

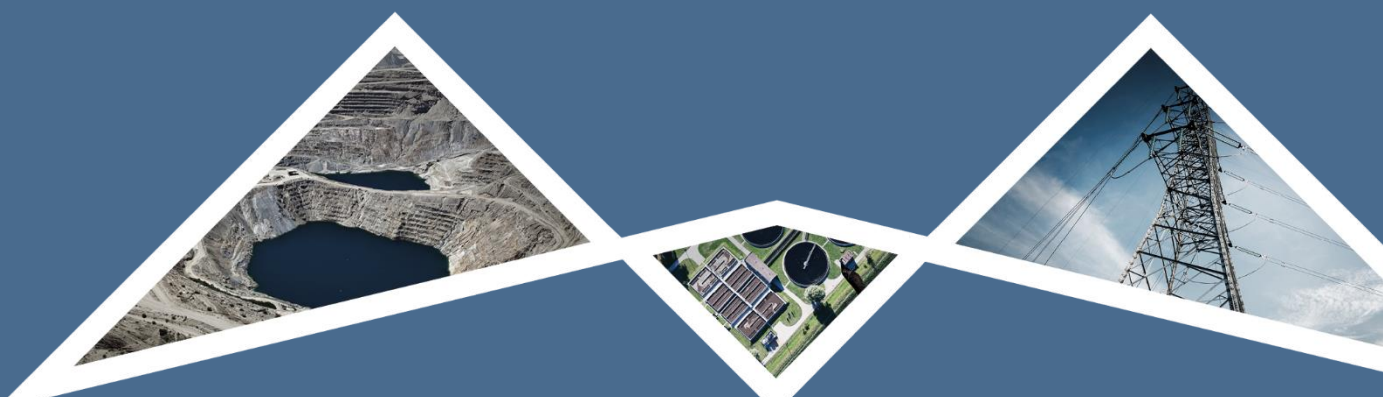


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# ENVIRONMENTAL MANAGEMENT PROGRAMME

MINE WASTE SOLUTIONS RECLAMATION PUMP STATION AND  
ASSOCIATE PIPELINES PROJECT





#### DOCUMENT DETAILS

**EIMS REFERENCE:** 1542

**DOCUMENT TITLE:** Environmental Management Programme for the MWS Reclamation Pump Station and associated Pipelines Project

#### DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
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#### REVISION AND AMENDMENTS

REVISION DATE:	REV #	DESCRIPTION
<b>2023/02/10</b>	ORIGINAL DOCUMENT	Draft EMPr for public review and comment
<b>2023/05/24</b>	ORIGINAL DOCUMENT	Final EMPr for public review and comment



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## List of Abbreviations

BA	:	Basic Assessment
DFFE	:	Department of Forestry, Fisheries and the Environment
DWS	:	Department of Water and Sanitation
EA	:	Environmental Authorisation
EAP	:	Environmental Assessment Practitioner
ECO	:	Environmental Control Officer
EIA	:	Environmental Impact Assessment
EIMS	:	Environmental Impact Management Services Pty (Ltd)
EMPr	:	Environmental Management Programme
EO	:	Environmental Officer
LoM	:	Life of Mine
MWS	:	Mine Waste Solutions
NB	:	Nominal Bore
NEMA	:	National Environmental Management Act
NEM:WA	:	National Environmental Management Waste Act
PPE	:	Personal Protective Equipment
PPP	:	Public Participation Process
TSF	:	Tailings Storage Facility



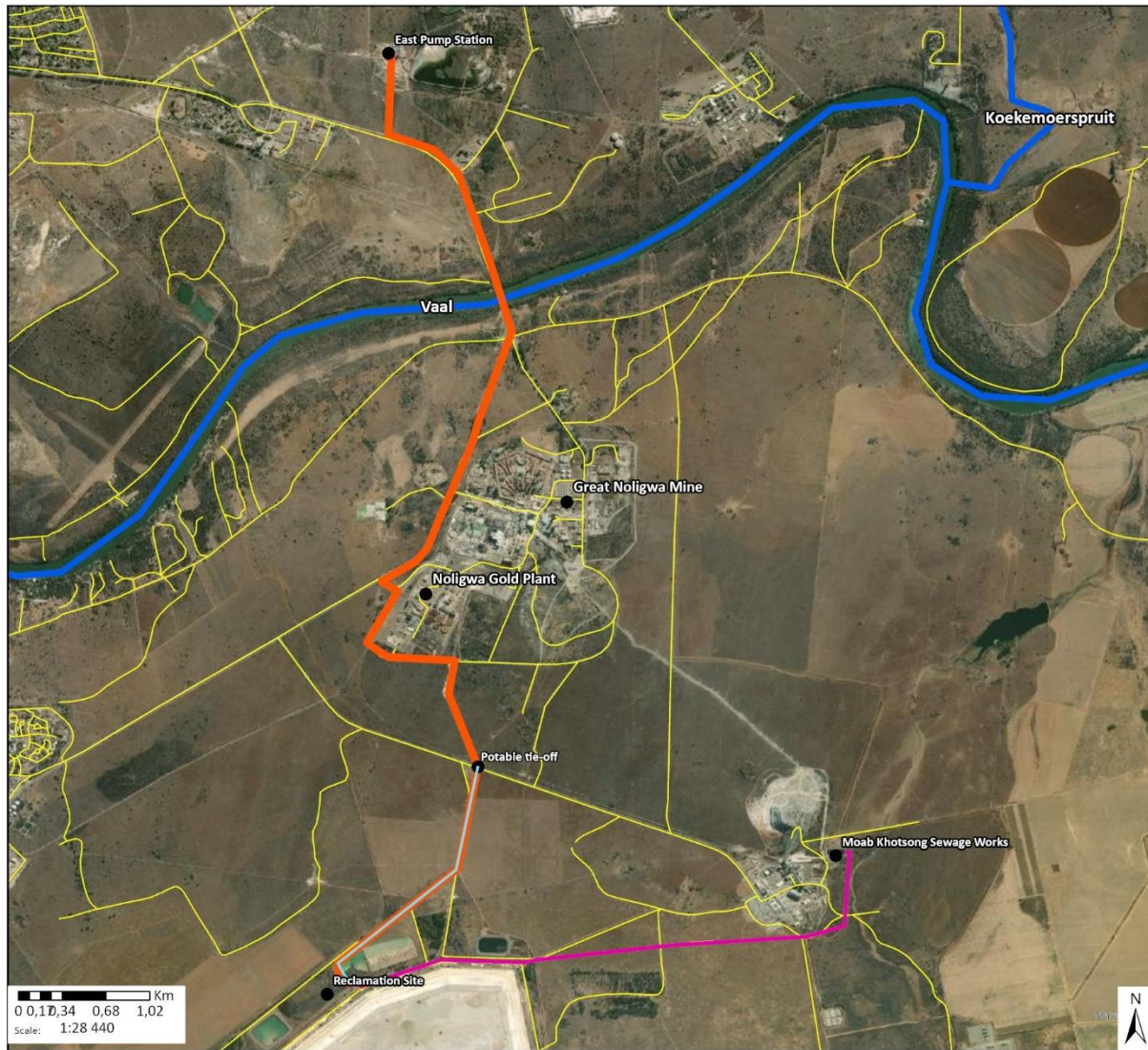
## 1 INTRODUCTION

Environmental Impact Management Services (Pty) Ltd (EIMS) has been appointed to undertake a Basic Assessment Process and to subsequently prepare an Environmental Management Programme (EMPr) for the Mine Waste Solutions (MWS) development of a reclamation pump station and installation of additional pipeline infrastructure to meet the planned Life of Mine (LoM) production through increasing the volume of return water from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station Return. A typical EMPr is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and that the positive benefits of the projects are enhanced. This EMPr has been compiled as a guideline for the mitigation and management measures to be implemented to avoid, reduce and minimise potential environmental impacts arising out of the construction and operational phases of the project. Refer to Figure 1 for a locality map and Figure 2 for a sensitivity map for the proposed project.

## 2 SCOPE OF THIS DOCUMENT

An EMPr is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are minimised, and that the positive benefits of the projects are enhanced. This EMPr has been compiled as a guideline, in accordance with the Environmental Impact Assessment Regulations (GN R982 of 2014 as amended) for the requirements of an EMPr, to establish the mitigation and management measures that need to be implemented to avoid, reduce and minimise potential environmental impacts arising out of any of the phases applicable to the project.

It should be noted, that an EMPr is a working document that should be updated on a regular basis, as and when necessary. The EMPr thus supports an on-going proactive mitigation approach and duty of care to the environment. The EMPr shall allow for risk minimization and will ensure legal compliance. This EMPr will also allow the user to make minor amendments to ensure continual revision and improvement of risk mitigation through the continual re-assessment of risks associated with the activity.



### Locality Map

1542 Harmony Mispah TSF Reclam and Pipelines EIA WULA

- Places
- Roads
- Rivers
- Name
- Reclamation Pipelines
- Sewage Pipeline
- Potable Water Pipeline

Data Sources:  
CSG; ESRI  
Coord System: GCS WGS 1984  
Datum: WGS 1984  
Units: Degree  
Ref: 1542\_Locality Map\_Update

Date: 2022/11/10  
EIMS Ref: 1542  
Compiled: CM  
Reviewed: JP  
Approved: LW



Figure 1: Locality of the proposed pipelines

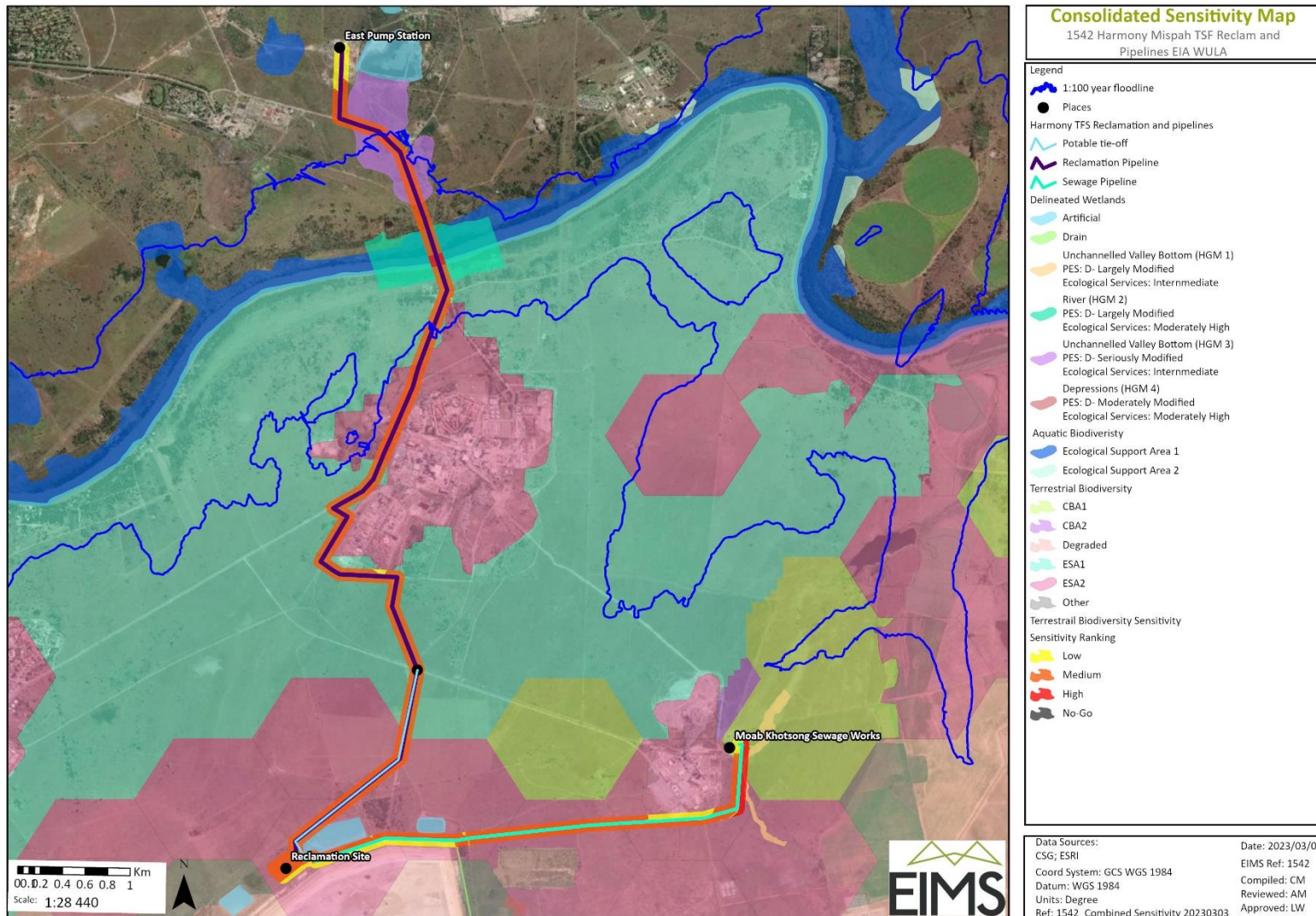


Figure 2: Sensitivity map of proposed pipelines





### 3 DOCUMENT STRUCTURE

Table 1: EMPr Structure

Appendix 4 Reference	Description	Section in EMPr
<b>Appendix 4(1)(1)(a):</b>	Details of – I. The EAP who prepared the EMPr; and II. The expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 4 Appendix H 1
<b>Appendix 4(1)(1)(b):</b>	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 5
<b>Appendix 4(1)(1)(c):</b>	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 2
<b>Appendix 4(1)(1)(d):</b>	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including – I. Planning and design; II. Pre-construction activities; III. Construction activities; IV. Rehabilitation of the environment after construction and where applicable post closure; and V. Where relevant, operation activities;	Section 10
<b>Appendix 4(1)(1)(f):</b>	A description of proposed impact management actions, identifying the manner in which the impact management contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – I. Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; II. Comply with any prescribed environmental management standards or practices; III. Comply with any applicable provisions of the ac regarding closure, where applicable; and IV. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 10
<b>Appendix 4(1)(1)(g):</b>	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10
<b>Appendix 4(1)(1)(h):</b>	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 10
<b>Appendix 4(1)(1)(i):</b>	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 10
<b>Appendix 4(1)(1)(j):</b>	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 10
<b>Appendix 4(1)(1)(k):</b>	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 10



Appendix 4 Reference	Description	Section in EMPr
<b>Appendix 4(1)(1)(l):</b>	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section <b>Error!</b> <b>Reference source not found.</b>
<b>Appendix 4(1)(1)(m):</b>	An environmental awareness plan describing the manner in which – I. The Applicant intends to inform his or her Employees of any environmental risk which may result from their work; and II. Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 9
<b>Appendix 4(1)(1)(n):</b>	Any specific information that may be required by the competent authority.	N/A



## 4 REQUIREMENTS OF AN EAP

In terms of Regulation 13 of the EIA Regulations, 2014, an independent EAP, must be appointed by the Applicant to manage the application. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA's;
- Comply with the NEMA, the Regulations and all other applicable legislation;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the Applicant and the relevant environmental authority.

The declaration of independence of the EAPs involved and the Curriculum Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the compilation of this report are attached as Appendix 1.

### 4.1 DETAILS OF THE EAP

EIMS was appointed by the Applicant as the EAP to compile this report. The contact details of the EIMS consultants who compiled the report are as follows:

Name of Practitioner	Mr John von Mayer (Project Manager)	Ms Ayabulela Manjezi (EAP)
Tel No.:	011 789 7170	011 789 7170
Fax No.:	086 571 9047	063 443 1696
E-mail:	john@eims.co.za	aya@eims.co.za

### 4.2 EXPERTISE OF THE EAP

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 27 years' experience in conducting EIAs, including many EIAs for mines and mining related projects.

Mr John von Mayer is a senior consultant at EIMS and has been involved in numerous significant projects the past 10 years. He has experience in Project Management, small to large scale Environmental Impact Assessments, Environmental Auditing, Water Use Licensing, and Public Participation. He is a Registered Professional Natural Scientist (400336/11) with the South African Council Natural and Scientific Professions (SACNASP) as well as a registered Environmental Assessment Practitioners Association of South Africa (EAPASA) Environmental Practitioner (2019/1247).

Ms Ayabulela Manjezi holds a BSc Honours degree in Environmental Management from the University of South African, BSc Honours in Applied Geology from the University of the Western Cape and is currently employed as an Environmental Consultant at EIMS. Ayabulela is a Registered Candidate Natural Scientist (142390) with the South African Council for Natural Scientific Professions (SACNASP) as well as a Candidate Environmental Assessment Practitioners Association of South Africa (EAPASA) Environmental Practitioner (2019/1279).

## 5 DESCRIPTION AND SCOPE OF THE PROPOSED PROJECT

The section below provides a detailed description for the proposed return water and slurry pipelines project. Most of the key information presented in this chapter was obtained from the Applicant. MWS plan to construct a new process water and slurry pipeline and reclamation pump station. The slurry pipeline will be a flanged 600mm NB (Nominal Bore) steel pipeline with a concrete mortar or HDPE lining and flow rate of 472 l/s. The section across the Vaal River will be a continuous welded pipe with HDPE liner. While the low-pressure process



water pipeline will be a flanged 500mm NB steel pipeline and flow rate of 337 l/s. Both pipes will be installed on surface on prefabricated concrete plinths.

A new slurry reclamation pump station will also be constructed west of the Mispah 1 TSF. The area cleared for the pump station will be ~ 4ha and consist of a series of slurry and high-pressure water pumps and associated infrastructure. The liquefied slurry from the TSF gravitate to the pump station where it is pumped to MWS processing plant in Stilfontein via the East pump station. From the East pump station, the slurry is pumped through existing pipelines to MWS processing plant to extract gold before the tailings is disposed at Kareerand TSF. The pipelines will predominately follow existing pipeline corridors and vegetation clearance will be minimum.

Additionally, a 100mm NB potable waterline and 150mm NB sewage line will also be installed to the reclamation pump station. The sewage from the change house and ablution will be pumped to the Moab Khotsong sewage Works.. The sewage pipeline will be flanged steel pipeline and installed above-ground on pre-cast concrete plinths and a 3.5m wide access road, adjacent to the pipelines, will be cleared/graded to provide access for construction, maintenance and inspections.

Impacts relating to the proposed project were identified and mitigation measures and management procedures proposed in Section 10 of this EMPr.

## 5.1 PROJECT DESCRIPTION

The Applicant (Mine Waste Solutions - MWS) wishes to expand their reclamation activities to the Mispah 1 TSF through the construction of a reclamation pump station and installation of additional pipelines to meet the planned LoM for Mispah TSF to approximately 8 years and reclaiming around 75 Million tons at a rate of around 9.4 mT/annum. The current return water and slurry pipeline infrastructure fail to meet the requirements of the planned LoM and has direct and indirect impacts on the long-term sustainability of the MWS operations. The planned infrastructure is a new 600mm slurry- and 500mm low-pressure process water pipelines of almost 9km from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station, as shown in Figure 1. Both the slurry and process water pipeline to cross the Vaal River at Noligwa Bridge.

## 6 ROLES AND RESPONSIBILITIES

The Applicant will be responsible for ensuring overall compliance with the provisions of the EMPr. Implementation is the key to the success of the EMPr. In order to ensure that the EMPr and its mitigation measures are implemented, roles and responsibilities need to be clearly defined and documented prior to commencement. This section serves as a guide on which party is normally responsible for certain tasks. Specific roles are designated in the specific environmental management and mitigation requirements in this EMPr.

### 6.1 THE PROJECT APPLICANT/PROPONENT

The Applicant is the principal party (Proponent) of the project. The legal accountability for correct implementation of the relevant requirements of the EA and EMPr falls primarily upon the Applicant and must therefore be built into all contractor's contractual agreements. The Applicant's role typically includes:

- Provide for all necessary supervision during the execution of the project including appointment of key personnel to act on his/her behalf during the different phases of the project phase (e.g. project manager). The key personnel will be tasked with ensuring that the various contractors/developers comply with the necessary provisions of the EA and EMPr;
- Ensure that the principle contractor appoints a suitably qualified, competent Environmental Officer (EO) that will be responsible for among others, ensuring compliance (on a monthly basis) with the EMPr and EA throughout the construction of the relevant project components;
- Notify the relevant competent authority of changes in the development resulting in significant environmental impacts (if and when necessary);
- Assess the various contractor's environmental performance during construction;



- Ensure compliance with regulations;
- To implement the projects as per the approved project plan;
- To ensure that implementation is conducted in an environmentally acceptable manner;
- To comply with special conditions as stipulated by surrounding landowners during the negotiation process (if any); and
- To inform and educate all Employees about the environmental risks associated with the different activities that should be avoided during the construction process and lessen significant impacts to the environment.

Therefore, ultimately, the Applicant is responsible for the development and implementation of the EMPr and, where relevant, ensuring that the conditions in the EA are satisfied. Where construction activities are contracted out (e.g. to contractors and subcontractors), the liability associated with non-compliance still rests with the Applicant (unless otherwise agreed upon between the authorities, the Applicant and the contracting parties). The Applicant (and not the contractor) is therefore responsible for liaising directly with the relevant authorities with respect to the preparation and implementation of the EMPr and meeting authorisation conditions.

## 6.2 THE PROJECT MANAGER

During the development, it is envisaged that there may be a number of contractors and sub-contractors undertaking various activities on the project. The Project Manager would oversee all contractors and sub-contractors from a project management point of view. The roles of the Project Manager typically include the following:

- The Project Manager acts on behalf of the Applicant regarding the administration of contracts to sub-contractors, etc.;
- Provides and/or approves scheduling, aspects of co-ordination and estimating;
- Ensures implementation of the project plan within cost, time and quality constraints;
- Ensures that implementation of EMPr is executed as planned; and
- Keeps the asset owner informed of progress made during the life cycle of the project.

## 6.3 THE ENVIRONMENTAL OFFICER

The applicant or the principal contractor shall appoint an Environmental Officer (EO), who is responsible for the on-site implementation of the EMPr. The Contractor's EO ensures that all Sub contractors working under the Contractor and sub-contractors abide by the requirements of the EMPr.

The EO roles will include:

- Preparing activity based Environmental Method Statements where applicable and where required by the EMPr;
- Establishing and maintaining an environmental incident register;
- Taking required corrective action within specified time frame in respect of non-conformances and environmental incidents;
- Assist in finding environmentally acceptable solutions to construction problems;
- Attendance at HSE meetings, toolbox talks and induction programmes (where relevant);
- Inspect the site as required to ensure adherence to the management actions of the EMPr during construction and operational phase;



- Report any complaints to the EO to be captured in the Consultation register;
- Liaise with the construction team on issues related to implementation of, and compliance with the EMPr;
- Ensure that all third parties who carry out all or part of the Contractor's obligations under the contract comply with the requirements of this EMPr;
- Ensure adequate and compliant waste management; and
- Ensuring that environmental signage and barriers are correctly placed and maintained.

## 6.4 THE AUTHORITIES

The authorities that should be involved include the Department of Forestry, Fisheries and the Environment (DFFE). The authorities may be required to perform the following roles:

- Review Monitoring and Audit reports, if required;
- Review whether there is compliance by the Applicant and Contractor with the terms of the EMPr and permit/license conditions. Whenever necessary, the authorities should assist the Applicant in understanding and meeting the specified requirements; and
- The authorities may perform random controls to check compliance. In case of persistent non-compliance, the Applicant will be required to provide an action plan with corrective measures, and have it approved by the authorities.

## 7 OBJECTIVES OF EMPR

The objectives of this EMPr are to ensure that the environment is properly considered during the design, construction, operations, and decommissioning phases, and that negative impacts are minimised or prevented, and positive impacts enhanced. At the same time the EMPr should provide a logical extension of the EIA, specialist studies, or any other technical planning and assessment documentation, to ensure that recommendations are implemented, and that the project does not deviate from the environmental profile that formed the basis of the assessment.

### 7.1 RESPONDING TO NON-COMPLIANCES

Non-compliance with the conditions of the EMPr must be viewed as breach of appointment contract for which the Contractor will be held responsible. Non-compliance will be identified and managed through the following key activities:

- Inspections of the site and activities across the site;
- Audits of the site and relevant documentation as well as specific activities; and
- Reporting on a monthly basis.

Non-compliance with the EMPr or any other environmental legislation, specifications or standards shall be recorded by the EO in the non-conformance register. This register shall be maintained by the EO and will be sent to the Applicant and Contractor on a regular basis (monthly), and the Applicant shall ensure that the responsible party takes the necessary corrective actions. Non-conformances may only be closed out in the register by the EO upon confirmation that adequate corrective action has been taken and/or documented proof provided. The register should be utilised to measure overall environmental performance.

### 7.2 RECORD KEEPING

The Applicant, or the Project manager (if assigned) is therefore responsible for the identification, storage, protection, retrieval, retention and disposal of records as part of the EMPr. Records must be legible, identifiable,



and traceable. The EO must monitor the Contractor's adherence to the approved impact prevention conditions and must issue the Contractor with a notice of non-compliance if transgressions are observed.

### 7.3 ENVIRONMENTAL INCIDENTS

For the purposes of this project, an environmental incident can be divided into three levels, i.e. major, medium and minor. All Major and Medium environmental incidents shall be recorded in the EO's non-conformance and incident register. Minor incidents shall be recorded by the contractor, and by the Applicant (operational phase) in their own incident register. Definitions and explanations of environmental incidents are provided in Table 2.

Table 2: Description of incidents and non-conformances for the purpose of the project

<b>Non-Conformance</b>	Any deviation from work standards, practices, procedures, regulations, management system performance etc. that could either directly or indirectly lead to injury or illness, property damage, damage to the workplace environment, legal transgression or a combination of these.
<b>Major Environmental Incident</b>	An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in widespread, long-term, irreversible significant negative impact on the environment and/or has a high risk of legal liability. A major environmental incident usually results in a significant pollution and may entail risk of public danger. Major environmental incidents usually remain an irreversible impact even with the involvement of long-term external intervention i.e. expertise, best available technology, remedial actions, excessive financial cost etc. Major environmental incidents may be required to be reported to the authorities. The EO shall make the final decision as to whether a particular incident should be classified as a Major incident. An example of a Major environmental incident would be a significant spillage of slurry into a watercourse.
<b>Medium Environmental Incident</b>	An incident or sequel of incidents, whether immediate or delayed, that results or has the potential to result in widespread or localised, short term, reversible significant negative impact on the environment and/or has a risk of legal liability. A medium environmental incident may be reported to the authorities, can result in significant pollution or may entail risk of public danger. The impact of medium environmental incidents should be reversible within a short to medium term with or without intervention. The EO shall make the final decision as to whether a particular incident should be classified as a Medium incident. An example of a Medium environmental incident would be a large spill of slurry (e.g. >50 litres) onto land and/or watercourse.
<b>Minor Environmental Incident</b>	An incident or sequel of incidents, whether immediate or delayed, where the environmental impact is negligible immediately after occurrence and/or once-off intervention on the day of occurrence. An incident where there is unnecessary wastage of a natural resource is also classified as a minor environmental incident. An example would be leaking water pipes that result in the wastage of water. A minor environmental incident is not reportable to authorities. An example of a minor incident is day to day spills of fuel or oil onto the ground where the spill is less between one and five (5) litres.

The following incident reporting procedures shall apply to this project:

- All environmental incidents shall be reported to the EO, and shall be recorded in the incident registers;
- The EO shall record the incident in the non-conformance and incident register and advise on the appropriate measures and timeframes for corrective action;



- An incident report shall be completed by the relevant party responsible for the incident for all medium and major incidents and the report shall be submitted to the Project Manager and EO within 5 calendar days of the incident;
- The EO shall investigate all incidents and identify any required actions to prevent a recurrence of such incidents; and
- In the event of an emergency incident (unexpected sudden occurrence), including a major spill, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed, the Applicant shall notify the relevant authorities in accordance with Section 30(3) of the NEMA. The Applicant shall engage the EO who shall assess all major incidents and shall advise the Applicant when any such incident must be reported to the authorities as per the above requirement.

## 8 REVIEW AND REVISION OF THE EMPr

It is important to note that this EMPr is made legally binding on the Applicant. It is important to consider that the EMPr is a dynamic document which may require alteration and /or amendment as the project evolves. Conditions under which the EMPr would require revision include:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater intensity, extent and significance than predicted;
- Inadequate mitigation measures (i.e. where environmental performance does not meet the required level despite the implementation of the mitigation measure);
- Secondary impacts occur because of the mitigation measures; and
- Instances where the implementation of the specified management, as a result of changes in circumstances, may become impractical or unreasonable to implement.

The Applicant in consultation with the EO should be responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It shall be the responsibility of the Applicant, in consultation with the EO, to ensure that all personnel are performing according to the requirements of the document control procedure, and to initiate the revision of controlled documents, when required by changes in process or operations.

The EO must undertake a risk assessment of any proposed changes to the EMPr. This risk assessment must be included in the applicable monthly audit report, and where applicable supported by the necessary proof of public consultation. It is important to note that if alterations and/or amendments are required; these may only be affected with written approval from the competent authority and in accordance with the relevant legal processes.

## 9 ENVIRONMENTAL AWARENESS PLAN AND TRAINING

Training and environmental awareness is an integral part of a complete EMPr. The overall aim of the training will be to ensure that all site staff are informed of their relevant requirements and obligations pertaining to the relevant authorisations, licences, permits and the approved EMPr and protection of the environment. The Contractor must ensure that the employees and any third party, who carried out work at the site, are adequately trained with regards to the implementation of the EMPr and the general environmental legislative requirements and obligations.

The environmental awareness programmes should contain and highlight the following information:

- The importance of environmental policies and conformance to the policies;





- The environmental impacts, actual or potential, of their work activities;
- Environmental legal requirements and obligations; and
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the Agency's environmental management systems, including emergency preparedness and response requirements.

The Applicant shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. Emergency Response Plan

The Applicant must identify potential emergencies and develop procedures for preventing and responding to them. There are several options for dealing with high priority impacts and risks, as the paradigm has two components, probability and consequence. The design of control measures rests on understanding the cause and effect. Best practise is to intervene with the ultimate factors where feasible, rather than treat the outcomes. Emergency response therefore has the option of reducing probability or reducing the consequence while reducing the probability is the preferred option. Below are some common emergency preparedness approaches:

- Threat consequence if a risk eventuates, when the risk becomes an issue;
- Combine reducing the probability and treating the consequence;
- Offset environmental losses by investing in other assets;
- Not manage some of the risks because there are too many; and
- Make provision to manage residual impacts or issues that arise because of shortcomings in risk identification and rating, avoidance and mitigation or because a rare event has occurred.

Residual impacts are those impacts that despite reducing the probability and consequence might still occur. In these cases, parties will have to be compensated, pollution cleaned up and damage to the environment remediated.

The Applicant shall be required to develop and implement an Emergency Preparedness and Response Plan and Method Statements prior to commencing work. The Applicant must ensure that the Emergency Preparedness and Response Plan makes provision for environmental emergencies, including, but not limited to;

- Fire Prevention;
- Site Dust Management;
- Fire Emergency Response;
- Spill prevention;
- Spill Response;
- Noise Management;
- Pollution Control;
- Accidents to Employees; and
- Use of hazardous substances and materials, etc.

The Applicant and Contractor must ensure that lists of all emergency telephone numbers/contact persons (including fire control) are kept up to date and that all numbers and names are posted at relevant locations throughout the lifespan of the project.



## 9.1 SPILL RESPONSE PROCEDURE

The Contractor must ensure that all Employees, staff and labourers are informed and instructed regarding implementation of spill prevention measures and spill response procedures. In the event of a spill, the following general requirements shall apply, and the detailed spill procedure must cater for these requirements;

- Immediately reporting of spills by all Employees and/or visitors to the relevant supervisor and EO (this requirement must be including in induction training);
- Take immediate action to contain or stop the spill where it is safe to do so;
- Contain the spill and prevent its further spread (e.g. earth berm or oil absorbent materials for spill to land or by deploying booms and/or absorbent material for a spill to water);
- Dispose of any contaminated soil or materials according to appropriate waste disposal procedure. Note: Waste from spills of hazardous materials shall be disposed of as hazardous waste at a suitably licensed waste disposal facility;
- The Contractor's EO shall record details of the spill in their respective incident registers;
- Photographic evidence shall be obtained of the spill clean-up.

In the case of large spills, the services of a specialist spill response agency shall be required, who shall advise on appropriate clean-up procedures and follow-up monitoring (if required). The incident procedures as defined in Section 10 shall also apply.

The Applicant must also, (as per Section 30 of the NEMA) notify the Director-General (DHSWS, DFFE and DMRE), South African Police Services, Provincial Environmental Authority, the Local Municipality, and any persons whose health may be affected of the nature of an incident including:

- Any risks posed to public health, safety and property,
- Toxicity of the substance or by products released by the incident and
- Any step taken to avoid or minimise the effects of the incident on public health and the environment.

## 9.2 MEASURES TO CONTROL OR REMEDY ANY CAUSES OF POLLUTION OR DEGRADATION

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed activities taking place on the project are provided below:

- Limit the size of the area to be disturbed as far as is practically possible;
- Ensure that the environmentally sensitive areas are adequately demarcated throughout the construction phase;
- Ensure topsoil, subsoil and rock dumps are provided with adequate storm water runoff measures;
- Contain potential pollutants and contaminants (where possible) at source;
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates;
- Ensure the timeous clean-up of any spills;
- Implement a waste management system for all waste streams present on site;
- Investigate any claims of pollution or contamination as a result of the project activities; and
- Rehabilitate the site in line with the requirements of the rehabilitation / decommissioning plan.



## 10 IMPACT MANAGEMENT AND MITIGATION MEASURES

This section contains the guidelines, operating procedures, rehabilitation and pollution control requires that are relevant for the proposed project to ensure that the identified impacts are properly managed and mitigated to avoid or minimise degradation of the surrounding environment and to positively impact the socio-economic aspects of the area. Table 3 below summarizes the management and mitigation measures for all identified impacts. This table also includes the party responsible for ensuring compliance with each management or mitigation measure, the party responsible for monitoring (and frequency thereof) compliance and the performance indicators that can be utilized to ensure that the target for each management and mitigation measure is achieved. It is essential that the EMPr be carefully studied, understood and adhered to at all times.



Table 3: Impact Management and Mitigation Measures

Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
<b>10.1 COMPLIANCE</b>					
<b>10.1.1 LEGAL COMPLIANCE WITH LEGISLATION</b>					
<b>A</b>	Identify and comply with all relevant national, provincial and local legislation, including associated regulations and bylaws and shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.	Applicant	Planning Construction Operation Decommissioning	Ensures compliance with the legislation.	Ongoing throughout the project
<b>B</b>	Should there be changes in legislation and/or regulations the Applicant shall take the necessary actions to incorporate such changes and to pass these requirements on to the Contractors.	Applicant	Planning Construction Operation Decommissioning	Ensure compliance with the legislation.	Ongoing throughout the project
<b>10.1.2 COMPLIANCE WITH EMPr</b>					
<b>A</b>	This EMPr should be adhered to during the lifetime of the project and updated when needed as per Section 8 of this report. The Applicant is responsible for the maintenance, update and review of the EMPr. The EO shall include any recommendations for proposed amendments/alterations of the EMPr to the Applicant who shall engage the competent authority, to the extent required, with regards to such changes.	Applicant	Planning Construction Operation Decommissioning	Ensure compliance with the EMPr.	Ongoing throughout the project
<b>10.1.3 APPOINTMENT OF CONTRACTORS</b>					
<b>A</b>	The Applicant is responsible to appoint a Project Manager to assist in appointing contractors and managing of processes. The contractors should be suitably qualified for the job and should preferably be sourced locally as far as reasonably possible.	Applicant Project Manager	Planning Construction (only if required) Operation (only if required) Decommissioning	Appoint suitably qualified contractors sourced locally as far as reasonably possible.	As necessary at the start of the project



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
<b>10.2 PLANNING AND DESIGN</b>					
<b>10.2.1 IMPACTS ON EXISTING INFRASTRUCTURE AND SERVICES</b>					
<b>A</b>	Identify all infrastructure and services within proximity of the proposed facility during the planning phase and attempt to plan around the identified infrastructure and services as far as reasonably possible. If any construction sensitive infrastructure and services (underground or above-ground) exist, they should be clearly marked, and contractors should avoid these.	Applicant Project Manager Contractor	Planning	No existing infrastructure is damaged or existing services are halted without notice because of construction.	Once off before construction
<b>B</b>	Communicate with surrounding land users to help identify existing infrastructure and services within the area. If any services are to be temporarily halted during construction the relevant landowner and/or affected parties must be notified timeously (at least two weeks) prior to the service disruption. Appropriate alternative supply must be arranged for the service recipients if repair will require a significant amount of time.	Applicant Project Manager	Planning Construction	Identification of surrounding infrastructure and services to prevent damage or the halting of important services. Ensures effective communication with surrounding occupiers.	Ongoing for the duration of construction.
<b>10.2.2 VEGETATION AND HABITAT</b>					
<b>A</b>	A site walkthrough must be conducted prior to the construction phase. Ideally, the walkthrough must be conducted between October and March by a suitably qualified EO/ECO, specifically for the 'High' sensitivity areas. A walkthrough prior to construction being undertaken (irrespective of the season) is suitable for the 'Low' and 'Medium' sensitivity habitats. Priority must be the identification of any listed flora and fauna species.	Project manager, Environmental Officer & Contractor	Planning Phase, Pre-Construction	Identification of Plant & animal species	Once off
<b>C</b>	Any individual protected plant that may be observed needs a relocation or destruction permit for any individual that may be removed or destroyed as a result of the activities. Preferably, the plants should be	Project manager, Environmental Officer & Contractor	Planning Phase, Pre-Construction		Once off



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
	relocated to an area that will not be impacted on by future activities.				
<b>10.3 CONSTRUCTION AND OPERATIONAL</b>					
<b>10.3.1 VEGETATION AND HABITATS</b>					
<b>A</b>	The construction and final development footprints should be demarcated, and all proposed activities should be restricted to the proposed development areas	Project manager Environmental Officer	Planning	Reduce disturbance of the sensitive areas.	Ongoing throughout construction
<b>B</b>	Development activities should as far as possible take place only within the 'Low' & 'Medium' sensitivity areas. The proposed pipeline should be constructed within the existing road/pipe servitude or in close relation to the existing roads/pipelines.  Restrict all laydown, material storage, cement mixing, earth deposition and storage etc. aspects and activities to 'Low' sensitivity areas.	Project manager, Environmental Officer & Contractor	Planning Phase, Construction Phase		
<b>C</b>	Any indigenous woody material that is removed during construction can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent erosion. Large wooded stumps or branches may be used to enhance the local habitat features and encourage herpetofauna.	Environmental Officer & Contractor	Operational and Decommissioning phase	Woody material around footprint	
<b>D</b>	Areas of dense and healthy indigenous vegetation, even secondary communities outside of the direct project footprint, should not be fragmented or disturbed further. This is particularly relevant to the wetland habitats (see the relevant wetland report).	Project manager, Environmental Officer	Life of operation	Maintain indigenous vegetation and prevent the spread of alien vegetation.	Ongoing throughout construction



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
E	Areas to be developed/disturbed must be specifically demarcated so that during the construction/activity phase, only the demarcated areas are to be impacted upon.	Environmental Officer & Project Manager	Planning, Construction and Operational Phase	Reduce disturbance of the surrounding environmentally sensitive areas and development of demarcated areas	Ongoing throughout construction
F	All vehicles and personnel must make use of the existing roads and walking paths, especially construction/operational vehicles.	Environmental Officer & Design Engineer	Construction and Operational Phase	Roads and paths used	
G	All laydown, chemical toilets etc. should be restricted to least concern sensitivity areas. Any materials may not be stored for extended periods and must be removed from the project areas once the construction/closure phase has been concluded. No permanent structures should be permitted at laydown area. No storage of vehicles or equipment will be allowed outside of the designated project areas.	Environmental Officer Design Engineer	Construction/Operational Phase	Reduce disturbance of the surrounding environmentally sensitive areas.	
H	No plant species whether indigenous or exotic may be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants.	Environmental Officer Contractor	Life of operation	Any instances.	Ongoing
I	Rocks removed during the construction can be used in designated areas where erosion control needs to be performed. These areas must be identified by a rehabilitation plan. Alternatively, they may be piled in 'Medium' sensitivity grassland habitat to create useful habitat features for herpetofauna.	Environmental Officer Contractor	Operational phase	Rock Piles	During operation phase
J	Leaking equipment and vehicles must be repaired immediately or be removed from the project areas to facilitate the repair. Use of trip trays under all stationary vehicles.	Environmental Officer Contractor	Life of operation	Ensure that all construction vehicles are in good condition, prevent the pollution of soils and surrounding environment.	Daily throughout construction
K	A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.	Project manager, Environmental Officer Contractor	Life of operation	Prevention of spill events, vehicles dripping.	Ongoing throughout construction



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
	<ul style="list-style-type: none"> <li>The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site;</li> <li>Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use;</li> <li>No servicing of equipment is to take place on site unless necessary;</li> <li>All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers; and</li> <li>It is important to appropriately contain any diesel storage tanks and/or machinery spills (e.g., accidental spills of hydrocarbons, oils, diesel etc.) in such a way as to prevent them leaking and entering the environment.</li> </ul>				
<b>L</b>	A fire action plan needs to be complied with and implemented to restrict the impact unplanned fires might have on the surrounding areas.	Environmental Officer Contractor	Life of operation	Ensure that a proper fire management plan is in place for adequate response in the event of fire breakouts on site.	Ongoing throughout construction
<b>M</b>	Delineate protected areas where plant species of conservation concerns are found or likely to be found.	Environmental Officer Biodiversity Specialist	Construction	Ensure no loss of plants of conservation concern.	Ongoing throughout construction
10.3.2 FAUNA					
<b>A</b>	No trapping, killing, or poisoning of any wildlife is to be allowed. Signs must be put up to enforce this. These actions are illegal in terms of provincial environmental legislation.	Environmental Officer	Life of operation	Evidence of trapping etc	Ongoing
<b>B</b>	A qualified environmental control officer must be on site when clearing begins. The area must be walked though prior to construction to ensure that no faunal species remain in the habitat and get killed. Should animals not	Environmental Officer, Contractor	Pre-Construction, Construction Phase	Presence of any floral or faunal species	During phase





Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
	move out of the area on their own, relevant specialists must be contacted to advise on how the species can be relocated.				
<b>C</b>	Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.	Environmental Officer & Contractor, Engineer	Planning and construction	Presence of trapped animals and open holes	Ongoing
<b>D</b>	Should any SCC fauna be observed in active nests within the proposed footprint area before or during construction, all activities must cease immediately. A relevant faunal specialist must be consulted in order to facilitate the capture or removal of any SCC animals (refer to Appendix D3 of the BAR for list of SCC fauna).	Environmental Officer, Contractor, and estate manager	Life of Operation	SCC fauna	Ongoing
<b>E</b>	The areas to be developed (or activity areas) must be specifically demarcated to prevent the movement of staff or equipment/vehicles into the surrounding environments. Signs must be put up to enforce this.	Project manager, Environmental Officer	Construction/Operational Phase	Infringement into surrounding areas	During phase
<b>F</b>	The duration of the construction should be minimized to as short a term as possible, to reduce the period of disturbance on fauna.	Project manager, Environmental Officer & Design Engineer	Construction/Operational Phase	Construction timeframe	During phase
<b>G</b>	In the event that outside lighting is required outside lighting should be designed and limited to minimise impacts on fauna. Fluorescent and mercury vapor lighting should be avoided, and sodium vapor (yellow) lights should be used wherever possible.	Project manager, Environmental Officer & Design Engineer	Construction/Operational Phase	Light pollution and period of light	During phase
<b>H</b>	All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. Speed limit signage must be visible to traffic.	Health and Safety Officer	Construction Phase	Compliance to the training	During phase



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
I	Noise must be kept to a minimum during the evenings/ at night to minimise all possible disturbances to amphibian species and nocturnal mammals and birds.	Environmental Officer	Construction/Operational Phase	Noise levels	Ongoing
J	Schedule activities and operations during the least sensitive periods, to avoid migration, nesting, and breeding seasons as far as possible.	Project manager, Environmental Officer & Design Engineer	Life of operation	Activities should take place during the day	Ongoing
K	Signs must be put up in order to show the importance and sensitivity of surrounding areas and their functions. This especially pertains to the partially functional wetland areas.	Environmental Officer	Life of operation	Presence and condition of signs	Ongoing
L	Only use environmentally friendly dust suppressant products.	Environmental Officer & Contractor, Engineer	Construction and operation	Presence of chemicals in and around the project area	Ongoing
10.3.3 ALIEN VEGETATION					
A	The implementation of an Alien Invasive Plant management plan is very important, especially because of the invasive species identified on site which, if left unchecked, will continue to grow and spread prolifically leading to further and more significant deterioration to the health of the natural environment within and nearby to the footprint area. The plan must especially pertain to any recently cleared areas.	Project manager, Environmental Officer & Contractor	Life of operation	Assess and control presence and encroachment of alien vegetation	Quarterly monitoring
B	The construction footprint area should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Road footprints must be kept to prescribed widths.	Project manager, Environmental Officer & Contractor	Construction/Operational Phase	Footprint Area	During phase
C	It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests from entering the site and proliferating.	Environmental Officer & Health and Safety Officer	Life of operation	Presence of waste	Life of operation



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
D	A pest control plan for rodents (for example) must be put in place and implemented; it is imperative that poisons not be used.	Environmental Officer & Health and Safety Officer	Life of operation	Evidence or presence of pests	Life of operation
10.3.4 WASTE MANAGEMENT					
A	Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site. <ul style="list-style-type: none"> <li>Refuse bins must be emptied and secured;</li> <li>Temporary storage of domestic waste shall be in covered waste skips; and</li> <li>Maximum domestic waste storage period must be 7 days.</li> </ul>	Environmental Officer & Health and Safety Officer	Life of operation	Presence of waste	Life of operation
B	Any litter, spills, fuels, chemical and human waste in and around the project area must be removed and disposed of timeously and responsibly.	Environmental Officer & Health and Safety Officer	Construction/Closure Phase	Presence of Waste	Daily
C	It must be made an offence to litter or dump any material outside of specially demarcated and managed zones. Signs and protocols must be established to explain and enforce this.	Contractor, Environmental Officer & Health and Safety Officer	Life of operation	Presence of Waste and Dumping	Daily, Ongoing
D	A minimum of one toilet must be provided per 10 persons. Portable toilets must be regularly serviced to ensure that the system does not degrade over time and spill into the surrounding area.	Environmental Officer & Health and Safety Officer	Life of operation	Number of toilets per staff member. Waste levels	Daily
E	The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.	Environmental Officer & Health and Safety Officer, Contractor	Life of operation	Availability of bins and the collection of waste	Ongoing
F	Under no circumstances may domestic waste be burned on site. Waste may never be stored in an open pit where it is susceptible to the elements such as wind and rain.	Environmental Officer, Contractor &	Life of operation	Collection/handling of waste	Ongoing



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
		Health and Safety Officer			
10.3.5 NOISE					
<b>A</b>	Noise must be kept to an absolute minimum during the working hours to minimize all possible disturbances to amphibian species and nocturnal mammals.	Environmental Officer Contractor	Construction	Prevent disturbance to faunal communities	Daily throughout construction.
<b>B</b>	Ensure that all equipment are serviced and fitted with the appropriate noise abatement measures. Ensure that vehicles are not allowed to idle for longer than 5 minutes when not in use. Use the smallest / quietest equipment as reasonably as possible.	Health and Safety Officer	Construction	Prevent nuisance of surrounding landowners	Daily throughout construction.
<b>C</b>	All construction work must be limited to normal working hours from 7:00 in the morning to 17:00 in the afternoon to avoid nuisance of any surrounding landowners.	Environmental Officer Contractor	Construction	Prevent nuisance of surrounding landowners	Ongoing throughout construction
10.3.6 COMPLAINS REGISTER					
<b>A</b>	A complaints register should be opened and maintained onsite. Any surrounding landowner complaints related to the activity should be recorded on the register and addressed immediately. The measures taken to address the complaints should be recorded on the register. The appointed ECO must check this register regularly.	Environmental Officer Contractor Applicant ECO	Construction	Prevent nuisance of surrounding landowners and prevent unnecessary delays that may be caused by conflicts between the construction team and surrounding landowners.	Monthly throughout construction
10.3.7 SOILS					
<b>A</b>	An approved spill procedure to be followed in the event of a spillage incident must be made available onsite and all site personnel should be trained on the on proper spill clean-up measures.	Environmental Officer Contractor	Construction	Minimise impacts of soil pollution, ensure that the contractors are well equipped with adequate tools to respond to a spill incident. Ensure adequate spill clean-up is undertaken.	When necessary in the of a spill
<b>B</b>	The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil, or hazardous substance spills are cleaned-up and discarded correctly.	Environmental Officer Contractor	Construction		Ongoing throughout construction



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
<b>C</b>	During construction activities, all rubble and waste generated must be removed from the site and in to a licensed facility.	Environmental Officer Contractor	Construction	Minimise the disturbance of natural soil profiles and soil functioning.	Ongoing throughout the project
<b>D</b>	Any contaminated soils must be remediated or removed and discarded at an appropriately to a licensed facility, stored temporarily in a bunded area and/or fertilizers determined through soil sampling and analysis.	Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>E</b>	A minimum of 300mm of topsoil is to be stripped and stockpiled separately. Excavated material should be stockpiled in a manner where it can act as storm water control berms.	Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>F</b>	Erosion should be monitored and stabilised as soon as possible wherever it occurs.	Environmental Officer Contractor	Construction		Ongoing throughout construction
10.3.8 TRAINING					
<b>A</b>	All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof on-site. Discussions are required on sensitive environmental receptors within the project areas to inform contractors and site staff of the presence of species of conservation concern, their identification, conservation status and importance, biology, habitat and wetland requirements, spill response procedure and management requirements in the Environmental Authorisation and within the EMPr.	Environmental Officer	Construction Life of operation	Ensure that site personnel are aware of site sensitivities.	Ongoing throughout the project
<b>B</b>	Contractors and employees must all undergo an environmental induction and be made aware of the sensitive habitats nearby to the project area.				
<b>C</b>	All staff should receive an Environmental Awareness programme which also covers the surrounding area. This programme must be used to inform of the importance of wetland areas and their conservation.				



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
10.3.9 EROSION					
<b>A</b>	Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited.	Project manager Environmental Officer	Life of operation	Prevent loss of vegetation and ensure less erosion.	Ongoing throughout the project
<b>B</b>	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. Vegetate areas where no concrete structures are built to allow stormwater infiltration.	Project manager Environmental Officer	Life of operation	Ensure re-establishment of indigenous vegetation.	When necessary throughout construction
10.3.10 WETLANDS					
<b>A</b>	Existing roads must be used as much as possible.	Project manager Environmental Officer Contractor	Planning, Construction and Operational	Prevent loss of wetland functionality and ensure low negative impacts to surrounding watercourses. negative impacts to surrounding.	Ongoing throughout construction
<b>B</b>	Avoid unnecessary vegetation clearing and avoid preferential surface flow paths.	Project manager Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>C</b>	Storage of potential contaminants in bunded areas and away from water resources.	Project manager Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>D</b>	All contractors must have spill kits available and be trained in the correct use thereof.	Contractor	Construction		Ongoing throughout construction
<b>E</b>	Adhere to the prescribed wetland buffers. Restrict all non-essential activities (e.g. cement mixing) to outside of wetlands and their prescribed buffers.	Project manager Environmental Officer Contractor	Planning and Construction		Ongoing throughout construction
<b>F</b>	Construct as far as possible during winter when flow volumes are lowest, prioritise this for crossing sites. This	Project manager Environmental Officer	Planning and Construction		Monthly throughout construction



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
	will reduce impacts to wetlands due to soil poaching and vegetation trampling under peak saturation levels.	Contractor			
<b>G</b>	Conduct regular inspections along the pipeline route and fix leaks timeously.	Project manager Environmental Officer Contractor	Operational		Ongoing throughout construction
<b>H</b>	Adequate sanitary facilities and ablutions must be provided for all personnel throughout the project area.	Project manager Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>I</b>	Have action plans on site, and training for contractors and employees in the event of spills, leaks, and other impacts to the aquatic systems.	Project manager Environmental Officer Contractor	Construction		Ongoing throughout construction
<b>J</b>	All waste generated on-site must be adequately managed and separated and recycling of different waste materials should be supported.	Project manager Environmental Officer Contractor	Construction		Monthly throughout construction
<b>K</b>	Mixing of concrete must under no circumstances take place in any wetland or their buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished.	Project manager, Environmental Officer Contractor	Construction		Once off at the start of construction
<b>L</b>	Exposed areas must be ripped and vegetated to increase surface roughness. Landscape and re-vegetate all denuded areas as soon as possible	Project manager Environmental Officer Contractor	Construction		Monthly throughout the project
<b>M</b>	All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site.	Project manager Environmental Officer Contractor	Construction		Daily throughout the project
<b>N</b>	Monitor the pipelines for leaks and spills on a regular basis. Repair damaged pipes immediately to avoid excessive spills	Project manager Environmental Officer	Operational		As necessary, throughout



Item No.	Impact Management Action	Responsible Party	Phase	Target/Aspect	Monitoring Frequency
		Contractor			Operational Phase
10.3.11 HERITAGE AND PALEONTOLOGY					
<b>A</b>	If heritage or palaeontological resources are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented . SAHRA must be notified immediately and all activities must be stopped and await a heritage/palaeontologist assessment.	Applicant Contractor ECO Heritage Specialist	Construction	Ensure compliance with SAHRA recommendations and the NHRA.	Ongoing throughout construction
10.3.12 AIR QUALITY					
<b>A</b>	Construction vehicles and other traffic should, where possible, make use of existing roads to reach the site.	Environmental Officer Contractor	Construction	Ensure dust management is practised on site.	Daily throughout the project
<b>B</b>	Ensure dust suppression measures are implemented on exposed soils and dust generating routes.	Contractor	Construction and Operational		
<b>10.4 SITE CLOSURE AND REHABILITATION</b>					
10.4.1 SITE CLOSURE					
<b>A</b>	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species	Environmental Officer Contractor	Closure Phase/Rehabilitation phase	Ensure the site is returned to pre-construction conditions, prevent erosion or introduction of alien invasive species.	Quarterly for up to two years after the closure
<b>B</b>	All footprints are to be rehabilitated and landscaped after decommissioning activities are completed. Rehabilitation of the disturbed areas existing in the project areas must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species that are endemic to this vegetation type;	Environmental Officer Contractor	Closure Phase/Rehabilitation phase		When necessary