



# **BOKPOORT CSP PLANT: 3 KM WATER PIPELINE AND ASSOCIATED INFRASTRUCTURE**

Final Environmental Management Programme

September 2014

ACWA POWER SOLAFRICA BOKPOORT CSP POWER PLANT (PTY) LTD

## *Document description*

Client:

**ACWA Power Solafrica Bokpoort CSP Power Plant (Pty) Ltd**

Project Name:

**Final Environmental Management Programme for the proposed construction of a 3km water pipeline and associated infrastructure on portions 0 and 5 of farm Sand Draai 391, near Groblershoop, Northern Cape**

Royal HaskoningDHV Reference Number:

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## Glossary

<b>Accident</b>	A road vehicle accident.
<b>Building and Demolition Waste</b>	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.
<b>Contractor</b>	Companies appointed on behalf of the Client to undertake activities, as well as their sub-contractors and suppliers.
<b>Construction Project Management Team</b>	The team consists of a Project Manager as well as a Site Environmental officer.
<b>Degradation</b>	The lowering of the quality of the environment through human activities e.g. river degradation, soil degradation.
<b>Domestic Waste</b>	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.
<b>Emergency</b>	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.
<b>Environment</b>	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: <ul style="list-style-type: none"> <li>(i) the land, water and atmosphere of the earth;</li> <li>(ii) micro-organisms, plants and animal life;</li> <li>(iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and</li> <li>(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.</li> </ul>
<b>Environmental Control Officer</b>	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.
<b>Environmental Impact</b>	A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation’s activities, products or services.
<b>Environmental Management Plan</b>	A detailed plan of action prepared to ensure that recommendations for enhancing or ensuring positive environmental impacts and limiting or preventing negative environmental impacts are implemented during the life-cycle of the project.

<b>General Waste</b>	General waste means waste that does not pose an immediate hazard or threat to health or to the environment, and includes - <ul style="list-style-type: none"> <li>(i) domestic waste;</li> <li>(ii) building and demolition waste;</li> <li>(iii) business waste; and</li> <li>(iv) inert waste.</li> </ul>
<b>General Waste Landfill Site</b>	A waste disposal site that is designed, managed and permitted to allow for the disposal of general waste.
<b>Hazardous Waste Landfill Site</b>	A waste disposal site that is designed, managed and permitted to allow for the disposal of hazardous waste.
<b>Impact</b>	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
<b>Incident</b>	An undesired event which may result in a significant environmental impact but can be managed through internal response.
<b>Mitigation</b>	Measures designed to avoid, reduce or remedy adverse impacts.
<b>Principal Agent</b>	The principal agent is appointed by the Client to oversee the overall project management and the management of the professional project team.
<b>Recovery</b>	The controlled extraction of a material or the retrieval of energy from waste to produce a product.
<b>Re-Use</b>	To utilise articles from the waste stream again for a similar or a different purpose without changing the form of properties of the articles.
<b>Recycle</b>	A process where waste is reclaimed for further use, this involves the separation of waste from a waste stream for further use and the processing of that separated material as a product or raw material.
<b>Site Environmental Officer</b>	The Site Environmental Officer (SEO) is a Contractor representative, responsible for the environmental aspects on the construction site. The SEO will be responsible for the day-to-day monitoring of the EMP on site..
<b>Waste</b>	Waste means any substance, whether or not that substance can be reduced, re-used, recycled and recovered - <ul style="list-style-type: none"> <li>(i) that is surplus, unwanted, rejected, discarded, abandoned or disposed of;</li> <li>(ii) which the generator has no further use of for the purposes of production;</li> <li>(iii) that must be treated or disposed of; or</li> <li>(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— <ul style="list-style-type: none"> <li>☒ a by-product is not considered waste; and</li> <li>☒ any portion of waste, once re-used, recycled and recovered, ceases to be waste</li> </ul> </li> </ul>
<b>Waste Disposal Facility</b>	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.

**Workforce**

The entire project team including people employed by the Principal Agent 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.



## *Abbreviations and Acronyms*

BA	Basic Assessment (i.e. EIA process)
BAR	Basic Assessment Report
DAEA&RD	KwaZulu-Natal Provincial Department of Agriculture, Environmental Affairs & Rural Development
DWA	National Department of Water Affairs
EA	Environmental Authorisation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
I&AP	Interested and Affected Party
IEM	Integrated Environmental Management
NEMA	National Environmental Management Act (Act No. 107 of 1998) (as amended)
NEM:AQA	National Environmental Management: Air Quality Act (Act No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NEM:ICM	National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008)
NEM:PAA	National Environmental Management: Protected Areas Act (Act No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (Act No. 36 of 1998) (as amended)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
RoW	Right of Way
S&EIR	Scoping and Environmental Impact Report Process
SEMA	Specific Environmental Management Acts (i.e. NEMA, NEM:AQA, NEM:BA, NEM:ICM, NEM:PAA, NEM:WA, and NWA)
WMA	Water Management Area
WUL(A)	Water Use Licence (Application)

# 1 Introduction

## 1.1 Project Overview

**Royal HaskoningDHV** (hereafter referred to as RHDHV) was appointed by **ACWA Power Solafrika Bokpoort CSP Power Plant (Pty) Ltd** to carry out **Environmental Services** which include the drafting of an **Environmental Management Programme (EMPr)** for the proposed construction of a 3 km water pipeline and associated infrastructure.

On 14 June 2011, Solafrika Thermal Energy (Pty) Ltd received Environmental Authorisation for the *Construction of a 75 MW Concentrated Solar Thermal Power (CSP) Plant and associated infrastructure in the Siyanda District Municipality, Northern Cape (DEA Ref 12/12/20/1920)*.

In addition, a Basic Assessment study for a 15 km water pipeline to the CSP plant was conducted in 2012 that sought environmental authorisation for the following infrastructure:

- ✦ The 15 km water pipeline (extending from the Orange River through the farm Sand Draai 391 and terminating at the farm Bokpoort 390);
- ✦ A pump station on the farm Sand Draai 391; and
- ✦ Storage ponds as well as associated infrastructure on the approved CSP site on portion 0 of the farm Bokpoort 390.

An environmental authorisation (Ref No: 14/12/16/3/3/1/591) was granted for the pipeline on 8 March 2013.

Since the authorisation, a refinement of the design, mostly due to abstraction point challenges, has taken place that has resulted in the proposed re-alignment of approximately 3 km of underground PVC water pipeline with a diameter of approximately 315 mm of the previously authorised pipeline, as well as the substitution of storage ponds with storage / regulation tanks in line with the industry standard design for bulk raw water storage in CSP plants worldwide.

After studies were undertaken at the river intake point, it was established that during some months of the year, it will not be possible to abstract water due to level changes that occur during the different seasons. Therefore, a decision was made to change the water abstraction point to a new point (known as 'Shalom') (indicated by the blue circle on locality map, **Figure 1**, below) and this will result in a re-alignment of the original (approved) route by 3 km from the abstraction point (indicated in green on the locality map, **Figure 1**, below).

The proposed 3 km re-alignment and associated infrastructure traverses only one farm, namely Sand Draai 391.

The objective of constructing the proposed pipeline is to supply filtered water from the Orange River to the approved CSP plant that is currently undergoing construction.

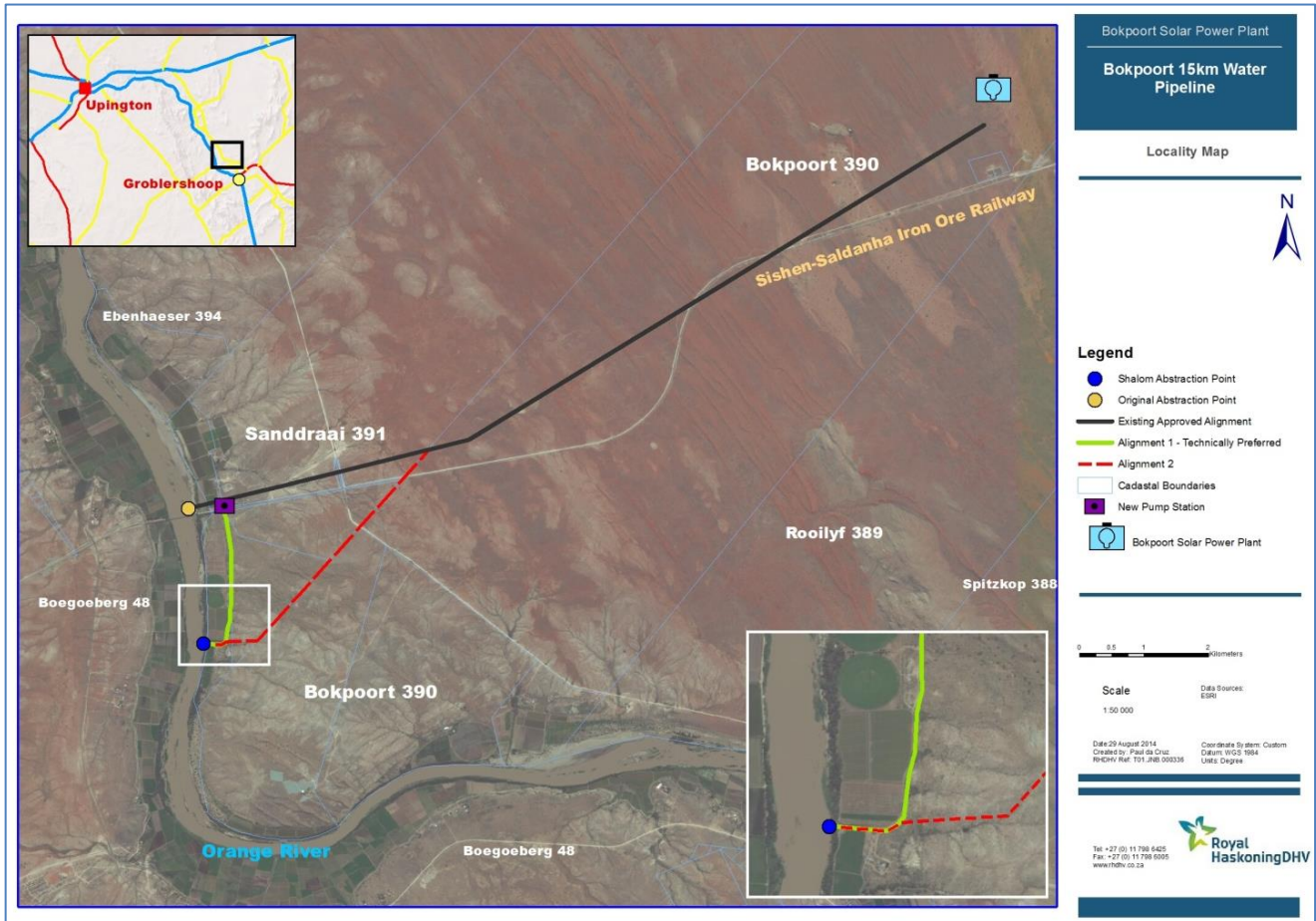


Figure 1: Locality map of the proposed upgrade

This EMPr aims to identify all possible environmental sensitivities, and provide mitigation measures for the proposed upgrade.

## 1.2 Objectives of the Environmental Management Programme

The Environmental Management Programme (EMPr) has the following objectives:

- ✦ Ensuring compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international.
- ✦ 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 associated with the proposed project.
- ✦ To identify measures that could optimise beneficial impacts.
- ✦ 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 the safety recommendations are complied with.
- ✦ Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- ✦ Specify time periods within which the measures contemplated in the final environmental management plan must be implemented, where appropriate.
- ✦ Provide rational and practical environmental conditions / requirements to:
  - Minimise disturbance of the natural environment;

- Ensure water resource protection;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Prevent soil and sand erosion and facilitate the re-vegetation of affected areas;
  - Maintenance of newly re-vegetated areas;
  - Restrict noise disturbance; and
  - Ensure compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment.
- ✦ Adopt the best practical means available to prevent or minimise adverse environmental impacts.
  - ✦ Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste.
  - ✦ Train the Client, its employees and contractors with regard to their environmental obligations

## 2 Overall Approach

### 2.1 Structure of the Environmental Management Programme

The EMPr typically provides proposed mitigation and management measures for the following phases of the project shown in **Figure 2**.



**Figure 2: Phases of the EMPr process and applicability**

### 2.2 Purpose of the EMPr

The EMPr includes the following:

- ✦ Roles and responsibilities of the various responsible parties involved with the various phases of the project;
- ✦ Standards, guidelines and legal requirements (including any possible environmental permits required and the processes to be followed in obtaining these permits);
- ✦ Environmental specifications for construction;
- ✦ Environmental specifications for operation;
- ✦ Environmental specifications for rehabilitation; and
- ✦ Environmental awareness plan.

The EMPr specifies the minimum requirements to be implemented by the Client, as per the scope of works and scope of the environmental authorisation, in order to minimise and manage the potential environmental impacts and ensure sound environmental management practices.

The EMPr also provides the framework for environmental monitoring throughout the construction, operational and rehabilitation phases.

The provisions of this EMPr are binding on the Client during the life of the project. The EMPr must be binding on the Client or any authority to which responsibility for all buildings and associated infrastructure has been delegated to.

It is noted that protection of the environment is enshrined in the Duty of Care requirement of the National Environmental Management Act (Act No. 107 of 1998) (as amended), which thus means that it is the duty of all land-owners and users to ensure that the activities they carry out on a site do not cause detriment to the environmental facets thereof. The EMPr thus functions as a monitorable mechanism that will allow the Client the ability to ensure that all that operate on the site do so in an environmental safe manner. It is also structured in such a way that the conditions may be linked to a standard construction contract. The EMPr is a live document which must be continuously updated, with the approval of the Competent Authority.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all time.

Each action within the EMPr is supported by the priority of when the specific action will need to be implemented. Each of these aspects is briefly described below for ease of reference.

### **2.2.1 Environmental Aspect**

This section highlights the various aspects associated with the project i.e. the Client / Contractor's activities that will interact with the environment.

### **2.2.2 Environmental Measures and Action Plans**

This section indicates the actions required to either prevent and/or minimise the potential impacts on the environment that is associated with the project.

### **2.2.3 Responsibility**

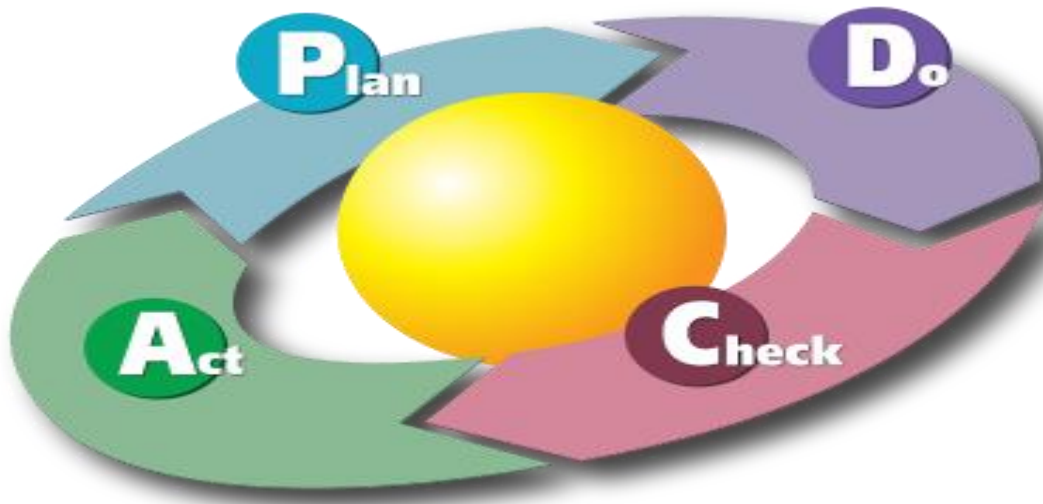
This section indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr.

### **2.2.4 Monitoring Frequency**

This section indicates when the actions for that specific aspect must be implemented and/or monitored.

## **2.3 EMPr as a “live” document**

The approach adopted for this EMPr is derived from the Deming Cycle (**Figure 3**), 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 3: Deming cycle of continuing improvement**

### 2.3.1 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.

### 2.3.2 Do

Throughout the development's life-span, the developer will be required to develop and maintain a Quality Management System (QMS) – designed to ensure that best management practices are implemented in day-to-day management. Such a QMS must 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 of the project.

### 2.3.3 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 on-going 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.

### 2.3.4 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 scheme.

## 2.4 Details of the Environmental Management Team

**Table 1: Environmental Team**

Name	Organisation	Responsibility	Telephone	Email
<b>Malcolm Roods</b>	RHDHV	Project Principal	011 798 6005	Malcolm.Roods@rhdhv.com
<b>Bjorn Hoffmann</b>	RHDHV	Environmental Consultant	031 719 5571	Bjorn.Hoffmann@rhdhv.com

## 3 Environmental Code of Conduct

One of the objectives of the EMPr is to ensure that all the workforce, contractors, sub-contractors and construction staff have an understanding of environmental issues and potential impacts on site activities. This environmental code of conduct provides the basic rules that should be strictly adhered to.

It is the responsibility of the Site Environmental Officer and ECO (as appointed) to ensure that each contractor, sub-contractor and workforce understand and adhere to the Code of Conduct.

### **Environmental Code Of Conduct**

**All persons are obliged to keep to the rules of this code of conduct**

**Ignorance, negligence, recklessness or a general lack of commitment resulting in environmental degradation or pollution must not be tolerated!**

#### **Environmental Rules**

- ✧ Do not waste electricity, water or consumables;
- ✧ Only use authorised accesses;
- ✧ Do not litter;
- ✧ Dispose solid waste to the correct waste containers provided;
- ✧ Prevent pollution;
- ✧ Use the toilet facilities provided;
- ✧ Do not dispose contaminated waste water to the storm water or the environment;
- ✧ Immediately report any spillage from containers, plant or vehicles;
- ✧ Do not burn or bury any waste in the sand;
- ✧ Do not trespass onto private properties;
- ✧ Strictly leave all animals alone. Never tease, catch or set devices to trap or kill any animal;
- ✧ Never damage or remove any trees, shrubs or branches unless it forms part of working instructions;
- ✧ Do not deface, draw or cut lettering or any other markings on trees, rocks or buildings in the area;
- ✧ Know the fire fighting procedure and locations of fire fighting equipment; and
- ✧ Know the environmental incident procedures.



## 4 Legal Requirements

The following (**Table 2**) is a summary of the environmental legislation applicable to the proposed project.

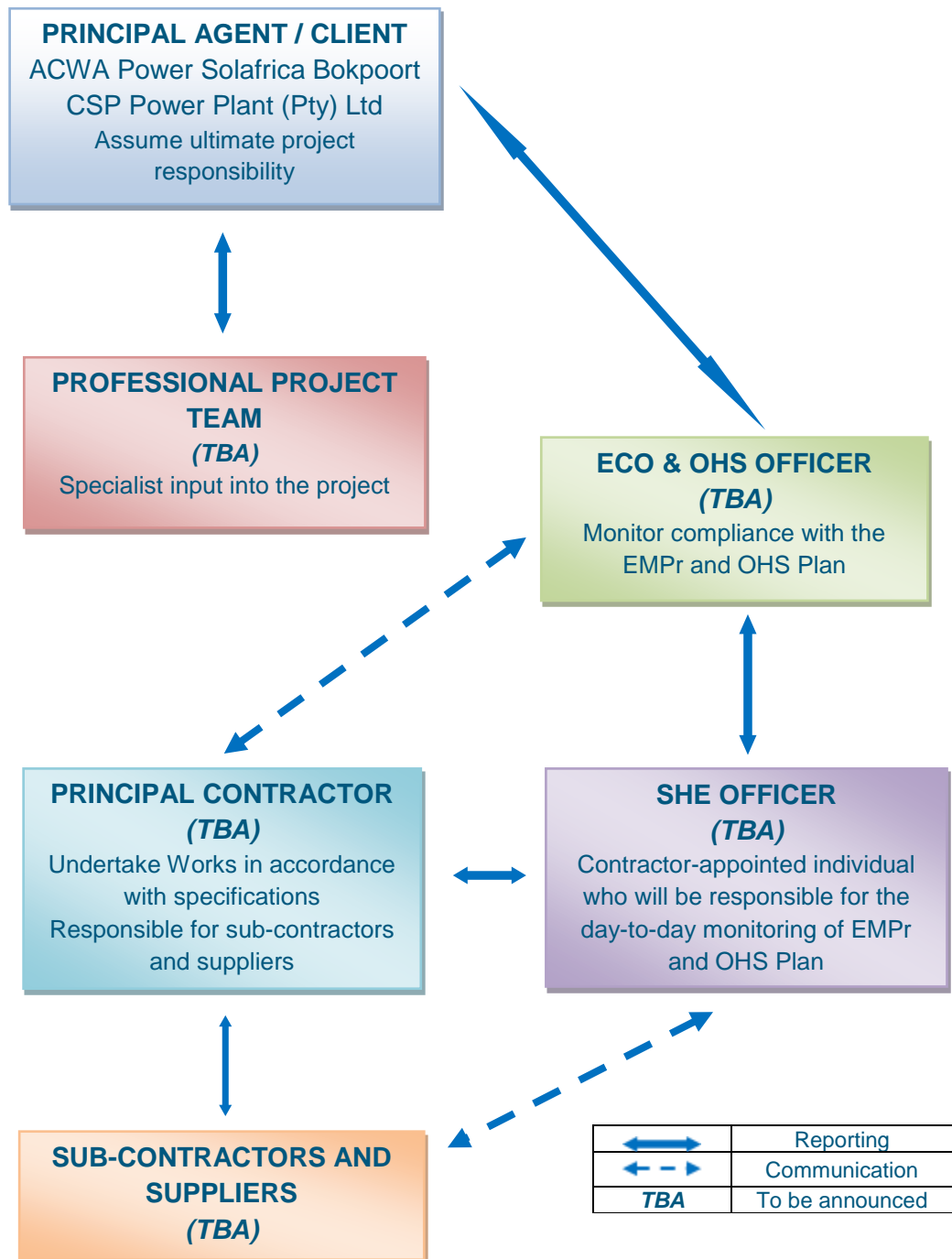
**Table 2: Summary of environmental legislation (all legislation taken as most recent amended versions)**

Legislation	Sections	Relates To
The Constitution (No 108 of 1996)	Chapter 2	Bill of Rights.
	Section 24	Environmental rights.
National Environmental Management Act (Act No. 107 of 1998 [as amended])	Section 2	Defines the strategic environmental management goals and objectives of the government. Applies through-out 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 Waste Act (Act No. 59 of 2008) and List of Waste Activities (November 2013)		Provides for specific waste management measures and the remediation of contaminated land.
National Heritage Resources Act (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 disturb any archaeological or paleontological 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), not already covered under the environmental law. Where covered under such law the provincial heritage resources authorities must be notified of a proposed project and must be consulted during the HIA process. The HIA is thus approved under the environmental authorisation, which must take into account the provincial heritage resources authorities' comments prior to making a decision on the HIA.

Legislation	Sections	Relates To
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	Section 34	Control of noise
	Section 35	Control of offensive odours
National Dust Control Regulations (GNR 827 of November 2013)		Control of dust.
Occupational Health and Safety Act (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
National Water Act (Act No. 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
Hazardous Substances Act (Act No. 15 of 1973) and regulations		Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances
National Road Traffic Act (Act No. 93 of 1996)		Road safety
Ordinance		Town Planning and Townships Ordinance 15 of 1986
By-laws		Promulgated by-laws: <ul style="list-style-type: none"> <li>✦ Waste Management</li> <li>✦ Property Rates by laws</li> <li>✦ Legal Services</li> <li>✦ Municipal Cemeteries</li> <li>✦ Discharge of Industrial Effluent</li> <li>✦ Electricity Supply</li> </ul>
SANS 10103 (Noise Regulations)		The measurement and rating of environmental noise with respect to annoyance and to speech communication
Provincial Ordinances		Sensitive species are protected under these Ordinances and must be considered.

# 5 Management and Monitoring Procedures

## 5.1 Organisational Structure and Responsibilities



**Figure 4: Project organisational structure**

Note: The organisational structure will need to be reviewed and finalised on inception, especially in terms of both reporting and responsibility of the involved parties.

**Table 3: Roles and responsibilities of key members**

<b>Principal Agent</b>
<p><b>The Principal Agent (Client) will:</b></p> <ul style="list-style-type: none"> <li>✦ Ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project.</li> <li>✦ 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.</li> <li>✦ Ensure that all stipulations within the EMPr are communicated and adhered to by its appointed Contractor(s).</li> </ul>
<b>Environmental Control Officer</b>
<p><b>The Environmental Control Officer will:</b></p> <ul style="list-style-type: none"> <li>✦ Monitor the implementation of the EMPr during construction activities and must remain employed until the site is handed over to the Client by the Contractor.</li> <li>✦ Be familiar with the recommendations and mitigation measures of the associated EMPr for the project.</li> <li>✦ Ensure site protection measures are implemented on site.</li> <li>✦ Ensure that the Principal Contractor, sub-contractors, construction teams and the Principal Agent are in compliance with the EMPr at all times.</li> <li>✦ Monitor all site activities monthly for compliance.</li> <li>✦ Conduct monthly audits of the site according to the EMPr, and report findings to the Principal Agent/Contractor.</li> <li>✦ Recommend corrective action for any environmental non-compliance at the site.</li> <li>✦ 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.</li> <li>✦ Conduct once-off training with the Contractor on the EMPr and general environmental awareness.</li> <li>✦ Submission of an environmental audit report to the Client and Principal Agent upon completion of the project.</li> <li>✦ 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.</li> </ul>
<b>Occupational Health And Safety Officer</b>
<p><b>The Occupational Health and Safety Officer will be responsible for undertaking of the following:</b></p> <ul style="list-style-type: none"> <li>✦ Compilation of a comprehensive project health and safety risk assessment (HSRA).</li> <li>✦ Compilation of health and safety specifications based on risks identified.</li> <li>✦ Reviewing and approval of health and safety plan(s) submitted by appointed Principal Contractor(s).</li> <li>✦ Conducting bi-monthly health and safety inspections and compiling monthly OHS reports.</li> <li>✦ Conducting monthly health and safety audits with audit reports.</li> <li>✦ Assisting the Principal Agent/Contractor in the investigation of major accident/incidents.</li> <li>✦ Monitoring of site activities for compliance to the Occupational Health and Safety Act and Regulations.</li> <li>✦ Establishment and monitoring of project health and safety file.</li> <li>✦ Monitoring the Principal Contractor(s)' health and safety performance.</li> <li>✦ Preparation of project close-out reports and submission of project health and safety files to the Client.</li> </ul>

### Site Environmental Officer (SEO)

#### The SEO will:

- ✦ Must be a senior staff member directly involved in the site construction activities appointed by the Principal Contractor.
- ✦ Be fully conversant with the Environmental Management Programme.
- ✦ Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them.
- ✦ Compilation of Method Statements together with the Principal Contractor that will specify how potential environmental impacts in line with the requirements of the EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved.
- ✦ Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the Contractor.
- ✦ Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr.
- ✦ Take appropriate action if the specifications contained in the EMPr are not followed.
- ✦ Monitor and verify that environmental impacts are kept to a minimum, as far as possible.
- ✦ Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr.
- ✦ Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr.
- ✦ 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 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.

### Principal Contractor (Including Sub-Contractors)

- ✦ Execution of Works in accordance with contract specifications.
- ✦ Complying with the environmental management specifications.
- ✦ Adhering to any instructions issued by the SEO on advice of the ECO.
- ✦ Arrange for all employees and those of sub-contractors to receive training before the commencement of construction in order that they are aware of the conditions of the EMPr.

## 5.2 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 the Contractors and Sub-contractors) to undertake the required EMPr 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 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 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.

## 5.3 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.

Monthly audits will be conducted by the Environmental Control Officer.

Compilation of a monthly audit report with a rating of the compliance with the EMPr. The ECO must keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage must be recorded in full to ensure the responsible party is held liable. The Contractor must be held liable for all unnecessary damage to the environment.

## 5.4 Reporting Procedures

### 5.4.1 Documentation

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

- ✦ Record of Complaints;
- ✦ Monitoring Checklists;
- ✦ Non-conformance Reports;
- ✦ Written Corrective Action Instructions; and
- ✦ Notification of Emergencies and Incidents.

### 5.4.2 Environmental Register

The ECO will put in place an Environmental Register, note that this may form part of the overall site construction related register.

The ECO 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; and
- ✧ Copies of all correspondence received regarding complaints / incidents.

The SEO (or the team member assigned this task) must maintain the Environmental Register that will:

- ✧ Contain environmental complaints and correspondence received from the public to the Contractor or the ECO;
- ✧ Record and report incidents that cause harm or may cause harm to the environment;
- ✧ Record all hazardous materials used on site; and
- ✧ Maintain a record of all Waste Disposal Manifests detailing the nature of the waste disposed of, the waste classification and the location of the site to which such waste was sent.

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 ECO or the Principal Agent.

## 6 Environmental Management Programme

### 6.1 Pre-Construction Phase

#### 6.1.1 Administrative and Legal Requirements

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Roles and Responsibilities for Environmental Management</b>	The overall responsibility for ensuring the implementation of this EMPr rests with the Client.	Client Client / Contractors	Daily
	Responsibility for on-site implementation of environmental management as well as the associated cost with the implementation of the EMPr rests with all appointed contractors, sub-contractors and suppliers.		Monthly
	Client and appointed contractors must ensure that all permanent and temporary staff, sub-contractors and suppliers adhere to this EMPr.	Client	Monthly
	Prior to the commencement of construction as well as during construction, appropriate signage must be erected along the roads warning both pedestrians and motorists of earthworks.	Contractors	
	The principle contractor must appoint a senior staff member directly involved in the site construction activities as the Site Environmental Officer (SEO). This person must ensure the implementation of and adherence to the EMPr in the contractor's execution of the day-to-day construction activities. This environmental responsibility must be specified in this person's duties, which will also include: <ul style="list-style-type: none"> <li>i. Liaison with the appointed Environmental Control Officer (ECO);</li> <li>ii. The onsite implementation of the EMPr;</li> <li>iii. Monitoring inappropriate behaviour, environmental impacts, including pollution and environmental incidents; and</li> <li>iv. The implementation of corrective action.</li> </ul>	Contractor	Daily
	The proposed project activities must not be in conflict with any South African legislation, Municipal plans, policies or by-laws. Thus no construction activities, beyond that approved by the relevant environmental authorisation without the approval of the ECO and the relevant competent authority, must be undertaken.	Client	Monthly
	All procedures and equipment must be used in accordance with the Occupational Health and Safety Act Regulations (OHSA) of South Africa, Act No. 85 of 1993.	Contractor / ECO	
	The Client must appoint a person with a qualification in environmental management and relevant monitoring, auditing and training experience as the ECO for the full scope of the authorisation. The ECO must be the responsible person for monitoring and reporting on compliance in respect to the implementation of the EMPr. Environmental Authorisation (EA) requirements include: <ul style="list-style-type: none"> <li>i. Monthly monitoring of activities to ensure compliance with the EMPr;</li> <li>ii. Liaison and on-going communication with the SEO;</li> <li>iii. Ensuring environmental awareness among members of the workforce;</li> <li>iv. Ensuring that the Contractor/s and members of the construction workforce are aware of the requirements of the EMPr;</li> </ul>	Client / ECO	Monthly



Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	v. Implementing preventative and corrective actions in accordance with the requirements of the EMPr and outcomes of environmental monitoring;		
	vi. Reporting of environmental incidents that may occur on site in accordance with the requirements of the EMPr and environmental legislation; and vii. Monitoring and reporting on compliance with this EMPr to the Client and relevant competent authority.		
	The contractor and SEO must inform the Client and ECO prior to the commencement of any significant construction activity.	Contractor / SEO	Daily
<b>Compliance</b>	All persons employed by the Client or their contractors, must abide by the requirements of the EMPr.	Client / Contractors	Daily
	The Client or contractor must not direct a person to undertake any activity which would place them in contravention of the specifications contained within the EMPr.	Client / Contractors	
	A fine system must be implemented for wilful negligence or non-compliance resulting in environmental degradation or pollution. The fine system must be agreed to by all parties at the outset of the construction phase. Please refer to Section 7.	Client	
<b>Environmental Training and Induction</b>	In terms of section 2(h) and (j) of the NEMA, the contractor has the responsibility to ensure all personnel involved in the project are aware of, and familiar with, the EMPr, the key environmental issues and consequences of non-compliance to the EMPr.	Contractor	Daily
	To ensure compliance to the EMPr by contractors, sub-contractors and employees, the Client must ensure that the EMPr forms part of the formal site induction for all contractors, sub-contractors and casual labourers, preferably in their native language. The induction training will, as a minimum, include the following: i. The environmental impacts, actual or potential, of their work activities; ii. The environmental benefits of improved personal performance; iii. Their roles and responsibilities in achieving compliance with the EMPr, including emergency preparedness and response requirements; and iv. The potential consequences of departure from specified operating procedures.	Client	Monthly
	All contractors, sub-contractors and casual labourers must acknowledge their understanding of the EMPr and environmental responsibilities by signing an induction attendance register.	Contractor	Monthly

### 6.1.2 No Go Areas

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>"No Go" Areas</b>	No-go areas must be agreed to in consultation between the ECO, SEO, and, Client prior to construction	SEO / ECO / Client	Daily
	During the construction phase, workers must be limited to areas under construction within the site and access to undeveloped areas.	Contractor	
	Unauthorised entry, stockpiling, dumping or storage of equipment, material or waste must be strictly prohibited in identified no-go areas.	Contractor	
	No workers must access the construction site indiscriminately via existing or newly shaped vegetated embankments. Identified or existing public access ways must be used.		
	Unauthorised access onto/into private properties is strictly prohibited.		

### 6.1.3 Construction Programme

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Construction Programme	The construction programme will need to take into account limitations of the environment in terms of construction activities.	Contractor	Daily
	The Contractor must ensure that all affected landowners / authorities are advised of the proposed programme at the beginning of the contract period. A record of notification must be provided to the Site Engineer (SE) / Project Manager (PM) / SEO and ECO.	Contractor	Monthly
	Construction activities are to be confined to normal working hours (07h00 – 18h00) Mondays to Fridays only. Longer construction period time periods may be negotiated with surrounding land-owners and tenants if so required. This time limitation does not apply to construction activities within buildings once the building-shells are in place as noise implications will under such circumstances not move outside of the building footprint.	Contractor	Daily
Information to Affected Parties	The Contractor is to make contact with those people who are directly affected by the Construction activities providing the following information: <ol style="list-style-type: none"> <li>i. When construction will take place near the affected party's property;</li> <li>ii. How the Construction will affect normal activities (residence access etc.);</li> <li>iii. Details of potential high impact activities such as blasting of rock; and</li> <li>iv. Contact information in case of emergencies.</li> </ol>	Contractor	Monthly

### 6.1.4 Site Establishment

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Contractor Site Establishment	The Contractor is to keep a thorough pre-construction photographic record prior to the commencement of any construction works. This photographic record must show the state or condition of all boundary fences. Additionally, the photographic record must show the preconstruction state or condition of the farmer's roadway servitude and the surface water features impacted upon by the construction works from the starting point to the end point of the proposed works area.	Contractor	Before Construction
	The site selected for Construction Camp (if required) should ensure that potential negative impacts on the biophysical environment are kept to a minimum.	Contractor / ECO	Monthly
	The identified construction camp (and any additional areas still to be identified and approved) must be defined, secured and limited to authorised contractors only.	Contractor	Monthly
	If the Contractor chooses to locate the camp site on private land, he must get prior written permission from both the Client and the landowner.	Contractor / ECO	Monthly
	On-site accommodation will not be required. The construction camp (if required) can thus be comprised of: <ol style="list-style-type: none"> <li>i. site office;</li> <li>ii. ablution facilities;</li> <li>iii. designated first aid area;</li> <li>iv. eating areas;</li> </ol>	Contractor	Daily

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	v. staff lockers; vi. storage areas; vii. batching plant (if required); viii. refuelling areas (if required); ix. maintenance areas (if required); and x. Crushers (if required).		
	The size of the construction camp (if required) should be minimised.	Contractor	Monthly
	Adequate parking must be provided for site staff and visitors at the Construction camp (if required).		
	Vegetation removed for any additional construction camp establishment (if required) must be kept to a minimum. No trees are to be removed with the exception of alien weeds and invader plants identified and approved by the SEO and ECO.		
	No persons, other than a night-watchman / security guard, may stay overnight at the construction camp.		
<b>Sanitation</b>	Where waterborne sewerage is not available, temporary chemical toilets must be provided by a company that has been approved by the Client. Such toilets must be available for all site staff, both at the construction camp, and on site as agreed by the Client.	Contractor / SEO / ECO	Daily
	The SEO and ECO should be consulted on the location of any temporary chemical toilets.		
	In cases where facilities are linked to existing sewage structures, all necessary regulatory requirements concerning construction and maintenance should be adhered to.	Contractor	
	Bins and/or skips must be provided at convenient intervals for disposal of waste within the construction camp as well as along the work areas.		
	Recycling and the provision of separate waste receptacles for different types of waste should be encouraged.		

### 6.1.5 Equipment and Secured Storage Areas (if required)

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Equipment and Secured Storage Areas (if required)</b>	Storage areas for material and equipment must be situated within the boundaries of the construction camp or as agreed in consultation with the SEO and ECO. These areas must be secured to prevent unintended damage or pollution to the environment.	Contractor	Daily
	Storage areas must be designated, demarcated and fenced if necessary.		Monthly
	Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by children / animals, etc.		Daily
	Definitions of hazardous substances / materials are those that are potentially: poisonous, flammable, carcinogenic or toxic. Some examples of hazardous substances / materials include:		
	i. diesel, petroleum, oil, bituminous products; ii. cement (raw form); iii. solvent based paints; iv. lubricants; v. explosives;		

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	vi. drilling fluids; vii. pesticides, herbicides; or viii. Liquefied Petroleum Gas		
	All hazardous substances must be stored within a secured storage area with impervious lining and bunding. Drip trays must be used where appropriate.		Daily
	Fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.		
	Fuel storage areas must be at least 3.5 m from any buildings, boundaries or combustible / flammable material(s).		
	Symbolic safety signs (in accordance with SABS 1186) must be erected at storage facilities and tank capacities must be clearly indicated (in accordance with SABS 0232).		
	Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.		
	Contractors must submit a method statement and plans for the storage of hazardous materials and emergency procedures.		Monthly

### 6.1.6 Material Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Source Materials</b>	Contractors must prepare a source statement indicating the sources of all materials (including topsoil, sands, natural gravels, crushed stone, asphalt, clay liners, etc.), and submit these to the Client, SEO and ECO for approval prior to commencement of any work.	Contractor	Monthly
	Where possible, a signed document from the supplier of natural materials should be obtained confirming that they have been obtained in a sustainable manner and in compliance with relevant legislation.		

### 6.1.7 Education of site Staff on General Environmental Conduct

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Environmental Education and Awareness</b>	Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: <ul style="list-style-type: none"> <li>i. What is meant by “environment”;</li> <li>ii. Why the environment needs to be protected and conserved;</li> <li>iii. How construction activities can impact on the environment;</li> <li>iv. What can be done to mitigate against such impacts;</li> <li>v. Awareness of emergency and spills response provisions;</li> <li>vi. Value of wild animals and the importance of their conservation; and</li> <li>vii. Social responsibility during construction. E.g. being considerate to local residents.</li> </ul>	Contractor / ECO	Monthly

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	<p>It is the ECO's responsibility to provide site managers with environmental training and to ensure that the managers/foremen have sufficient understanding to pass this information onto the construction staff:</p> <ul style="list-style-type: none"> <li>i. Translators are to be used where necessary;</li> <li>ii. The Client should be on hand to answer questions;</li> <li>iii. The use of pictures and real-life examples is encouraged as these tend to be more easily remembered;</li> <li>iv. Use should be made of environmental awareness posters on site;</li> <li>v. Construction workers should be made aware that they are not to make excessive noise (e.g. Shouting / hooting) when the site is near to commercial / residential areas; and</li> <li>vi. The need for a "clean site" policy also needs to be explained to the construction workers.</li> </ul>		
<b>Worker Conduct on Site</b>	<p>A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules:</p> <ul style="list-style-type: none"> <li>i. No alcohol / drugs to be present on site;</li> <li>ii. No firearms or hunting weapons allowed on site or in vehicles transporting staff to / from site, (unless used by security personnel);</li> <li>iii. Prevent excessive noise;</li> <li>iv. Prevent unsocial behaviour;</li> <li>v. Bringing pets onto the site is forbidden;</li> <li>vi. No harvesting of firewood from the site or from the areas adjacent to it;</li> <li>vii. Construction staff is to make use of the facilities provided for them, as opposed to ad-hoc alternatives. (e.g.: fires for cooking; the use of surrounding bush as a toilet facility is forbidden);</li> <li>viii. Trespassing on private / commercial properties adjoining the site is forbidden;</li> <li>ix. Driving under the influence of alcohol is prohibited; and</li> <li>x. Other than pre-approved security staff, no workers must be permitted to live on site.</li> </ul>		

### 6.1.8 Fire Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Fire Management</b>	<p>The workforce must be made aware of fire prevention and fire fighting measures, including the position and usage of fire extinguishers and on-site fire hydrants, etc. Cross links to the Occupational Health and Safety requirements to be confirmed and enforced – requirements in terms of OHS must prevail.</p>	Contractor	Monthly

### 6.1.9 Conservation of Resources

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Conservation of Resources	Energy saving initiatives must be implemented. These could include timers or day/night switches on lighting or solar panel lighting.	Client	Monthly
	Water saving devices must be installed at new and upgraded ablution facilities.		

### 6.1.10 Pollution Control Measures

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Pollution Control Measures	The Contractor must prepare an emergency procedure and a procedure for the management e.g. storage, decanting and disposal of hazardous substances.	Contractor	Monthly
	Holding tanks containing fuel, hydrocarbon, chemicals must be bunded and lined to contain any spillages. The containment volume must be 110% of the total volume stored in the tanks.		
	Fifty kilograms (50 kg) of hydro carbon absorbent to be stored at the construction camp at all times.		

### 6.1.11 Solid Waste Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
General Waste	Facilities for solid waste collection are to be provided.	Contractor	Monthly
	The Contractor is to institute a daily litter collection programme. The collected waste is to be disposed of regularly and proportionately to its generation at a licensed site designed for waste disposal.		
	No burning of waste will be permitted on any site.		
Sanitation	The Contractor is to ensure that suitable toilets are provided, however, these cannot be located within 100 m of the watercourse.	Contractor	Monthly
	The Contractor is to advise all staff and sub-contractors that use of the surrounding environment for urination or defecation is strictly prohibited.		
Wastewater	Water containing waste must not be discharged into the natural environment. Measures to contain the water containing waste and safely dispose of it must be implemented.		

### 6.1.12 Water Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Water Management	To prevent storm water damage, the increase in storm water run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan must be submitted to the Client for approval and must include the location and design criteria of any temporary stream crossings (siting and return period, etc.)	Contractor	Monthly
	During site establishment, storm water culverts and drains are to be located and covered with metal grids to prevent blockages if deemed necessary by the Engineer.		
	After construction, the site should be contoured to ensure free flow of runoff and to prevent ponding of water.		

### 6.1.13 Protection of Fauna and Flora

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Fauna and Flora	No vegetation may be cleared without prior permission from the Client / SEO / ECO.	Contractor ECO	Monthly
	Trees that are not to be cleared should be marked beforehand with danger tape. The ECO must be given a chance to mark vegetation that is to be conserved before the Contractor begins clearing the site.		
	Disturbance to birds, animals and reptiles and their habitats should be minimised wherever possible.		
	No large trees are to be removed, cut or pruned for any construction activities, unless they are classified as an invader species or are part of the approved removal and transplanting program.		
	The contractor must ensure that all remaining indigenous tree species (dead and alive) and shrubs are retained wherever possible.		
Sensitive Habitats	Trees and shrubs to be conserved must be clearly marked and demarcation must remain in place for the duration of construction.		
	Areas which are identified by the Client or the ECO as being ecologically sensitive are to be suitably demarcated to prevent damage by plant equipment and labour. Temporary "Bonnox" type fencing (i.e. sturdy welded mesh wire fencing) should be used and should be moved in phases as the construction progresses from one area to the next.		

### 6.1.14 Public and Workforce Safety

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Public and Workforce Safety	Dedicated pathways (temporary) for pedestrians must be developed to ensure safe passage around construction activities.	Contractor	Monthly
	The dangers associated with construction site entry and exit points and public access must be given special consideration.		
	All construction workers handling chemical or hazardous substances must be trained in the use of such substances and the environmental, health and safety consequences of incidents.		

### 6.1.15 Social Impacts

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Social Impacts	Disruption of access for local residents must be minimised and must have the Client's permission.	Contractor	Monthly
	The Contractor is to inform neighbours of disruptive activities at least 24 hours beforehand. This can take place by way of posters placed in appropriate positions giving the Client's and Contractor's details, by way of notice in the local newspaper, direct letter-drop to nearby properties, or, any other method approved by the Client.		
	Local communities or local community organisations must be given preference in supplying services and labour to the construction activities. A roster of "temporary labour" must be kept indicating "origin" of employee.		



## 6.2 Construction Phase

### 6.2.1 Administrative and Legal Requirements

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Roles and Responsibilities for Environmental Management	Refer to Section 6.1.1	SEO	Daily
	In addition, the SEO must provide evidence to the ECO that the EMPr is being implemented and adhered to (either through inspections sheets or audit reports)		
Compliance	Refer to Section 6.1.1		
Environmental Training / Induction	Refer to Section 6.1.1		
Review	The ECO and SEO must consult and review implementation progress as well as discuss and resolve inter alia environmental concerns, non-compliance (including environmental incidents) and I&AP issues raised.	ECO / SEO	

### 6.2.2 Site Establishment

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Site Establishment	Refer to Section 6.1.4	Contractor	Once Off
	All areas disturbed outside of the demarcated areas or without permission of the Site Environmental Officer, ECO and Engineer will be subject to a fine.		
	All construction activities must be strictly limited to the construction area.		
	Unauthorised stockpiling, dumping or storage of equipment or materials must not be strictly prohibited within the demarcated “no go” areas.		
Sanitation	Refer to Section 6.1.4	Contractor	Ongoing
	Chemical toilets are to be maintained in a clean state and should be moved to ensure that they adequately service the work areas		
	The construction of “long drop” toilets is forbidden.		
	Under no circumstances may open areas or the surrounding bush be used as a toilet facility.		
	Bins should have liner bags for efficient control and safe disposal of waste.		
	The Contractor must ensure that all litter is collected from the work and camp areas daily.		
	Bins and/or skips should be emptied regularly and waste should be disposed of at a registered landfill site. Waybills for all such disposals are to be kept by the Contractor for review by the Engineer / Site Environmental Officer /ECO.		
A registered chemical waste company is to be used to remove waste from chemical toilets on site.			

### 6.2.3 Equipment, Vehicle Maintenance Yard and Secured Storage Areas (if required)

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Equipment, vehicles and storage</b>	<p><b>Refer to Section 6.1.5</b> Note that vehicle maintenance should by preference not take place on the site. If emergency repairs are required to vehicles or construction plant then the conditions as specified below should be implemented.</p>	Contractor	Ongoing
	Fire prevention facilities must be present at all storage facilities.		
	Material Safety Data Sheets (MSDSs) must be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.		
	An oil balance must be implemented to demonstrate appropriate management of hydrocarbons.		
	Plant and equipment must be adequately maintained to prevent spillage of oil, diesel, fuel or hydraulic fluid. The Contractor must repair or withdrawn equipment or machinery from use if they consider these to be polluting and irreparable.		
	Suitably covered receptacles must be available at all times and conveniently placed for the disposal of waste oils and greases. All used oils, grease or hydraulic fluids must be placed therein and these receptacles must be removed from the construction camps on a regular basis for recycling.		
	A procedure for the management of oils spills must be introduced. This should address the cleaning of spillage from hard surfaces, utilising environmental friendly cleaning materials as well as the removal and disposal of polluted sand.		
	Fuel must be stored in tanks with lids, which will be kept firmly shut and under lock and key at all times, within a secondary containment facility.		
	Fuel decanting and refuelling must take place within the construction camp. 50kg of hydrocarbon absorbent to be placed at the construction camp.		
No smoking must be allowed in the vicinity of storage or dispensing areas.			
<b>Handling of Hazardous Materials</b>	All concrete mixing must take place on a designated, impermeable surface.	Contractor	Ongoing
	No vehicles transporting concrete to the site may be washed on site.		
	No vehicles transporting, placing or compacting asphalt or any other bituminous product may be washed on site.		
	Lime and other powders must not be mixed during excessively windy conditions.		
	All substances required for vehicle maintenance and repair must be stored in sealed containers until they can be disposed of / removed from the site.		
	Hazardous substances / materials are to be transported in sealed containers or bags.		

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Spillages</b>	<p>It is important that any significant spillages of chemicals, fuels, etc. during the construction phase are reported to this office and other relevant authorities. In the event of a spill, the following steps can be taken:</p> <ol style="list-style-type: none"> <li>i. Stop the source of the spill</li> <li>ii. Contain the spill</li> <li>iii. All significant spills must be reported to this Department and other relevant authorities</li> <li>iv. Remove the spilled product for treatment or authorised disposal</li> <li>v. Determine if there is any soil, groundwater or other environmental impact</li> <li>vi. If necessary, remedial action must be taken in consultation with this Department</li> <li>vii. Incident must be documented</li> </ol>	Contractor	Ongoing

### 6.2.4 Stockpile Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Stockpile Management</b>	Stockpiles should not exceed 2 m in height unless otherwise permitted by the Client.	Contractor	Monthly
	If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases.		
	Overburden and sub soil must be stored separately from topsoil.		
	Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding.		

### 6.2.5 Fire Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Fires</b>	No open fires or uncontrolled fires must be permitted on site. Open fires for cooking / heating purposes must be strictly prohibited.	Contractor	Ongoing
	The contractor must ensure that adequate fire-fighting equipment (i.e. fire extinguishers and existing fire hydrants) is present on the site all times and in good working order.		
	The workforce must be made aware of fire prevention and fire fighting measures.		
	Any flammable material must be stored in areas where it does not present a fire hazard to surrounding vegetation and people. This includes bitumen, thinning agents, petrol, LPG containers, fuels and oils.		

## 6.2.6 Pollution Control Measures

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Pollution Control Measures	<b>Refer to Section 6.1.10</b>	Contractor	Ongoing
	Material Safety Data Sheets (MSDSs) for onsite chemicals, hydrocarbon materials and / or waste and hazardous substances must be readily available. MSDSs should include information pertaining to environmental impacts and measures to minimise and mitigate against any potential environmental impacts which may result from an incident.		
	Static tanks containing fuel, oil, grease or bituminous material must be confined to the construction camp until required.		
	These containment facilities must be checked and maintained at all times.		
	Rain water collected within these containment facilities can be released, if not contaminated. If the contents of containment facilities are contaminated, the material must be removed and disposed of as hazardous waste.		
	The contractor must exercise suitable precautions with the storage, handling and transport of all materials that could adversely affect the environment. If pollution of any surface or groundwater occurs, it must immediately be reported in accordance with the incident reporting and communication procedure and appropriate mitigation measures must be employed.		
	In the case of a spill of hydrocarbons, chemicals or bituminous material in the contractor's camp or at the construction sites, the spill should to be contained and the material together with any contaminated soil / sand collected and disposed of as hazardous waste.		
	Should a pollution incident occur on site the Site Environmental Officer and ECO must: <ul style="list-style-type: none"> <li>i. Ensure the immediate implementation of reasonable measures to contain and minimise the impacts of the incident;</li> <li>ii. Notify all persons as per the procedure;</li> <li>iii. Undertake clean up procedures immediately;</li> <li>iv. Record the incident in the Environmental Incident Register; and</li> <li>v. Implement measures to prevent similar incidents from occurring in the future.</li> </ul>	SEO / ECO	On incident

## 6.2.7 Solid Waste Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
General Waste	The waste management strategy will be agreed to with the Site Environmental Officer and ECO, and will include, but is not limited to, the re-use and recycling of any solid waste generated in construction activities.	Contractor	Weekly
	Recyclable waste must be separated, reused and recycled at approved facilities. Proof must be available.		
	Different waste bins, for different waste streams, must be provided to ensure correct waste separation.		
	All non-recyclable solid waste must be disposed of at a permitted landfill site, and proof must be available and presented to the ECO at the monthly site visits.		
	No building rubble must be used for any infilling work.		

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	<p>Littering must be prohibited and dumping of any waste must not be allowed in undeveloped or open areas.</p> <p>No waste material must be burned, buried in the sand or disposed of in any area that is not a licensed landfill site.</p> <p>General waste produced on site may include:</p> <ul style="list-style-type: none"> <li>i. Office waste (e.g. paper, plastic);</li> <li>ii. Operational waste (e.g. geofabric material, wood);</li> <li>iii. Overburden (Spoil); and</li> <li>iv. General domestic waste (food, cardboards, paper, bottles, tins).</li> </ul> <p>An adequate number of general waste receptacles must be available at the contractor's camp and on site to collect waste from restoration activities and employees and to prevent littering.</p> <p>All general waste must be removed from the restoration areas on a daily basis and disposed of in suitable waste receptacles at the contractor's camp.</p> <p>Bins must be clearly marked and lined for efficient control and safe disposal of waste.</p> <p>Hazardous waste must not to be mixed or combined with general waste earmarked for recycling or disposal at a licensed landfill site.</p> <p>Waste bins should be cleaned out on a regular basis to prevent any windblown waste and/or visual or odour disturbance.</p>		
<b>Sewage / Waste Water and Infrastructure</b>	<p>Discharge of waste from temporary chemical toilets into the environment must be strictly prohibited.</p>	Contractor	
<b>Hazardous Waste</b>	<p>Hazardous waste produced on site may include:</p> <ul style="list-style-type: none"> <li>i. Oil and other lubricants, diesel, paints and solvent;</li> <li>ii. Containers that contained chemicals, oils or greases; and</li> <li>iii. Equipment, steel, other material (rags), soils and water contaminated by hazardous substances (oil, fuel, grease or chemicals).</li> </ul> <p>Mixing / decanting of all chemicals / hazardous substances must take place either on a tray / container with an impermeable surface.</p> <p>Hazardous waste is to be disposed at a Permitted Hazardous Waste Landfill Site. The contractor must provide proof of disposal.</p> <p>Hazardous waste bins must be clearly marked, stored in a contained area (or have a drip tray) and covered (either stored under a roof or the top of the container must be covered with a lid).</p> <p>It may be feasible for the waste to be transported to a central point where it can be collected in bulk by the waste disposal company. It should however be noted that:</p> <ul style="list-style-type: none"> <li>i. Transport of hazardous materials must be done in accordance with legislative control; and</li> <li>ii. Relevant SABS Codes of Practice must be adhered to.</li> </ul>	<p>Contractor</p> <p>Contractor / ECO</p> <p>Contractor</p>	

## 6.2.8 Erosion and Sedimentation Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Erosion	Soil / sand erosion through contractor activities must be prevented.	Contractor	Weekly
	Suitable erosion control measures must be implemented in areas sensitive to erosion i.e. storm water discharge points and embankments. These measures could include: <ul style="list-style-type: none"> <li>i. The suitable use of sand bags or soil saver;</li> <li>ii. The prompt rehabilitation of exposed sand / embankment areas (with indigenous vegetation for example where appropriate);</li> <li>iii. The removal of vegetation, only as it becomes necessary for work to proceed;</li> <li>iv. Preventing the unnecessary removal of vegetation especially on steep areas; or</li> <li>v. Taking necessary precautions in terms of design, construction and earthworks.</li> </ul>	Contractor	
	The time that stripped areas are left open to exposure should be minimised wherever possible. Care should be taken to ensure that lead times are not excessive.		
	Wind screening and storm water control should be undertaken to prevent soil loss from the site.		
	Procedures that are in place to conserve topsoil during the construction phase of the project are to be applied to the set up phase. I.e. topsoil is to be conserved while providing access to the site and setting up the camp.		
	Should the importation of sand from external sources commercial sources be required, these must only be obtained from licensed sand winning operators. Proof of license must be obtained for auditing purposes.		
	Any sand made available from external sources for restoration work must be approved by the Site Environmental Officer and ECO, in consultation with a specialist, prior to acceptance of delivery by the contractor.		
	The stormwater management plan must be adhered to at all times.		

## 6.2.9 Water Management

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Storm water	Temporary cut off drains and berms may be required to capture storm water and promote infiltration.	Contractor	Ongoing
	Storm water pipelines must be consolidated where possible to reduce the number of discharge points within an area.		
	Earth, stone and rubble is to be properly disposed of so as not to obstruct natural water pathways over the site. I.e. these materials must not be placed in storm water channels, drainage lines or rivers.	Contractor/ ECO	
	There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed	Contractor	
	The stormwater management plan must be adhered to at all times.		
Water Quality	Storage areas that contain hazardous substances must be bunded with an approved impermeable liner.	Contractor	
	Spills in bunded areas must be cleaned up, removed and disposed of safely from the bunded area as soon after detection as possible to minimise pollution risk and reduced bunding capacity.		

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	A designated, bunded area is to be set aside for vehicle washing and maintenance. Materials caught in this bunded area must be disposed of to a suitable waste site or as directed by the Client.		
	Provision should be made during set up for all polluted runoff to be treated to the Client's approval before being discharged into the storm water system.		
	Washing of clothes, equipment or machinery within any watercourse is prohibited.		
	Mixing / decanting of all chemicals and hazardous substances must take place either on a tray or on an impermeable surface. Waste from these should then be disposed of to a suitable waste site.		
	Every effort should be made to ensure that any chemicals or hazardous substances do not contaminate the soil or ground water on site.		
	Care must be taken to ensure that run-off from vehicle or plant washing does not enter the ground water. Wash water must be passed through a hydrocarbon-removing trap prior to being discharged as effluent to a regular municipal sewer.		
	Site staff must not be permitted to use any stream, river, other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. Municipal water (or another source approved by the Client) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.		
	The riparian corridor outside the area required for construction of the abstraction facility must be maintained as a strict no-go area for construction workers and machinery.		
	Should water need to be abstracted from the stream for construction this must only occur if authorised by the DWA.		
	No concrete batching or chemical/fuel storage areas are to be located within 100m of a surface water feature.		
	No temporary construction access is to be constructed through any surface water feature and no machinery may enter any wetland area unless preauthorised to do so by the ECO.		
	Watercourse channels and other parts of any surface water feature must be restored to the preconstruction state.		

### 6.2.10 Air Quality

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Air Quality	Construction sites may become sources of wind generated dust and dust suppression techniques must be implemented when necessary.	Contractor	Monthly
	Reasonable speed limits must be maintained at all times in order to prevent accidents, excessive noise and dust and road fatalities of migrating animals.		
	No burning of waste, such as plastic bags, cement bags and litter, must be permitted at the contractor or restoration sites.		
	A complaints register must be provided to report any excessive dust incidents.		

### 6.2.11 Noise

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Noise	Construction activities must be undertaken according to working hours stipulated by the Client i.e. during daylight or at night.	Contractor	Ongoing
	Construction vehicles and equipment generating excessive noise must be fitted with appropriate noise abatement measures.		
	Construction workers must be provided with the appropriate PPE, i.e. ear plugs.		
	A complaints register must be provided to record any complaints regarding excessive noise.		
	All complaints received must be investigated and a response given to the complainant within 14 days.	Contractor / ECO	

### 6.2.12 Protection of Fauna and Flora

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Fauna and Flora	<b>Refer to Section 6.1.13</b>	Contractor	Ongoing
	Care must be taken to avoid the introduction of alien plant species to the site and surrounding areas. (Particular attention must be paid to imported material).		
	No natural vegetation is to be collected for use as firewood		
	No animals are to be disturbed unnecessarily and no animals are allowed to be shot, trapped or caught for any reason.		
	Fines must be imposed and immediate dismissal on any contract employee who is found attempting to snare or otherwise harm faunal species.		

### 6.2.13 Areas of Specific Importance

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Archaeological Sites	If an artefact on site is uncovered, work in the immediate vicinity must be stopped immediately.	Contractor	On event
	In the event of any further site/feature being found in the course of the development, SAHRA must be contacted immediately so that the find can be investigated and mitigation measures recommended.		
	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 Site Environmental Officer or ECO of such discovery.		
	Work may only resume once clearance is given in writing by the archaeologist / heritage specialist.		
	If a grave or midden is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the graves / middens must be stopped and the Client or ECO informed of the discovery.		
	The project proponent will, in the case of graves, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.		



## 6.2.14 Public and Workforce Safety

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
General	<b>Refer to Section 6.1.14</b>	Contractor	Ongoing
	Construction activities should be undertaken according to working hours stipulated by the Client i.e. during daylight or at night.		
	Flag men must be appointed and provide ample warning of road hazards.		
	All members of the construction workforce working on the site or near the roads must be provided with the appropriate high visibility clothing to ensure that can be seen by motorists.		
	The workforce must be provided with sufficient potable water and under no circumstances are they to use untreated water from local watercourses for drinking.		
	The workforce must be made aware of possible hazards associated with sewage spillage within the areas of restoration work. The workforce must be monitored for ill health associated with exposure to sewage contaminated areas.		
	Care must be taken with electrical connections. All connections must be treated as live until confirmed otherwise.		
Fencing	The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.	Contractor	Ongoing
	Confined sites should be fenced and manned to control the access of persons to the site. Potentially hazardous areas such as trenches are to be demarcated and clearly marked.		

## 6.2.15 Social Impacts

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Disruption of Infrastructure and Services	<b>Refer to Section 6.1.15</b>	Contractor	Ongoing
	Contractor's activities and movement of staff is to be restricted to designated construction areas.		
	Should construction staff be approached by members of the public or other stakeholders, they should assist them in locating the Client or Contractor, or provide a number on which they may contact the Client or Contractor.		
	The conduct of the construction staff when dealing with the public or other stakeholders must be in a manner that is polite and courteous at all times. Failure to adhere to this requirement may result in the removal of staff from the site by the Client.		
Visual	Disruption of access for local residents must be minimised and must have the Client's permission.	Contractor	Ongoing
	Storage facilities, elevated tanks and other temporary structures on site should be located such that they have as little visual impact on local residents as possible.		
	In areas where the visual environment is particularly important the construction sites may require screening in the form of shade cloth or other suitable materials prior to the beginning of construction.		
	Special attention should be given to the screening of highly reflective materials on site.		
	Lighting on site is to be set out to provide maximum security and to enable easier policing of the site, without creating a visual nuisance to local residents or businesses.		

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
	Lighting on the construction site should be pointed downwards and away from oncoming traffic and nearby houses.		

### 6.2.16 Monitoring, Reporting and Record Keeping

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Environmental Monitoring and Record Keeping</b>	Environmental monitoring must be undertaken by the Site Environmental Officer on a daily basis and by the ECO on a monthly basis. This monitoring will be undertaken in order to ensure compliance with all aspects or requirements of the EMPr.	SEO / ECO	As specified
	The Contractor must provide proof of disposal of building rubble, domestic waste, industrial waste and hazardous waste to licensed waste disposal or recycling facilities.	Contractor	As specified
	The ECO / Environmental Assessment Practitioner must review and update the EMPr, as required and communicate the changes to the relevant competent authority, and Contractor.	ECO / EAP	
	<b>Complaints register and environmental incident book</b>	Complaints received from the community and other I&APs must be registered and recorded by the Site Environmental Officer and brought to the attention of the Site Environmental Officer, ECO and contractor. All relevant parties must respond accordingly. The following information must be recorded in the case of any complaint/incident: <ul style="list-style-type: none"> <li>i. Time, date and nature of complaint;</li> <li>ii. Response and investigation undertaken; and</li> <li>iii. Corrective and preventative actions taken and by whom.</li> </ul>	SEO / ECO / Contractor
All complaints received must be investigated and a response given to the complainant within 14 days.		ECO / Contractor	As specified
All environmental incidents occurring on the site must be recorded in an Environmental Incident Book.		SEO / ECO	On event

### 6.2.17 Pollution Control and Emergency Procedures

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Pollution Control and Emergency Procedures</b>	The Contractor must ensure that relevant pollution control and emergency procedures are developed and the workforce trained on these procedures to ensure that correct actions are followed during pollution or emergency situations.	ECO	Ongoing
	Materials such as fuels, paints and chemicals used in the construction phase must be carefully stored and handled to minimise the risk of spillage into the environment.	Contractor	
	Any soil contaminated during construction must be removed and disposed of at a licensed disposal site.		On event

## 6.3 Rehabilitation Phase

### 6.3.1 General

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
General	A meeting is to be held on site between the Engineer, Site Environmental Officer, ECO and the Contractor to approve all remediation activities and to ensure that the site has been restored to a condition approved by the Engineer.	Contractor	Ongoing
	All areas where temporary services were installed are to be rehabilitated to the satisfaction of the Engineer.		
	Once rehabilitation has been carried out, a post-construction audit is to take place to ensure final compliance. The contractor is to rectify any non-compliance found by this audit, prior to vacating the site.		

### 6.3.2 Administrative Requirements

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Final Payment	Payment of the final invoice to contractors must not be made until a final inspection by the Site Environmental Officer and ECO is made and it has been confirmed that the work has been completed in accordance with the scope of work and EMP.	ECO	On closure

### 6.3.3 Site Clean-up

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Site Clean-up	Upon completion of the project or decommissioning of the construction camp, the sites must be rehabilitated to the pre-use or determined purpose for the areas. If required, the surface must be ripped and re-vegetated. Any temporary linkages to the water borne sewerage system are to be closed and the area rehabilitated.	Contractor	Daily
	All structures comprising the construction camp are to be removed from site.		
	The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint etc. and these should be cleaned up.		
	All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area must be top-soiled and re-grassed.		
	The Contractor must arrange the cancellation and removal of all temporary services.		
	All temporary chemical toilets should be removed from the construction camp and be disposed in an appropriate manner.		

### 6.3.4 Vegetation

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Vegetation	All areas that have been disturbed by construction activities (including the construction camp area) must be cleared of alien vegetation.	Contractor	Ongoing
	Open areas are to be re-planted as per the re-vegetation specification.		
	Alien invasive vegetation management is to be undertaken on a bi-annual (every 6 months) basis within the servitude during the operational phase.		
	All vegetation that has been cleared during construction is to be removed from site or used as much as per the re-vegetation specification, (except for seeding alien vegetation).		
	The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.		

### 6.3.5 Land Rehabilitation

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Land Rehabilitation	All surfaces hardened due to construction activities are to be ripped and imported materials thereon removed.	Contractor	Ongoing
	All rubble is to be removed from the site to an approved disposal site. Burying of rubble on site is prohibited.		
	The site is to be cleared of all litter.		
	Surfaces are to be checked for waste products from activities such as concreting or asphaltting and cleared in a manner approved by the Engineer.		
	All embankments are to be trimmed, shaped and replanted to the satisfaction of the Engineer.		
	The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials		

### 6.3.6 Material and Infrastructure

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
Material and Infrastructure	Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer.	Contractor	On closure
	All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer.		
	All leftover building materials must be returned to the depot or removed from the site.		
	The Contractor must repair any damage that the construction works has caused to neighbouring properties and services.		

### 6.3.7 Rehabilitation

Environmental Aspect	Environmental Measures and Action Plans	Responsibility	Monitoring Frequency
<b>Rehabilitation</b>	All damaged embankments must be shaped to an angle of repose not exceeding 35°, but preferably between 19° and 24° slope.	Client	Ongoing
	Embankments must be vegetated with indigenous vegetation as per site instructions.		Monthly
	All established vegetation must be monitored on a monthly basis by the Site Environmental Officer until properly established and appropriate actions must be implemented to address poor establishment as per Site Environmental Officer recommendations.		
	Final rehabilitation of contractor sites must be completed within a period specified by the Client.	Contractor	As specified
	The Contractor is to water and maintain all planted vegetation until the end of the defects liability period and is to submit a method statement regarding this to the Engineer.		

## 7 Fines and Penalties

Failure to conform to the conditions set out in the EMPr will result in the issuing of fines to the Contractor / Site Manager by the Principle Agent. These fines will be paid by the Contractor and will be used in the rehabilitation or landscaping of the site.

The final amount, however, will be quantified by the Project Manager prior to going on site. The values below are thus deemed to be a useful point of departure from which site and task appropriate values can be quantified.

Note that the escalation factor in terms of repeat offences also needs to be determined (e.g. doubling to a maximum combined value for a set of activities), and the point at which on repeat offence the contractor / sub-contractor is required to move off site.

**Table 4: Fine system to be implemented**

Offence	Amount
Failure to demarcate working areas	R10,000
Working outside of demarcated areas	R30,000
Failure to strip topsoil with intact vegetation	R50,000
Failure to stockpile topsoil correctly	R30,000
Failure to stockpile materials in designated areas	R10,000
Failure to take measures to prevent soil contamination	R10,000
Failure to take measures to control dust dispersion on site	R10,000
Washing of vehicles on site	R10,000
Pollution of water bodies and/or groundwater	R20,000
Failure to implement stormwater management provisions during construction	R20,000
Failure to control stormwater runoff	R30,000
Downstream erosion	R30,000
Failure to provide adequate sanitation	R10,000
Failure to erect temporary fences around trenches	R10,000
Failure to provide adequate waste disposal facilities and services	R50,000
Failure to reinstate disturbed areas within the specified time-frame	R30,000
Any other contravention of the project specific specification	R10,000

## 8 Declaration of Understanding of the EMPr

A declaration of understanding of the EMPr will be required to be signed by the Client, Engineers, and Contractors. A sample of this declaration is found below.

**DECLARATION OF UNDERSTANDING  
OF THE  
ENVIRONMENTAL MANAGEMENT PROGRAMME**

I, \_\_\_\_\_  
acting as Client / Engineer / Contractor / ECO representing \_\_\_\_\_  
\_\_\_\_\_

declare that I have read and understood the contents of the Environmental Specifications (which include the Environmental Management Programme, the Record of Decision and the Amended Environmental Authorisation, the Project Specifications and this guideline document) for:

Contract \_\_\_\_\_

I also declare that I understand my responsibilities in terms of enforcing and implementing the Environmental Specifications for the aforementioned Contract.

Signed: \_\_\_\_\_

Place: \_\_\_\_\_

Date: \_\_\_\_\_

Witness 1: \_\_\_\_\_

Witness2: \_\_\_\_\_