning

At this point of the project planning process, the necessity for and timing of the decommissioning of the proposed project is not known as the proposed CSP Plant will be in operation for the next 20-25 years. In order to minimise the extent of rehabilitation activities required during the decommissioning phase, the Developer must ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

The Developer must further ensure upon site closure and decommissioning of the authorised activity, an application in terms of applicable legislation (if necessary) will be made.

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
Groundwater contamination.	• Groundwater monitoring must be conducted to confirm any impacts.	Bi-annually	PM & ELO
Pollution of water resources due to infrastructure decommissioning: • Decommissioning of infrastructure such as buildings in the workshop and plant area would contain materials which could potentially act as pollutants to surface water resources..	• The surfaces of the CSP plant are rehabilitated. • Drains are maintained.	Bi-annually	PM & ELO
Soils: • Decommissioning of infrastructure and buildings. • Re-vegetating and rehabilitating the plant. • Rehabilitation of access roads.	• Vehicle movement has to be restricted to designated areas and roads in order to prevent degradation of any additional land or parts of land. • Vehicle movement has to be restricted to an absolute minimum that is required for the decommissioning. Unnecessary movement of vehicles will increase the degradation of paths and dirt roads leading to an increased erosion risk. • Progressive rehabilitation of the plant will occur. The final phase of rehabilitation should take place as soon as decommissioning has begun to prevent soil erosion. • Rehabilitation of access roads should start as soon as decommissioning is initiated.	Weekly	PM & ELO
Waste generation during decommissioning activities.	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed of in the appropriate manner at a licensed disposal site. • All rubble is to be removed from the site to an approved disposal site as approved by the EO.	Weekly	PM & ELO
Dust and emissions generated by decommissioning activities.	• Re-vegetation of exposed areas. • Plants used for re-vegetation should be indigenous to the area, hardy, fast-growing, nitrogen-fixing, provide high plant cover, be	Weekly	PM & ELO

Aspect and Associated Impact	Measures and Controls	Monitoring Frequency	Responsible Person/s
	adapted to growing on exposed and disturbed soil (pioneer plants) and should easily be propagated by seed or cuttings.		
Increase in noise pollution from vehicles and staff.	• All decommissioning vehicles and equipment are to be kept in good repair. • Where possible, stationary noisy equipment should be encapsulated in acoustic covers, screens or sheds. Proper sound insulation can reduce noise by up to 20 dBA. • Portable acoustic shields should be used in the case where noisy equipment is not stationary (for example drills, angle grinders, chipping hammers, poker vibrators).	Weekly	PM & ELO
During decommissioning, there is likely to be an increase in traffic from construction vehicles.	• No person is allowed to drive more than 40 km/h on a gravel road. This is applicable only to the access roads on site. All areas within the site itself, has a reduced speed limit of 15 km/h. This is communicated to all persons by means of National Speed Signs. • Seatbelts are to be worn at all times.	Daily	PM & ELO
Impact similar to construction – clearing of infrastructure could create bare, un-vegetated areas that would create a visual contrast with the natural vegetation. Stockpiling of rubble / cleared infrastructure that are not removed could create a contrast with the aesthetics of the natural environment.	• Decommissioning to be monitored by the EO according to the stipulations of the EMPr. • Ensure proper surface restoration and re-sloping in order to prevent erosion, taking cognisance of local contours and landscaping. • Exposed areas with slopes less than 1:3 should be rehabilitated with a grass mix that blends in with the surrounding vegetation. • The grass mix should consist of indigenous grasses adapted to the local environmental conditions. • Re-vegetated areas should be fenced to prevent damage by grazing animals. • Re-vegetated areas showing inadequate surface coverage (less than 30% within eight months after re-vegetation) should be prepared and re-vegetated from scratch. • Damage to re-vegetated areas should be repaired promptly. • Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grasses to properly establish.	Weekly	PM & ELO
Visual impacts to receptors during decommissioning.	• Rehabilitation follow ups need to be conducted, with re-planting if necessary in order to ensure the success of rehabilitation. • All operational equipment must be fully removed from the plant.	Weekly	PM & ELO

Appendix A: Sensitivity Map