ENVIRONMENTAL MANAGEMENT PROGRAMME

PREPARED FOR
ELANDSFONTEINCOLLIERY

MARCH 2021

MP 30/5/1/2/2/63MR AND MP 30/5/1/2/2/314MR

ENVIRONMENTAL MANAGEMENT PROGRAMME

PREPARED FOR ELANDSFONTEIN COLLIERY

DOCUMENT CONTROL

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REVISION AND AMENDMENTS

Date	No.	Description of Revision or Amendment
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1 INTRODUCTION

1.1 REPORT STRUCTURE

This report reflects an amendment and update to the existing approved Environmental Management Programme (EMPr) and is compliant with the EMPr content requirements contained in the regulations promulgated under the National Environmental Management Act (Act 107 of 1998) (NEMA as amended). **Table 1** below provides a summary of the NEMA requirements in terms of Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (GNR 982 as amended), and an indication in which section of this EMPr the relevant information can be found.

Table 1: Report Structure as per NEMA Regulation 982 Appendix 4.

Environmental Regulation	**Description**	**Section in Report**
NEMA Regulation 982 (2014) Appendix 4		
Appendix 4(1)(1)(a):	Details of – i. The EAP who prepared the EMPR; and ii. The expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Sections 1.7 and 1.8
Appendix 4(1)(1)(b):	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
Appendix 4(1)(1)(c):	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Figure 1 and Figure 3
Appendix 4(1)(1)(d):	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified though 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 Where relevant, operation activities;	Section 4

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(f):	A description of proposed impact management actions, identifying the manner in which the impact management outcomes 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 Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 5
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 3.2
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 3.3
Appendix 4(1)(1)(i):	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 3.1 and 3.4
Appendix 4(1)(1)(j):	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 5
Appendix 4(1)(1)(k):	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 3.4
Appendix 4(1)(1)(l):	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 2.4
Appendix 4(1)(1)(m):	An environmental awareness plan describing the manner in which – i. The applicant intends to inform his or her employees of any environmental risk which may result from their work; and ii. Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	Section 2.7

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(n):	Any specific information that may be required by the competent authority.	N/A

1.2 INTRODUCTION TO THE PROJECT

Elandsfontein Colliery Pty Ltd (hereafter referred to as the applicant) has appointed Geo Soil and Water cc (GSW) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the necessary Environmental Authorisation and amendment processes for Elandsfontein Colliery.

The Elandsfontein Colliery comprises of 2 distinct mining rights (MR314 and MR63). The applicant plans to consolidate the two mining right areas into a single mining right with associated consolidated EMPr. In addition, the applicant wishes to expand their existing mining operations to include additional mineral resource areas (i.e.: new open cast & underground areas within the consolidated mining right boundary).

The project includes inter alia the following application processes with associated activities:

- New Integrated Environmental Authorisation and Waste Management Licence (Scoping and Environmental Impact Report (S&EIR));
- New Integrated Water Use Licence (IWUL) with renewal of existing IWUL; and
- Section 102 consolidation of mining rights as well as consolidation of EMPr's into one holistic EMPr.

The new mining operations (**Figure 1**) will necessitate additional infrastructure establishment including Pollution Control Dams (PCD), internal haul roads, stockpiles, etc (**Figure 2**).

The project is located on a portion of the remaining extent of portion 8; remaining extent of portion 1; a portion of the remaining extent of portion 6; portion 44; portion 14 and the remaining extent of portion 7 of the Farm Elandsfontein 309 JS, located in Emalahleni Local Municipality, Nkangala District Municipality, Mpumalanga Province. The site is ~4km south of Kwa-Guqa and ~16k west of Emalahleni. The centre point of the site is 25°53'05.01"S and 29°05'36.57"E.

1.3 MINE INFRASTRUCTURE

The existing approved surface infrastructure at Elandsfontein Colliery consists of the following:

- Opencast pit;
- Underground mining areas;
- Stockpiles;
- Offices;
- Beneficiation Plant area (crushing and screening);
- Contractors yard;
- Weighbridge;
- Access and haul roads;
- Security point and fencing;
- Pumps and sumps;
- Clean water trenches;

- Dirty water trenches;
- 3 PCD's; and
- Storm water control trenches.

New infrastructure associated with the future mining areas would include the following:

- Soil stockpiles;
- Overburden stockpile;
- Stormwater channels;
- River crossings;
- 2 new lined PCDs; and
- Water Treatment Plant.

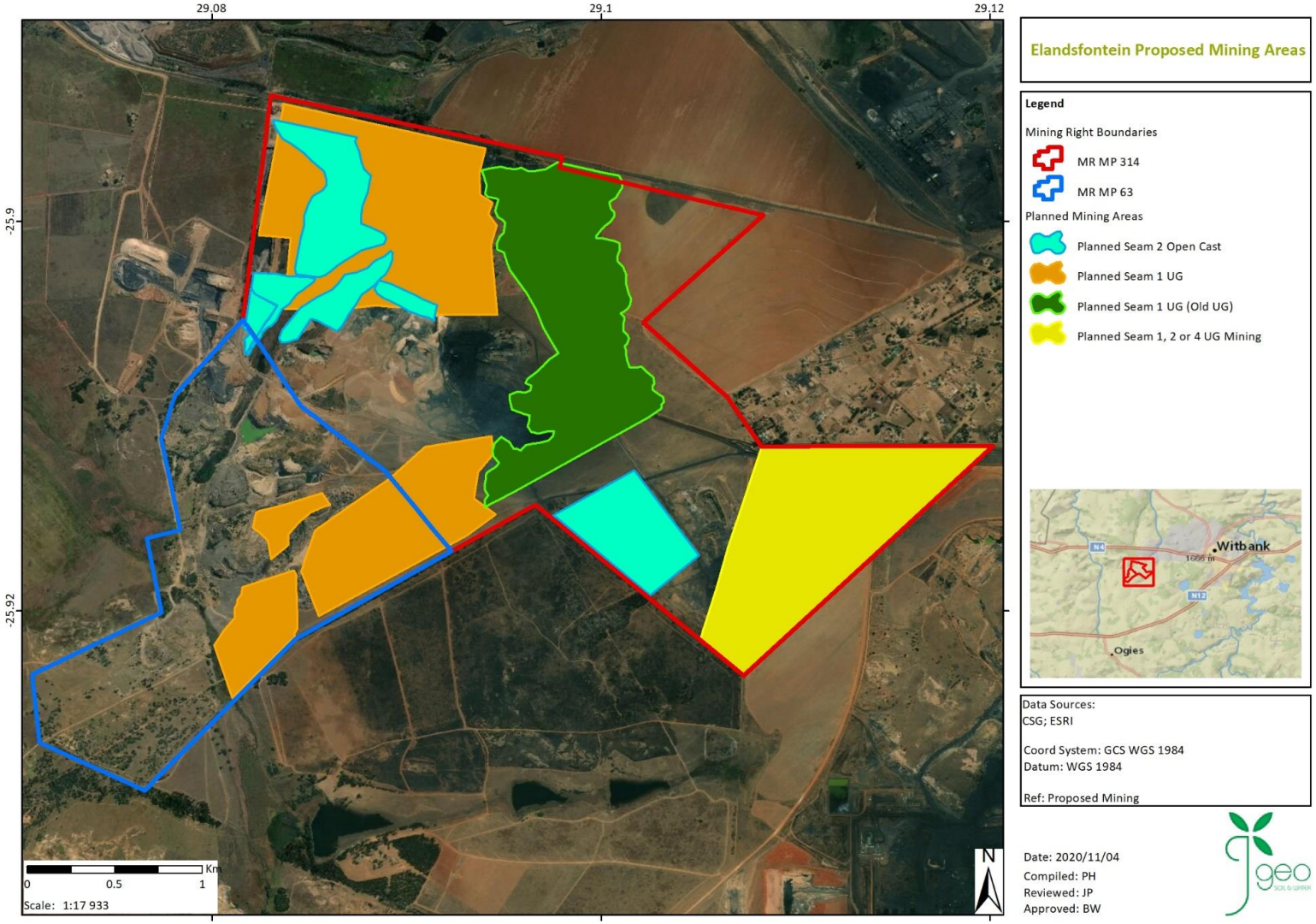

Figure 1: Locality map of Elandsfontein Colliery showing future mining areas

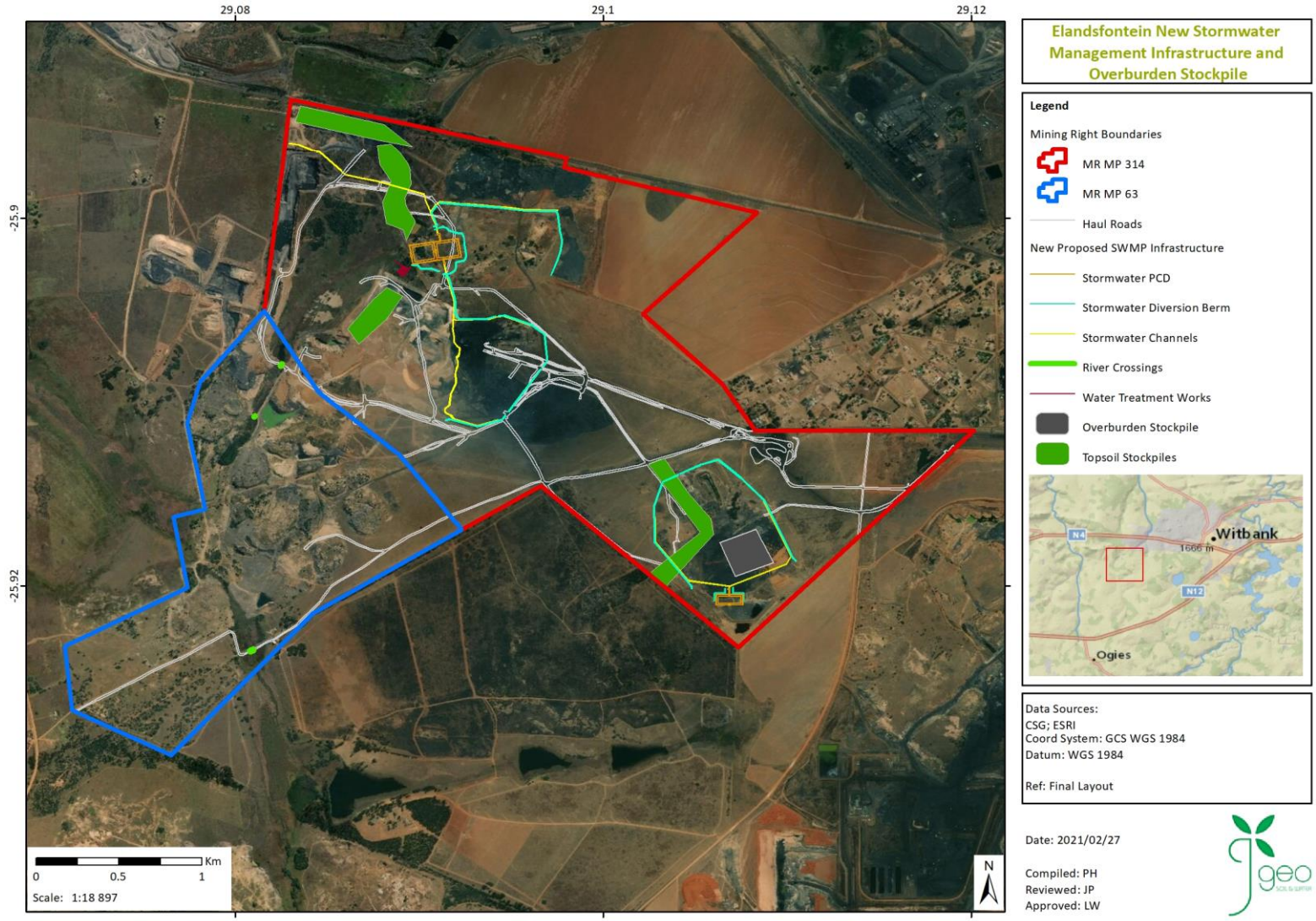

Figure 2: Map showing new proposed infrastructure

1.4 DESCRIPTION OF THE PROPERTY

Elandsfontein Colliery is situated in the Emalahleni Local Municipality, immediately west of the village of Clewer.

Table 2 indicates the farm portions that fall within the Elandsfontein Colliery Mining Rights including details of the mine to the nearest towns.

Table 2: Locality Details

Property Info	**Details**					
Farm Name	Mining Right holder Elandsfontein Colliery (Pty) Ltd. is the holder of a Mining Right in respect of certain properties of the farm Elandsfontein 309 JS.					
Application Area (Ha)	The mining footprint, existing and future infrastructure cover an area ~830 hectares (ha) (GIS).					
Magisterial District	The Elandsfontein Colliery is situated in the Emalahleni Local Municipality, situated in the Nkangala District Municipality.					
Distance and direction from nearest town(s)	The Elandsfontein Colliery is situated west and directly adjacent to Clewer and ~5 km south of Kwa-Guqa.					
21-digit Surveyor General Code for each Portion	Properties within approved Mining Right areas			Properties affected by this Application		
	Farm Name:	Portion	SG Codes:	Farm Name:	Portion	SG Codes:
	Elandsfontein 309 JS	1	T0JS000000000309 00001	Elandsfontein 309 JS	1	T0JS000000000 30900001
	Elandsfontein 309 JS	6	T0JS000000000309 00006	Elandsfontein 309 JS	7	T0JS000000000 30900007
	Elandsfontein 309 JS	7	T0JS000000000309 00007	Elandsfontein 309 JS	8	T0JS000000000 30900008
	Elandsfontein 309 JS	8	T0JS000000000309 00008	Elandsfontein 309 JS	14	T0JS000000000 30900014
	Elandsfontein 309 JS	14	T0JS000000000309 00014	Elandsfontein 309 JS	44	T0JS000000000 30900044
	Elandsfontein 309 JS	44	T0JS000000000309 00044			

1.5 LOCALITY MAP

Figure 1 indicates the locality of Elandsfontein Colliery, the approved Mining Right boundary and the proposed new mining areas.

1.6 SENSITIVITY MAP

A consolidated sensitivity map with the activity superimposed thereon is provided in **Figure 3.**

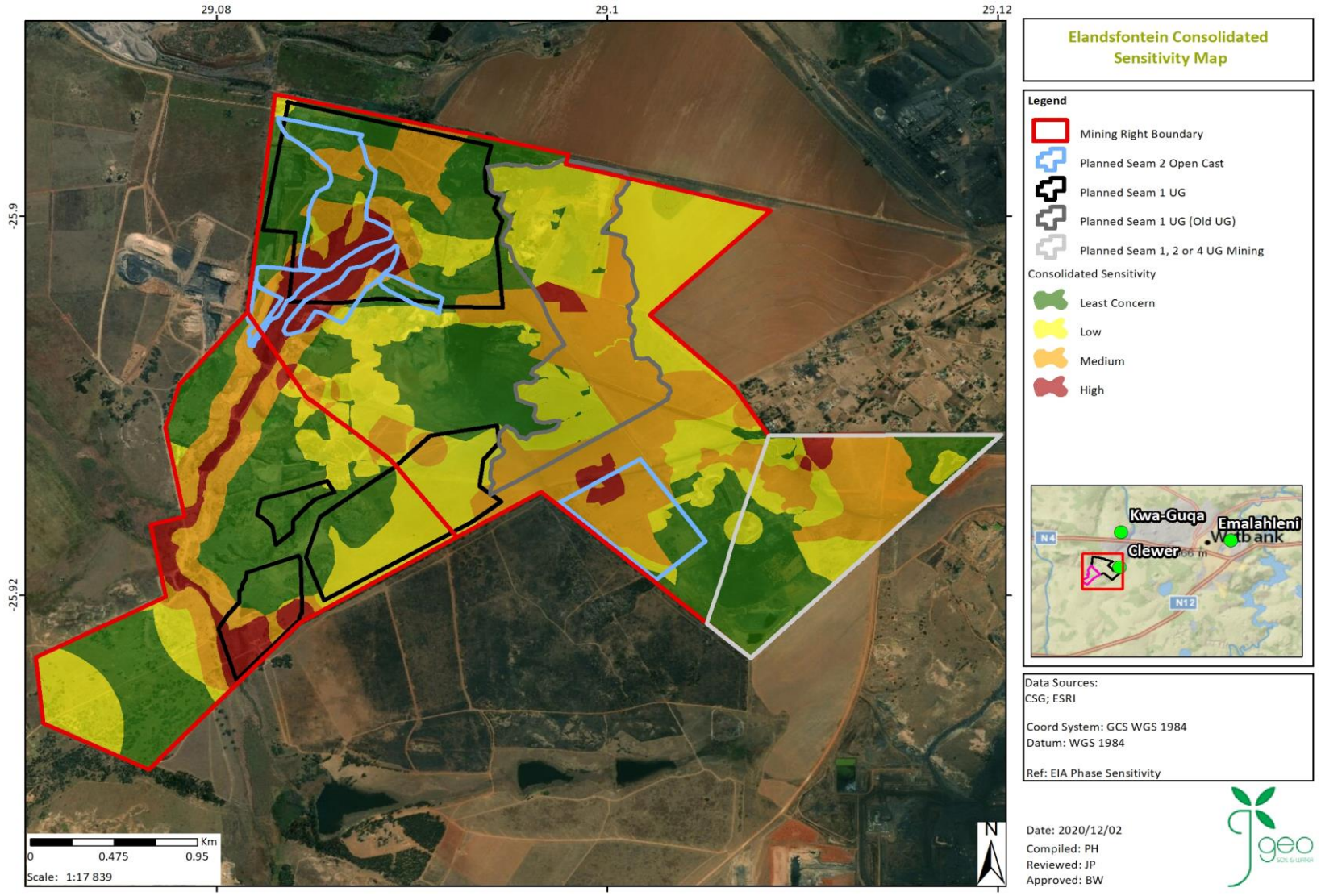

Figure 3: Composite Sensitivity Map

1.7 DETAILS OF THE EAP

GSW was founded in 2008 and has steadily grown to be a significant player in the Environmental Management Consulting industry in South Africa. GSW and its resources have been involved with many EIA projects and offers access to a broad body of knowledge and experience with the various Integrated Environmental Management tools (EIA; EMPr; EMP; SEA; EMF; etc.). GSW is responsible for project management and the compilation of the relevant reports for the Elandsfontein project. Details of the EAP are provided below:

- EAP Name: Adri Joubert
- SACNASP Registration Number: 400058/01
- Contact no: 082 926 8460
- Email address: adri@geosoilwater.co.za

1.8 EXPERTISE OF THE EAP

1.8.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations (Government Notice R. 982), an independent Environmental Assessment Practitioner (EAP), must be appointed by the applicant to manage the application. GSW 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 GSW is:

1) Objective and independent;
2) Has expertise in conducting EIA's;
3) Comply with the NEMA, the Regulations and all other applicable legislation;
4) Takes into account all relevant factors relating to the application; and
5) Provides full disclosure to the applicant and the relevant environmental authority.

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessments and relevant application processes) are attached as Appendix A.

1.8.2 SUMMARY OF THE EAP'S PAST EXPERIENCE

GSW is a private and independent environmental management-consulting firm that was founded in 2008. GSW has significant experience in conducting EIAs, including many EIA's for mines and mining related projects. Please refer to the GSW website (www.geosoilwater.co.za) for examples.

Adri Joubert is the sole owner and project manager at GSW and has been involved in numerous significant projects over the past 20 years. She has extensive experience in Project Management as well as with undertaking Environmental Impact Assessments and Environmental Auditing. Adri has acted as Project Manager and Quality Reviewer for several mining related projects for clients including but not limited to Mashala Resources, Continental Coal and Pembani Coal Carolina.

2 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

Management of operational risk is a key consideration for Mines operating within the social and economic context of South Africa. Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.

2.1.1 STAKEHOLDER ENGAGEMENT

Social impacts occur immediately in the planning phase of a project and as such it is imperative to start with stakeholder engagement as early in the process as possible. This report will be placed out for public review in order to encourage stakeholder engagement, in accordance with the relevant legislation. Stakeholder engagement is however required on an ongoing basis throughout the operation of the facility. As such, the mine will need to develop and implement a detailed Stakeholder Engagement Plan, designed to work as a living document for implementation over the entire LoM.

The following stakeholder engagement framework outlines the principles and objectives for stakeholder engagement during all phases of the mining operation.

- To identify and assess the processes and/or mechanisms that will improve the communication between local communities, the wider community and the colliery;
- To improve relations between mine staff and the people living in the local communities;
- To provide a guideline for the dissemination of information crucial to the local communities in a timely, respectful and efficient manner; and
- To provide a format for the timely recollection of information from the local communities in such a way that the communities are included in the decision-making process.

This stakeholder engagement plan will assist the colliery to outline their approach towards communicating in the most efficient way possible with stakeholders throughout the life of the project. Such a plan cannot be considered a once off activity and should be updated on a regular basis to ensure that it stays relevant and to capture new information. The Stakeholder Engagement Plan should consist of the following components:

- Stakeholder Identification and Analysis – time should be invested in identifying and prioritising stakeholders and assessing their interests and concerns.
- Information Disclosure – information must be communicated to stakeholders early in the decision-making process in ways that are meaningful and accessible, and this communication should be continued throughout the life of the project.
- Stakeholder Consultation – each consultation process should be planned out, consultation should be inclusive, the process should be documented, and follow-up should be communicated.
- Negotiation and Partnerships – add value to mitigation or project benefits by forming strategic partnerships and for controversial and complex issues, enter into good faith negotiations that satisfy the interest of all parties.
- Grievance Management – accessible and responsive means for stakeholders to raise concerns and grievances about the project must be established throughout the life of the project.

- Stakeholder Involvement in Project Monitoring – directly affected stakeholders must be involved in monitoring project impacts, mitigation and benefits. External monitors must be involved where they can enhance transparency and credibility.
- Reporting to Stakeholders – report back to stakeholders on environmental, social and economic performance, both those consulted and those with more general interests in the project and parent company.
- Management Functions – sufficient capacity within the company must be built and maintained to manage processes of stakeholder engagement, track commitments and report on progress.

It is of critical importance that stakeholder engagement takes place in each phase of the project cycle and it must be noted that the approach will differ according to each phase.

2.1.2 GRIEVANCE MECHANISM

Elandsfontein Colliery shall establish a specific mechanism for dealing with grievances. A grievance is a complaint or concern raised by an individual or organisation that judges that they have been adversely affected by the project during any stage of its development. Grievances may take the form of specific complaints for actual damages or injury, general concerns about project activities, incidents and impacts, or perceived impacts. Complaints should be addressed promptly using an understandable and transparent process that is culturally appropriate and readily acceptable to all segments of affected communities and is at no cost and without retribution. The mechanism should be appropriate to the scale of impacts and risks presented by a project and beneficial for both the company and stakeholders. The mechanism must not impede access to other judicial or administrative remedies.

The proposed grievance mechanism shall be based on the following principles:

- Transparency and fairness;
- Accessibility and cultural appropriateness;
- Openness and communication regularity;
- Written records;
- Dialogue and site visits; and
- Timely resolution.

Based on the principles described above, the grievance mechanism process involves four stages:

- Receiving and recording the grievance;
- Acknowledgement and registration;
- Site inspection and investigation; and
- Response.

2.1.3 INTERNAL GRIEVANCE PROCEDURE

Elandsfontein Colliery shall develop a detailed internal grievance mechanism designed to receive and facilitate resolution of workplace concerns and grievances raised by employees (and their organizations, where they exist). Employees must be informed of the grievance mechanism at the time of recruitment and it must be made easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and

transparent process that provides timely feedback to those concerned, without any retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.

2.2 DOCUMENT CONTROL

The document control system must provide for the following requirements;

- Documents are approved for adequacy prior to use;
- Review and update documents as necessary and re-approve documents;
- Ensure that changes and the current version status of documents are identified;
- Ensure that relevant versions of applicable documents are available at points of use;
- Ensure that documents remain legible and readily identifiable; and
- Prevent unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.

2.3 RECORD KEEPING

It is essential that an official procedure for control of records be developed to ensure records required to demonstrate conformity to environmental and social standards are. Records must be legible, identifiable and traceable.

2.4 AUDITING AND REPORTING PROCEDURES

The Applicant shall develop an auditing and reporting procedure, for conveying information from the compliance monitoring activities and to ensure that management is able to take rapid corrective action should certain thresholds be exceeded. The sections below present a framework for the development of the necessary procedures.

Different reporting mechanisms may include:

- Inspections;
- Accidents and emergencies;
- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

All monitoring and auditing must be accompanied by applicable records and evidence (e.g. delivery slips, photographic records, etc.). All reports must be retained and made available for inspection by the ECO, the Applicant and/or the Relevant Competent Authorities. All reports shall be signed by the relevant parties to ensure accountability. The applicant must use the audit report findings to continually ensure that environmental protection measures are working effectively on site through a system of self-checking. The EMPr should be viewed as a dynamic document aimed at continual environmental performance improvement.

2.5 RESPONDING TO NON-COMPLIANCES

Non-compliance will be identified and managed through the following four key activities including;

- **Inspections** of the site and activities across the site;
- **Monitoring** of selected environmental quality variables;
- **Audits** of the site and relevant documentation as well as specific activities;
- **Reporting** on a quarterly basis.

An environmental non-conformance and incident register must be prepared and maintained by the EO/ECO throughout the lifespan of the mine in order to monitor environmental concerns, incidents, and non-conformances. The register must include details of date, location, description of the NC or Incident, applicable environmental commitment/standard, corrective action taken, adequacy of corrective action, date rectified, etc.

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

2.6 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 incident register. Minor incidents do not need to be reported but require immediate rectification on site. Definitions and examples of environmental incidents are provided in **Table 3** below.

Table 3: Description of incidents and non-conformances for the purpose of the project

Non-Conformance	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, or a combination of these.
Major Environmental Incident	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 ECO shall make the final decision as to whether a particular incident should be classified as a Major incident.

Medium Environmental Incident	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 ECO shall make the final decision as to whether a particular incident should be classified as a Medium incident.
Minor Environmental Incident	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.

The following incident reporting procedures shall apply to this project:

- All environmental incidents shall be reported to the Mine EO who shall ensure that the appropriate rectification is undertaken;
- The Mine EO shall record all medium and major incidents in the incident register and advise on the appropriate measures and timeframes for corrective action;
- An incident report shall be completed by party responsible for the incident for all medium and major incidents and the report shall be submitted to the Mine Manager and Mine EO within 5 calendar days of the incident; and
- The Mine EO shall investigate all medium and minor incidents and identify any required actions to prevent a recurrence of such incidents.

In the event of an emergency incident (unexpected sudden occurrence), including a major emission, 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 legal requirements (e.g. Section 30 of NEMA and Section 20 of the NWA). In the event of a dispute in terms of the classification of a such an incident, the Applicant shall engage the ECO to advise on the potential reporting requirements in terms of the above.

2.7 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 applicant must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner and can comply with the relevant environmental requirements. To obtain buy-in from staff, individual employees need to be involved in:

- Identifying the relevant risk;

- Understanding the nature of risks;
- Devising risk controls; and
- Given incentive to implement the controls in terms of legal obligations.

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. All training must be formally recorded, and attendance registers retained. The environmental training should, as a minimum, include the following:

- General background and definition to the environment;
- The importance of compliance with all environmental policies;
- The environmental impacts, actual or potential, of their work activities;
- Compliance with mitigation measures proposed for sensitive areas;
- The environmental benefits of improved personal performance;
- Their roles and responsibilities in achieving compliance with the environmental policy and procedures and with the requirement of the applicant's environmental management systems, including emergency preparedness and response requirements;
- The potential consequences (legal and/or other) of departure from specified operating procedures;
- The mitigation measures required to be implemented when carrying out their work activities; and
- All operational risks must be identified, and processes established to mitigate such risk, proactively. Thus, the applicant needs to inform the employees of any environmental risks that may result from their work, and how these risks must be dealt with in order to avoid pollution and/or degradation of the environment.

In the case of permanent staff required during the operational phase of the project, the applicant shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the applicant shall keep a record of adequate environmental induction training.

2.7.1 MANNER IN WHICH EMPLOYEES WILL BE INFORMED OF ENVIRONMENTAL RISKS

The specific requirements for environmental training include:

- Site Environmental Induction Training: All site staff and employees will receive induction training which will be presented by the Health and Safety Manager Representatives. The induction training must include an environmental management component which will be prepared by the Mine EO and presented where possible by the Mine EO. The training material must include general environmental awareness and an overview of the EMPr and EA requirements. The Induction Training Material must be reviewed and approved by the ECO;
- Regular Environmental Toolbox Talks: Environmental toolbox talks will be prepared by the Mine EO to cover a range of environmental topics and must be presented to relevant staff during applicable times during all relevant phases. The aim of these toolbox talks will be to inform site employees of environmental requirements pertaining to specific activities, as well as specific EMPr and EA requirements and obligations;

- Informal training of all staff on site is also required on an on-going basis through informal discussions, on-site supervision and through facilitation of day to day activities. Such training must be given or otherwise facilitated by the Mine EO; and
- The Mine EO must review all safe work procedures/risk assessments/DSTI's (daily safe task instruction) from the safety department and include the relevant environmental risks and appropriate mitigation measures. Since the above procedures are specific to the applicable activity being undertaken, the inclusion of environmental measures aims to ensure each activity is undertaken in an environmentally responsible manner.

2.7.2 EMERGENCY RESPONSE PLAN

Elandsfontein Colliery 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 rest 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, reducing the probability is the preferred option. Below are some common emergency preparedness approaches:

- Threat consequence if and when the 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 prior to commencing work. The Emergency Preparedness and Response Plan should be based on a baseline Hazard and Risk Assessment and should provide for the following as a minimum:

- Risk assessment (identification of areas where accidents and emergency situations may occur, communities and individuals that may be impacted);
- Response procedures;
- Provision of equipment and resources;
- Designation of responsibilities;
- Communication and reporting (including that with potentially Affected Communities);
- Periodic training to ensure effective response; and
- Periodic review and revision, as necessary, to reflect changing conditions.

The Applicant must ensure that the Emergency Preparedness and Response Plan makes provision for environmental emergencies, including, but not limited to;

- Fire Prevention;
- Fire Emergency Response;
- Spill prevention;
- Spill Response;
- Contamination of a water resource;
- Accidents to employees; and
- Use of hazardous substances and materials, etc.

The Applicant 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.

2.7.2.1 FIRE

Fires represent a significant risk to mining operations and require special attention in the Emergency Response Plan. Sparks generated during welding, spontaneous combustion, cutting of metal or gas cutting can result in fires. Every possible precaution shall therefore be taken when working with this equipment near potential sources of combustion. The Applicant must take all reasonable measures to ensure that fires are not started as a result of activities on site. No smoking is allowed near containers with flammable contents or at areas that are highly flammable. Smoking is only permitted at areas designated for smoking. No open fires are permitted on site and no burning of waste is to be allowed on site. The Applicant shall ensure that there is always sufficient fire-fighting equipment available on site. Such precautions include having an approved fire extinguisher immediately available at the site of any such activities. The Applicant is to ensure that he/she has the contact details of the nearest fire station in case of an emergency. Appropriate and correctly serviced equipment must be available for all activities that are likely to generate fire.

It is further anticipated that firebreaks will be required around the site perimeter. It is recommended that such fire prevention measures are implemented in consultation with adjacent landowners and where necessary that the Applicant coordinate fire prevention efforts with local Fire Protection Agency (FPA).

2.7.2.2 HEALTH AND SAFETY

The Applicant shall make allowance for the supply, erection, maintenance and removal of the information boards. Information boards shall also provide the name of the process managers, relevant contact person and contact number. This will ensure that the public access to request information and/or to lodge any complaints. The boards will essentially be to advise the public of the construction activities to be undertaken or being undertaken and to advise of the prohibition of entering demarcated “no-go” areas.

The Applicant must ensure that compliance with the Mine Health and Safety Act (Act No. 29 of 1996) and the Occupational Health and Safety Act (Act No. 85 of 1993) is strictly adhered to. All reasonable measures must be taken to ensure the safety of all site staff and the surrounding community is not compromised. No weapons may be brought onto the property by any person unless the carrying of a weapon is required and approved in carrying out their specific duties. Where fencing is temporarily affected, temporary security must be provided at all times until the fence is reinstated.

The Applicant must ensure that all vehicles using public roads are in a roadworthy condition, that drivers adhere to the speed limits and that their loads are secured and that all local, provincial and national regulations are adhered to. The Mine shall make provision for flagmen to regulate traffic and construction vehicles when necessary.

The Applicant must ensure that all accidents and incidents are recorded and reported to the EO/ECO. The Applicant must have easy access to all relevant emergency numbers for example, spill response teams, fire authorities, fire protection associations, medical emergency, nearest emergency rooms (hospitals) to the site, of both private and public hospitals. The Applicant must take all reasonable measures to ensure the health and safety of all employees, visitors and the public.

2.7.2.3 SPILL RESPONSE PROCEDURE

All relevant employees, staff and labourers must be 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 included 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 (waste from spills of hazardous materials shall be disposed of as hazardous waste at a suitably licensed waste disposal facility);
- The Mine EO shall record details of the spill in their respective incident registers; and
- 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).

In the event of any spills which are classified as medium or major incidents, the Mine EO shall immediately inform the ECO/EM. The EO/ECO shall record the incident in the non-conformance and incident register and advise on the appropriate measures and timeframes for corrective action. Environmental incident reports shall be completed and submitted to the Mine Manger and ECO/EM within 5 working days for all medium and major incidents. If there is a requirement to report the incident to the authorities, this shall be done by the Applicant in consultation with the ECO/EM.

The Applicant must also, (as per Section 30 of the NEMA) notify the Director-General (DHSWS, DEFF and DMRE), South African Police Services and 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.

The Applicant 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.

2.7.2.4 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 are provided below:

- Limit the size of the area to be disturbed as far as is practically possible;

- Design and construct infrastructure such as the PCD and pit dewatering dams with both decant and drainage systems inclusive of storm water runoff measures;
- Conduct regular dam inspections in line with the regulatory requirements;
- Design and construct waste rock dumps and overburden dumps with adequate storm water runoff measures;
- Establish and maintain dirty and clean water systems in line with the regulatory requirements;
- Treat all contaminated water prior to discharge;
- 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 stream present on site;
- Investigate any I&AP claims of pollution or contamination as a result of mining activities;
- Continue with concurrent rehabilitation;
- Operate the mine in line with the proposed closure goals and objectives;
- Rehabilitate the proposed mining site in line with the requirements of the detailed rehabilitation and closure plan; and
- Implement the impact management objectives, outcomes and actions, as described above.

It is of critical importance that the broad measures to control or remedy any causes of pollution or environmental degradation are applied during all phases of the proposed mining operation. This is essential and allows for the operation to be conducted in a manner that will allow for the post mining closure goals and objectives to be met.

3 COMPLIANCE MONITORING

3.1 RESPONSIBLE PERSONS

Table 4: Roles and responsibilities for environmental resources on site

Environmental Resource	Key Responsibility	Tasks	Reporting
Environmental Manager (EM)	Overall responsibility for environmental management at the mine	Review compliance monitoring reports and audit reports Assign responsibilities for corrective actions and addressing non-compliance Liaison with authorities Issuance of NCR's Reporting KPI's to mine management Liaison with landowners and Key stakeholders with regards to environmental issues Supervise Environmental Monitoring Programmes	Reports to Mine management
Environmental Officer (EO)	The EO is responsible for **internal and external** monitoring compliance against the conditions of the EMPr and other licenses and permits. The EO is only responsible for implementation of management measures that are the responsibility of the Applicant	Undertake regular (at least weekly) site inspections Report on compliance and advise applicant on corrective actions Implement corrective actions where the responsibility lies with Applicant Coordinate and Implement Environmental Monitoring Programmes	Reports to EM

Environmental Resource	Key Responsibility	Tasks	Reporting
		Environmental record keeping	
Independent Environmental Auditor (IEA)	Responsible for external compliance audits and annual Performance Assessments	Conducting Auditing against the EMPR Recommendations for improvement	Reports to authorities

3.2 METHOD OF MONITORING IMPACT MANAGEMENT ACTIONS

This section provides a framework for the detailed procedure which will be developed by the mine.

Different reporting mechanisms may include:

- Inspections;
- Reporting accidents and emergencies;
- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

All monitoring and auditing must be accompanied by applicable records and evidence (e.g. delivery slips, photographic records, etc.). All reports must be retained and made available for inspection by the ECO, the Applicant and /or the Relevant Competent Authorities. All reports shall be signed by the relevant parties to ensure accountability.

3.3 MONITORING AND REPORTING FREQUENCY

The following auditing and reporting shall be required during operations:

- Weekly Compliance Reports: These reports must be prepared by the designated Mine EO and must aim to monitor and report on-site environmental performance; and
- Monthly Compliance Audits: These audits must be undertaken by the mine EO and must aim to monitor and report on compliance with the requirements of the relevant authorisations, licences and permits, the approved EMPr.

3.4 MECHANISMS FOR MONITORING COMPLIANCE

Table 5 below provides a summary of the functional requirements for monitoring that needs to be implemented, identifies who is responsible for the monitoring and the frequency of monitoring and reporting.

Table 5: Mechanisms for monitoring compliance

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
Mine Planning and Design	None	None		
Mine Infrastructure Construction	All Impacts Identified during the EIA	Site Inspections and checklists	Environmental Officer (EO) / Environmental Manager (EM)	Daily inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Weekly inspections
				Monthly Reports
			EO / EM	Monthly Audit Reports
			EO / EM	Annual Performance Assessment
Underground and Opencast Mining	All Impacts Identified during the EIA	Site Inspections and checklists	EO / EM	Daily inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Weekly inspections
				Monthly Reports
			EO / EM	Monthly Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment
Mineral Processing		Site Inspections and checklists	EO / EM	Daily inspections and checklists

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
	All Impacts Identified during the EIA	Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Weekly inspections
				Monthly Reports
			EO / EM	Monthly Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment
Decommissioning Activities	All Impacts Identified during the EIA	Site Inspections and checklists	EO / EM	Daily inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Weekly inspections
				Monthly Reports
			EO / EM	Monthly Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment
Rehabilitation	All Impacts Identified during the EIA	Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Weekly inspections
				Monthly Reports
			EO / EM	Monthly Audit Reports

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
			Independent Environmental Auditor	Annual Performance Assessment
Closure - Aftercare and Maintenance	All Impacts Identified during the EIA	Report Review and Development of Action Plans for Corrective Action	EO / EM	As Required
		Site Inspections and Audits	EO / EM	Bi-Monthly inspections
				Bi-Monthly Reports
			EO / EM	Bi-Annual Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment

3.5 THE EMPR PERFORMANCE ASSESSMENT / AUDIT REPORT

Scheduled Environmental Compliance Audits are required to be undertaken in terms of Regulation 34 of the National Environmental Management Act, Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014. Regulation 34 states:

1) *"The holder of an environmental authorisation must, for the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid-*

   (a) Ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and

   (b) Submit an environmental audit report to the relevant competent authority.

2) *The environmental audit report contemplated in sub-regulation (1) must-*

   (a) be prepared by an independent person with the relevant environmental auditing expertise;

   (b) provide verifiable findings, in a structured and systematic manner, on

      i) The level of performance against and compliance of an organisation or project with the provisions of the requisite environmental authorisation or EMPr and, where applicable, the closure plan; and

      ii) The ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;

   (c) Contain the information set out in Appendix 7; and

   (d) Be conducted and submitted to the competent authority at intervals as indicated in the environmental authorisation".

An EMPr performance assessment audit report shall be submitted to the Department of Mineral Resources and Energy (DMRE) on an annual basis (each year of mining and before applying for closure). The holder of the mining right must appoint an independent qualified person for the monitoring and to compile a report and must comply with NEMA GNR 982 Appendix 7.

3.6 REVIEW AND REVISION OF THE EMPR

It is important to note that this EMPr is made legally binding on the applicant at such time as the EMPr is approved by the decision-making authority. Since this is a mining project, the overarching legislation is the MPRDA, and it is important to note that in accordance with Section 102 of the MPRDA, no EMPr may be amended or varied without the written consent of the minister. It is however also important to consider that the EMPr is a dynamic document which may require such 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); and
- Secondary impacts occur as a result of the mitigation measures.

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

It is recommended that a risk assessment protocol must be developed and implemented by the EO which shall be utilised to evaluate the environmental risk associated with the potential proposed alterations and/or amendments. The results of the risk assessment must then be included in the submission to the competent authority for the amendment process. It is important to note that if alterations and/or amendments are required, these may only be effected with written approval from the competent authority and in accordance with the then-in-effect relevant legal processes.

4 IMPACT MANAGEMENT OUTCOMES

This section of the EMPr provides the impact management outcomes identified for the Mine. The impact management objectives, including the standard to be achieved, are summarised in **Table 6** below.

Table 6: Impact Management Outcomes

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Surface Rehabilitation **Mine area site preparation** **Opencast Mining** **Access roads**	Alteration of topography	Topography and Landform	Construction Operation Decommissioning Rehabilitation and Closure	Control through site planning and design	Refer to attached Rehabilitation and Closure Plan
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Storm water management**	Altered drainage patterns	Topography and Landform	Construction Operation Decommissioning Rehabilitation and Closure	Control through proper soil management procedures	Rehabilitation and closure plan DHSWS best practice Guidelines
Underground mining adits, ventilation shafts and rescue boreholes **Opencast Mining** **Post Closure Monitoring and Maintenance** **Water management infrastructure construction**	Soil surface change	Topography and Landform	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance through mine design and planning (depth of mining, safety factors, overburden and rock qualities)	Appropriate safety factors (Salomon and Monroe) as calculated by engineers and in consultation with DHSWS/DMRE
Underground and opencast mining	Impacts on Geology	Geology	Operation	Modify through mine planning, design and rehabilitation	MPRDA Rehabilitation and Closure Plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Post Closure Monitoring and Maintenance** **Storm water management** **Water management infrastructure construction**	Erosion and sedimentation	Soils	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through preventative measures (Soil placement, storm water infrastructure, erosion control structures)	CARA
Relevant Infrastructure removal **Mineral Processing** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Post Closure Monitoring and Maintenance** **Storm water management** **Water management infrastructure construction**	Soil compaction	Soils	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Avoid through implementation of EMPr mitigation measures Remedy through application of treatment measures (e.g. ripping)	Principles of CARA Rehabilitation and Closure Plan Ripping to 30cm where soil depth permits
General decommissioning activities **General Surface Rehabilitation** **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Underground mining** **Opencast Mining**	Soil Pollution/Contamination	Soils	Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. bunding, spill kits) Remedy through clean-up and waste disposal	Hazardous Substances Act NWA NEMA Duty of Care NEMWA Incident reporting procedures DHSWS minimum standards for waste disposal

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Post Closure Monitoring and Maintenance **Re-vegetation** **Storm water management** **Water management infrastructure construction**				Modify through soil treatment if required	
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Underground mining** **Opencast Mining** **Storm water management** **Water management infrastructure construction**	Loss of soil fertility (denitrification, loss of soil nutrient store and organic carbon stores) and loss of land capability	Land Capability	Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. limit area of disturbance) Remedy through soil remediation if required (e.g. fertilizer and Organic Matter applications)	CARA Rehabilitation and Closure Plan
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Underground mining** **Opencast Mining** **Storm water management** **Water management Infrastructure construction**	Loss of soil resource and its utilisation potential	Land Capability	Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. limit area of disturbance) Remedy through soil remediation if required (e.g. fertilizer and Organic Matter applications)	CARA Rehabilitation and Closure Plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Relevant Infrastructure removal **Mine area site preparation** **Underground mining** **Opencast Mining** **Water management Infrastructure construction** **Water Treatment**	Damage/Disruption of Ecosystem Services	Land Use	Construction Operation Decommissioning Rehabilitation and Closure	Avoid through implementation of EMPr mitigation measures (e.g. service detection and communication with landowners) Remedy through repair or reinstatement of services if required	Stakeholder Engagement Plan Rehabilitation and Closure Plan Grievance Mechanism
General Surface Rehabilitation **Relevant Infrastructure removal** **Mine area site preparation** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Storm water management** **Water management infrastructure construction**	Interference with existing land uses	Land Use	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Avoid through implementation of EMPr mitigation measures (e.g. communication with landowners)	Stakeholder Engagement Plan Rehabilitation and Closure Plan Grievance Mechanism
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities** **Mineral Processing**	Direct and indirect mortality of flora and fauna	Fauna and Flora	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Control through implementation of EMPr mitigation measures (e.g. limit area of disturbance, training) Avoid/Stop through relocation of threatened or protected species	NEMBA TOPS

Activity		Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Underground mining adits, ventilation shafts and rescue boreholes **Opencast Mining** **Post Closure Monitoring and Maintenance** **Site visits** **Storm water management** **Water management infrastructure construction**						
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Storm water management** **Water management infrastructure construction**		Habitat fragmentation and blockage of seasonal and dispersal movements	Fauna and Flora	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. shape of disturbed areas, maintaining corridors)	NEMBA
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities**		Introduction/invasion by alien (non-native) species	Fauna and Flora	Planning and Design Construction Operation	Control through implementation of EMPr mitigation measures (e.g. alien	NEMBA TOPS Alien vegetation management plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Mineral Processing **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining** **Post Closure Monitoring and Maintenance** **Site visits** **Storm water management** **Water management infrastructure construction**			Decommissioning Rehabilitation and Closure	vegetation management plan) Avoid/Stop through preventative measures (e.g. limit extent of disturbance)	Hazardous Substances Act SANS 10206
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Mineral Processing** **Underground and opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Water management Infrastructure construction**	Pollution of surface water resources/decreased water quality	Surface Water	Construction Operation Decommissioning Rehabilitation and Closure	Avoid through implementation of preventative measures (e.g. Bunding, Hazardous materials management, Pollution prevention measures, storm water management) Control through implementation of mitigation measures (water treatment when required)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines
Maintenance and operation of site infrastructure and facilities **Water management infrastructure construction** **Underground and opencast mining** **Water treatment plant**	Decrease in Surface Water Availability	Surface Water	Construction Operation	Avoid and control through implementation of preventative measures (e.g. limitation of water usage, water conservation strategies, optimization of	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines.

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				water usage and recycling)	
General Surface Rehabilitation **Underground mining dewatering** **Storm water management**	Dewatering of groundwater aquifers	Groundwater	Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. limitation of water usage, water conservation strategies, optimization of water usage and recycling)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines
General decommissioning activities **Mineral Processing** **Underground mining dewatering** **Re-vegetation** **Water management infrastructure construction**	Decrease in groundwater quantity/availability	Groundwater	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. limitation of water usage, water conservation strategies, optimization of water usage and recycling)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines
Post Closure Monitoring and Maintenance	Acid Mine Drainage	Groundwater	Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. AMD mitigation strategy, mine design and progressive rehabilitation)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				Remedy through water treatment when required	Rehabilitation and closure plan AMD mitigation Strategy
Maintenance and operation of site infrastructure and facilities **Mineral Processing** **Underground mining** **Opencast Mining** **Post Closure Monitoring and Maintenance** **Re-vegetation**	Pollution of groundwater/decreased water quality	Groundwater	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. Bunding, Hazardous materials management, Pollution prevention measures) Control through implementation of mitigation measures (AMD mitigation strategy, progressive rehabilitation)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines Rehabilitation and closure plan AMD mitigation Strategy
Maintenance and operation of site infrastructure and facilities **Underground and opencast mining** **Water management infrastructure construction**	Decreased water to adjacent wetlands	Wetlands	Construction Operation Decommissioning	Avoid and control through implementation of preventative measures (e.g. wetland delineation and mine planning, limitation area of wetland disturbance – i.e.: avoid wetlands and wetland buffer areas)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines Rehabilitation and closure plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				Remedy/modify through wetland rehabilitation	
Maintenance and operation of site infrastructure and facilities **Water management infrastructure construction**	Loss and disturbance of wetland habitat	Wetlands	Construction Operation Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. wetland delineation and mine planning, limitation area of wetland disturbance – i.e.: avoid wetlands and wetland buffer areas) Remedy/modify through wetland rehabilitation	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DHSWS best practice guidelines Rehabilitation and closure plan
Post Closure Monitoring and Maintenance	Decant from workings	Environmental Pollution	Rehabilitation and Closure	Avoid through implementation of suitable progressive rehabilitation and soil management Control/Remedy through interception of decant and treatment of polluted water where required	MPRDA NWA NEMA Duty of Care NEMA Polluter Pays Principle NEMWA GN704 DHSWS best practice guidelines Rehabilitation and closure plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **Relevant Infrastructure removal** **Mineral Processing**	General Environmental Pollution	Environmental Pollution	Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. Spill prevention, Hydrocarbon Storage)	Hazardous Substances Act NWA MSDS OHSA MHSA NEMA Duty of Care NEMA Polluter Pays Principle NEMWA Incident reporting procedures DHSWS minimum standards for waste disposal
General decommissioning activities **General Surface Rehabilitation** **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Underground and opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Storm water management** **Water management infrastructure construction**	Hydrocarbon spills/contamination	Environmental Pollution	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. bunding, spill kits) Remedy through clean-up and waste disposal Modify through soil treatment if required	Hazardous Substances Act NWA MSDS OHSA MHSA NEMA Duty of Care NEMWA Incident reporting procedures DHSWS minimum standards for waste disposal
General decommissioning activities **Maintenance and operation of site infrastructure and facilities**	Sewage spills/contamination	Environmental Pollution	Construction Operation Decommissioning	Avoid and control through implementation of preventative	NWA NEMA Duty of Care NEMA Polluter Pays Principle

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
			Rehabilitation and Closure	measures (e.g. location of toilets, spill prevention, waste management)	OHSA MHSA
Underground mining adits, ventilation shafts and rescue boreholes **Opencast Mining**	Discovery and preservation of fossils	Heritage	Operation	Avoid and control through implementation of preventative measures (e.g. Palaeontological site visit and training, watching brief) Modify through removal and curation of fossils	NEMA MPRDA NHRA SAHRA permitting requirements
Underground mining adits, ventilation shafts and rescue boreholes **Water management infrastructure construction** **Opencast Mining**	Destruction/damage of palaeontological resources	Heritage	Construction Operation Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. Palaeontological site visit and training, watching brief) Modify through removal and curation of fossils	NEMA MPRDA NHRA SAHRA permitting requirements
General Surface Rehabilitation **Mine area site preparation** **Underground mining adits, ventilation shafts and rescue boreholes** **Opencast Mining**	Destruction/damage of heritage resources	Heritage	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. fencing of graveyards,	NEMA MPRDA NHRA SAHRA permitting requirements

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Storm water management **Water management infrastructure construction**				watching brief, chance finds procedure) Stop through relocation of graves if required	
General Construction Management **General Mine Management**	Crime and violence	Social	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through preventative measures (e.g. site security, code of conduct)	Health and Safety Plan MHSA OHSA Code of Conduct
General Construction Management **General Mine Management**	Influx of migrant workers	Social	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through mitigation measures (e.g. recruitment procedure, grievance mechanism) Control through implementation of stakeholder engagement plan	Labour Act Basic Conditions of Employment Act SLP Commitments
General Construction Management **General Mine Management** **Mineral Processing**	Loss of sense of place	Social	Construction Operation Decommissioning Rehabilitation and Closure	Modify through reduction of visual impact	Rehabilitation and Closure Plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Construction Management **General Mine Management**	Relocation / resettlement	Social	Construction Operation Decommissioning Rehabilitation and Closure	Modify and control through mitigation measures (e.g. grievance mechanism, Relocation plan)	Constitution of South Africa SLP Commitments
General Construction Management **General Mine Management** **Maintenance and operation of site infrastructure and facilities**	Social vices	Social	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through mitigation measures (e.g. recruitment procedure, grievance mechanism, code of conduct) Control through stakeholder engagement plan	Labour Act Basic Conditions of Employment Act SLP Commitments Code of Conduct Livelihood restoration plan
General Construction Management **General Mine Management**	Economic growth	Socio-Economic	Construction Operation Decommissioning Rehabilitation and Closure	Maximise through optimisation of economic growth opportunities	SLP Commitments
General Construction Management **General Mine Management**	Education, Skills Development and Training	Socio-Economic	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Maximise skills development and training through implementation of SLP	SLP Commitments

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Construction Management **General decommissioning activities** **General Mine Management** **Maintenance and operation of site infrastructure and facilities** **Underground and opencast mining** **Water management infrastructure construction**	Employment Opportunities	Socio-Economic	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Maximise employment opportunities through implementation of SLP	SLP Commitments
General Construction Management **General Mine Management**	Loss of jobs and economic opportunities	Socio-Economic	Construction Operation Decommissioning Rehabilitation and Closure	Minimise impacts of job loss through skills development and livelihood restoration	SLP Commitments
General Mine Management	Re-instatement of livelihoods	Socio-Economic	Operation Decommissioning Rehabilitation and Closure	Minimise impacts of job loss through skills development and livelihood restoration	SLP Commitments
Underground and opencast mining	Coal supply for energy security	Socio-Economic	Operation	Maximise security of coal supply through sound and responsible mine management	Legal register SLP Commitments
General Construction Management **General decommissioning activities** **General Mine Management** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation**	Community health and safety	Health and Safety	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through preventative measures (e.g. HIV/AIDS awareness) Remedy through application of	OHSA MHSA SLP Commitments Grievance Mechanism

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Underground and opencast mining **Re-vegetation** **Water management infrastructure construction**				mitigation measures in EMP	
General Construction Management **General decommissioning activities** **General Mine Management** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Underground and opencast mining** **Re-vegetation** **Water management infrastructure construction**	Health impacts	Health and Safety	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through preventative measures (e.g. HIV/AIDS awareness) Remedy through application of mitigation measures in EMP	OHSA MHSA SLP Commitments Grievance Mechanism
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Mineral Processing** **Underground and opencast mining**	Fire and explosion hazard	Health and Safety	Construction Operation	Avoid and control through implementation of preventative measures (e.g. Fire breaks, Blasting procedures, hazardous substances management)	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration
Mine area site preparation **Underground and opencast mining** **Water management Infrastructure construction**	Damage to road infrastructure	Transportation, Infrastructure and Traffic	Construction Operation Decommissioning	Avoid and control through implementation of EMPr mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	National Road Traffic Act OHSA MHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Mine area site preparation **Underground and opencast mining** **Water management infrastructure construction**	Increased traffic	Transportation, Infrastructure and Traffic	Construction Operation	Avoid and control through implementation of EMPr mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	National Road Traffic Act OHSA MHSA
Mineral Processing	Visual impact of light at night	Visual	Construction Operation	Avoid and control through implementation of EMPr mitigation measures (e.g. directional down lighting)	Security specifications
General Surface Rehabilitation **Mine area site preparation** **Mineral Processing** **Underground and opencast mining adits, ventilation shafts and rescue boreholes** **Storm water management** **Water management Infrastructure construction**	Visual impact of mine infrastructure, stockpiles and dust	Visual	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. dust suppression, mine planning and progressive rehabilitation)	Rehabilitation and Closure Plan Final land use objectives
General decommissioning activities **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Mining** **Re-vegetation**	Greenhouse gas emissions	Air Quality	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. vehicle maintenance, progressive rehabilitation)	NEMAQA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Water management infrastructure construction **General Surface Rehabilitation** **Storm water management**					
Drilling monitoring boreholes **General decommissioning activities** **General Surface Rehabilitation** **Relevant Infrastructure removal** **Mine area site preparation** **Mineral Processing** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Storm water management** **Water management infrastructure construction**	Fugitive emissions (Dust)	Air Quality	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. speed limit enforcement) Control through implementation of EMPr mitigation measures (e.g. dust suppression)	Road Traffic Act NEMAQA Dust regulations
Drilling monitoring boreholes **General decommissioning activities** **General Surface Rehabilitation** **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mineral Processing** **Re-vegetation** **Storm water management** **Water management infrastructure construction**	Disturbing and/or nuisance noise	Noise	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Avoid through preventative measures (e.g. communication with landowners, timing of activities) Control through implementation of EMPr mitigation measures (e.g. Noise abatement measures)	ECA noise regulations SANS 10103 OHSA MHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Mining	Ground Vibration and human perception	Blasting and Vibration	Operation	Avoid and control through implementation of preventative measures (e.g. blast procedures, monitoring, communication with landowners, emergency response procedures)	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration Blast Procedures Emergency response procedure
Mining	Ground Vibration Impacts on productivity of farm animals (cattle, chickens, pigs, etc.)	Blasting and Vibration	Operation	Avoid and control through implementation of preventative measures (e.g. blast procedures, monitoring, communication with landowners, emergency response procedures)	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration Blast Procedures Emergency response procedure
Mining	Impacts on Infrastructure (roads, communications infrastructure, services, houses, boreholes)	Blasting and Vibration	Operation	Avoid and control through implementation of preventative measures (e.g. structural surveys, blast procedures, monitoring,	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				communication with landowners)	safe blasting for ground vibration Blast Procedures Emergency response procedure
Mining	Noxious fumes	Blasting and Vibration	Operation	Avoid and control through implementation of preventative measures (e.g. structural surveys, blast procedures, monitoring, communication with landowners)	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration Blast Procedures Emergency response procedure

5 IMPACT MANAGEMENT ACTIONS: MANAGEMENT PROGRAMME

Table 7: below provides measures for management of the environmental aspects that are impacted on during the different phases of the project.

Table 7: Description of the proposed impact management actions.

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall ensure that Social and Environmental human resources have the knowledge, skills, and experience necessary to perform their work with competence and efficiency.	Throughout LoM
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall appoint a suitably qualified and competent ECO or EM. The ECO must preferably have a tertiary qualification in an Environmental Management or appropriate field. The ECO should have appropriate qualification and experience in the implementation of environmental management specifications. The ECO shall be tasked with auditing the mines environmental compliance on a regular basis (at least quarterly). The Applicant shall provide the ECO with the necessary support to ensure that the environmental aspects relating to the development is adhered to.	Throughout LoM
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine must have a copy of this EMPr at the point of use and should be briefed by the Mine EO or ECO with regards to the use and implementation of the EMPr.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The EMPr must be made binding on all sub-contractors operating on behalf of the Mining Right Holder.	Throughout LoM
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall ensure that all sub-contractors abide by the requirements of the EMPr through the inclusion of the EMPr and applicable environmental requirements in contractual agreements for all sub-contractors.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Emergencies have the potential for large scale and high significance impacts	The mine shall develop and implement an Emergency Preparedness and Response Plan which shall include and provide for the following as a minimum: • Risk assessment; • Response procedures; • Provision of equipment and resources; • Designation of responsibilities; • Communication and reporting (including that with potentially affected communities) • Periodic training to ensure effective response; and • Periodic review and revision, as necessary, to reflect changing conditions.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The necessary provisions (financial, resources, materials) shall be made in order to ensure compliance with the Emergency Preparedness and Response Plan.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	The mine shall ensure that reasonable measures are taken to ensure the safety of all site staff, including induction training for all employees and visitors.	Throughout LoM
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	All staff and sub-contractors must be informed about the community concerns, especially during the construction phase. Toolbox talks can be used for this. Speed limits on the road to the mine must be enforced. People that do not adhere to the speed limits must receive written warnings.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	The mine shall provide appropriate Personal Protective Equipment (PPE) to employees wherever required and in accordance with the risks associated with their activities.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	The mine shall undertake safety audits to ensure compliance with the; • Occupational Health and Safety Act (Act No. 85 of 1993) and associated regulations; and • Mine Health and Safety Act (Act 29 of 1996) as amended and associated regulations.	Throughout LoM
General Mine Management	Construction Operation	Health and safety risks are classified as high significance	The mine shall implement a safety reporting procedure to ensure that all accidents and incidents (safety and environmental) are recorded and reported to the Mine manager and EO.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Decommissioning Rehabilitation and Closure	due to the value of human life		
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	Any containers in which hazardous substances (e.g. fuel, paints, solvents) are stored shall be clearly marked as to the contents therein (in accordance with OHSA regulations). Material Safety Data Sheets (MSDS) must be available at the hazardous stores for all chemicals stored therein.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	SANS Code of Practice for Mine Residue Deposits (SANS 10286, previously SABS 0286:1998) should be used to do a safety classification on any waste rock dumps.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Security risks can have a highly significant impact although localized	On-site vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site to minimise excessive environmental disturbance to the soil and vegetation off site, and to minimise disruption of traffic.	Throughout LoM
General Mine Management	Construction Operation	The creation of roads can have a significant and relatively widespread impact, especially as roads create corridors	Any new access (if required) shall first be approved by the Mine Manager and ECO (method statement may be required) and should be provided with erosion and silt pollution prevention measures where required.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Security risks can have a highly significant impact although localized	No person will be allowed to keep or use alcohol, recreational drugs, traditional or modern weapons, snares or otherwise dangerous objects on-site, or to enter the site while under the influence of alcohol or drugs.	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	All employees and visitors to the site must undergo a site induction which shall include basic environmental awareness and site-specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures). This induction should be presented or otherwise facilitated by the Mine EO wherever possible.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall develop and implement a recruitment policy that allows equal opportunity to all people (woman, disabled) and give preference to local labour where possible.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	A stakeholder engagement plan will assist the mine to outline their approach towards communicating in the most efficient way possible with stakeholders throughout the life of the project. Such a plan cannot be considered a once off activity and should be updated on a yearly basis to ensure that it stays relevant and to capture new information. Stakeholders must provide input in the Stakeholder Engagement Plan.	Throughout LoM
General Mine Management	Planning	No direct physical disturbance	Skilling and training of local community members should take place to equip people to become eligible for positions at the mine.	Prior to construction

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The procurement policy for the mine should focus on utilising service providers from the local area as far as reasonably possible to encourage the growth of local businesses.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall attempt, where possible, to recruit local service providers and subcontractors to assist with construction activities.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall comply with the conditions of the SLP developed for the mine to ensure the socio-economic benefits of the mine are maximised.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall comply with all relevant legislation pertaining to labour recruitment and employment.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall develop and implement a Stakeholder Engagement Plan in consultation with a suitably qualified specialist. This plan shall include a strategy to actively manage expectations. This includes the sharing of relevant information in a way that is accessible to all members of the local communities. Frequent communication is a key aspect in the management of expectations.	Developed as early as possible and implemented throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall designate a community liaison officer that deals specifically with the surrounding communities. The Mine shall communicate frequently with the affected stakeholders to ensure that they understand the processes and do not develop unrealistic expectations.	Appointment as early as possible and implemented throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall establish a detailed grievance mechanism for local communities to lodge concerns, suggestions and grievances which can be dealt with in a timely manner. The grievance mechanism shall aim to accomplish the following objectives; • Receive and register external communications from the public; • Screen and assess the issues raised and determine how to address them; • Identify roles and responsibilities relating to the reporting, recording and addressing of grievances; • Maintenance of a grievance register to record and track, and document responses and actions taken to address grievances; • Reporting of grievances to DMRE; and • Adjust the management program, as appropriate. The local communities must be informed that they can complain about perceived unsafe behaviour through the grievance mechanism.	Developed as early as possible and implemented throughout LoM
General Mine Management	Planning Construction Operation	No direct physical disturbance	A grievance register must be maintained by the mine to log grievances from landowners, communities, occupants and other Interested and Affected Parties, and respond to such grievances accordingly. The grievance register should be provided to authorities at any point in time if so requested. The grievance register shall contain, at a minimum, the following information;	Developed as early as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Decommissioning Rehabilitation and Closure		Date of the grievance being lodged, • Location relating to the grievance, • Contact details of the complainant, • Grievance description (detailed as possible), • Person receiving grievance, • Agreed corrective action, • Responsible party for corrective action, • Summary of actions taken (and date action was taken), • Status of grievance (open, closed-out, awaiting feedback etc.). The grievance mechanism must be communicated to all stakeholders and communities.	
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Open channels of communication between the mine and surrounding landowners/communities are essential. The mine shall establish a community liaison forum (CLF) that meet on a regular basis (at least quarterly). At this forum the mine can give feedback on its activities and keep the communities informed about matters that concern them in a transparent manner. The relevant authorities should also be invited to attend CLF meetings. This forum is an important mechanism to manage expectations and build relationships. Meeting minutes must be captured and forwarded to all attendees.	As early as possible in the process and implemented throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Employees should be sourced from the local area where possible.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall provide training, where necessary to the local work force as per the Environmental Awareness Plan. Skills development plans must be focussed on skills that the mine needs, and that are also transferable. As part of the Local Economic Development (LED) plan required as part of the SLP, the mine should identify projects that can assist more community members with earning a livelihood. The community should be involved in the identification of suitable programmes if possible, and the training programmes must include business development skills. Support should be given to people after the training to ensure that their newly acquired skills can be implemented.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Should relocation become necessary the mine must appoint a relocation specialist to compile a relocation action plan.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The Community Relations Manager (CRM) should establish relationships with the surrounding commercial farmers. This can include a yearly courtesy visit and sharing of environmental data to keep the farmers informed. All meetings should be recorded, and records must be included in the communication register. The names and contact details of surrounding landowners must be kept up to date.	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Stakeholder Engagement should continue throughout the life of the mine to ensure local communities are kept informed and allowed to raise issues. These issues will then be addressed through the grievance mechanism.	Throughout LoM
General Mine Management	Operation	No direct physical disturbance	Where retrenchments are unavoidable, they should be managed according to legislative requirements.	When retrenchments are required
Construction camp sewage management **Dust suppression**	Construction	Construction impacts are temporary in nature and have a limited extent but may include significant impacts	The physical footprint of any construction or site camp shall be minimised and vegetation clearance should be kept to the minimum required area. Topsoil shall be handled in accordance with the soil management principles presented in this EMPr and the soil management guide developed for the Mine. All construction and/or site camps shall be enclosed with a fence. The mesh size should be small enough for the fence to act as a catch net for blown debris and as a demarcation of the site. The fence shall be maintained as required to ensure access control remains effective.	Throughout construction

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Earthworks **Fencing** **Fuel Storage and refuelling** **Hazardous substances management** **Site security** **Soil Management** **Truck and heavy machinery operation** **Utilization of portable toilets and generation of sewage** **Vegetation clearance**			All temporary fences erected by the Mine shall be removed and the site restored on completion of construction. Site and construction camps must be kept in a clean, neat and tidy condition at all times. The Mine shall maintain good housekeeping practices and shall comply with the relevant HSE regulations in terms of materials storage. Stockpiles of construction materials may only be placed within demarcated areas within the construction camp. Laydown areas must be kept neat and tidy and free of litter or waste at all times. A waste storage area must be established within the site camp/construction camp that provides for appropriate and adequate waste storage and waste separation for recycling. All waste must be adequately contained to prevent ground and/or water pollution. The total volume of general waste stored shall not exceed 100m^3. In the case that a storage capacity exceeding this amount is required or planned for, the necessary waste permits must be obtained in accordance with the NEMWA beforehand. Dust suppression using dirty water is restricted to the dirty areas and must not be used for spraying topsoil stockpiles. The site camp/construction camp shall have adequate provision for the storage of hazardous waste (e.g. old oil filters, soil from spills etc.) and the waste shall be contained within closed containers to prevent the possibility of spillages. All fuel storage areas shall be bunded to contain at least 110% of the volume stored and will comply with the relevant safety regulations. Fuel storage areas may not be located within 100m of a watercourse and the total volume of fuel stored on site may not exceed 80 cubic metres (80 000l) without the necessary authorisation in terms of the NEMA. Fuel storage areas must be provided with an impervious surface with the provision to contain any potential fuel spillages during refuelling (e.g. a bunded, sealed concrete slab which drains to a sump/oil separator). No person may smoke or take part in any activity that may results in sparks near fuels and other flammable substances to prevent ignition. All hazardous substances shall be stored within designated areas that comply with the relevant HSE standards (e.g. ventilation, access control, HSE signage, firefighting equipment, MSDS, etc.) and that provide for spill prevention and containment. It is recommended that a dedicated, bunded and fenced Hazardous Storage Area is provided within the construction camp for this purpose.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
			Residue stockpiles shall not exceed 60m in height.	
			No open fires shall be permitted within the site camp/construction camp, except where approved by the responsible safety officer and EO/ECO and within a designated structure designed for that purpose. In such cases firefighting equipment must be readily available near the fireplace and an appropriate safety representative should be present at all times during burning of the fire. All fires shall be fully extinguished after use.	
Drilling monitoring boreholes **General Surface Rehabilitation** **Relevant Infrastructure removal**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Weeds and invader plants will be controlled in the manner prescribed in the Alien Management Plan that must be developed for the mine. Alien invasive tree species should be eradicated. Institute an eradication/control programme for early intervention if invasive species are detected, so that their spread to surrounding natural ecosystems can be prevented. Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds (including closure and post closure monitoring). The Plan must clearly define the areas from which alien vegetation must be removed as well as the plant, equipment, materials and methodology to be used (including safe disposal). Records of alien and invader species control must be kept for audit purposes.	Development of plan as soon as possible and implementation throughout LoM
Maintenance and operation of site infrastructure and facilities **Mine area site preparation**	Planning and Design Construction Operation	Impacts on red data species has a very high significance	The mine shall ensure that the relevant permits are obtained to remove and relocate protected species (if required). Plan activities carefully so that only vegetation that needs to be impacted is impacted. Permit natural vegetation to establish on topsoil stockpiles to maintain a seed bank. Overburden stockpiles and other residue stockpiles/deposits will not be suitable for vegetation establishment due to the lack of topsoil. Limit activity to area of disturbance and revegetate impacted areas as soon as possible.	Prior to commencement of activities or disturbance
Mineral Processing	Planning and Design Construction Operation Decommissioning	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Limit the vegetation disturbance to the designated areas only and the legal minimum requirement width for road and powerline servitudes must be strictly adhered to (where relevant). Where possible locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible and rehabilitate disturbed areas as soon as possible.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Post Closure Monitoring and Maintenance	Rehabilitation and Closure		No unnecessary clearing of vegetation may take place. Allow disturbed area to naturally revegetate through natural processes of succession however if deemed necessary, seeding with an appropriate seed mix must be undertaken.	
Site establishment – Camp **Permanent site office Infrastructure**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Vegetation clearance should be stripped with the topsoil to retain a more effective seedbank as well as giving the topsoil stockpiles better organic matter content.	Throughout LoM
Storm water management **Water management** **Infrastructure construction**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	The harvesting of plants by construction and mine workers is prohibited on site. This includes the harvesting of plants for firewood, construction material, the making of crafts and medicinal purposes.	Throughout LoM
Water Treatment	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Damage or harm to threatened plant species is illegal in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) unless a permit is issued. Threatened species are defined in terms of the most recent Red Data list of Southern African Plants. Employees and workers shall be educated with regards to any potential threatened species that may be encountered on site and shall take the necessary actions to prevent harm to any such species found on site.	Throughout LoM
	Construction Operation Decommissioning	Impacts on flora may occur over a large area (active mine areas) and	Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Rehabilitation and Closure	has the potential to be a relatively high significance		
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	All alien vegetation occurring on the site must be controlled in accordance with NEMBA. The area should be assessed, and the alien invasive species controlled. The mining areas should be monitored for the establishment and spread of alien invasive species throughout the LoM. The weed management plan and principles for weed management presented in this EMPr must be implemented throughout the lifespan of the mine.	Throughout LoM
	Construction Operation	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	All soil stockpiles shall be kept free of any weeds or alien invader plant species. Where possible, indigenous flora species should be encouraged to colonise stockpiles.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Alien species removal must take place in an appropriate manner, which includes: • Avoid disturbance to the soil as far as possible. • Use an appropriate control for each species. Some species may require manual and/or herbicide control. • Consult a specialist if necessary. • Adequate disposal to ensure these species do not spread from site.	Throughout LoM
General Surface Rehabilitation **Relevant Infrastructure removal**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Visitors and workers will be informed that the intentional killing of fauna is prohibited within the boundaries of the mining area, as well as neighbouring areas. No trapping, killing or poisoning of any wildlife is to be allowed on site, including snakes, birds, lizards, frogs, insects or mammals.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Maintenance and operation of site infrastructure and facilities **Mine area site preparation**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	The mine shall educate and inform all workers, subcontractors and visitors about any rare and endangered species through an environmental awareness plan and the distribution of posters, containing pictures of any potential rare and endangered species. Ensure that environmental awareness training takes place at regular intervals.	Throughout LoM
Mineral Processing **Post Closure Monitoring and Maintenance**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	The sighting of any rare or endangered species needs to be reported to management which will keep record of all such species. Should there be a risk of an impact to such a species, the mine shall notify a specialist who shall advise on the best course of action. Should relocation of any species be required, the necessary permits shall be obtained.	Throughout LoM
Site establishment – Camp **Site establishment – Permanent site office Infrastructure**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Ensure that there are waste disposal and littering prevention procedures in place to ensure decreased contact with humans. A waste management plan must be generated and implemented. The system must be monitored to ensure that the environment is not polluted, and that fauna do not consume the waste. Ensure that the appropriate training is given to staff and management.	During LoM
Site visits	Planning Construction Operation	Impacts on sensitive landscapes have the potential to be a relatively high significance with	The destruction of sensitive landscape features shall be avoided where possible and otherwise minimised through effective planning. In areas where the destruction cannot be avoided, these features should be re-introduced in the post mining landscape.	During construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Storm water management		widespread effects.		
Water management **Infrastructure construction** **Water Treatment**	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	No construction workers or mine employees may disturb, hunt, set traps/snares, utilise dead or alive fauna/livestock/wildlife/fish. This includes the killing of any animal caught in construction works. Disciplinary action must be taken if any fauna is wilfully disturbed or killed.	Throughout LoM
	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Ensure that noise control measures are implemented by reducing speed, ensure that exhaust systems are functioning according to manufacturer's specifications. Ensure that speed limits are enforced	Throughout LoM
	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Any animals found within excavations should be carefully returned without harm to an adjacent area away from mining activities, but preferably not further than 500m away from where it was found unless otherwise agreed to by the ECO.	Throughout LoM
	Planning and Design Construction	Impacts on fauna has the potential to be a relatively high significance	The Mine shall ensure that any snakes discovered in excavated areas, on or near the construction site are not killed or otherwise harassed. The Mine EO must be notified should a snake be found on or near the site. The Mine EO will be responsible to ensure that an	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure	especially where threatened or protected species are impacted upon	appropriately skilled person is summoned to remove the snake from the site for relocation to a suitable nearby location.	
	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	The mine shall take the necessary measures to limit the speed of trucks and vehicles on the roads on site and enforce these speed limits.	Throughout LoM
	Planning and Design Construction Operation Decommissioning	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Any red data species recorded within the areas that will be cleared should be relocated within re- vegetated areas where a good vegetation cover has been established. The mine must ensure relevant permits are in place if any threatened or protected species are relocated. Conduct a protected fauna species survey prior to commencement and relocate species where possible or required.	Throughout LoM
	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	No person should wilfully disturb the movement of any mammals, birds, amphibians, insects or reptiles on the mine site.	Throughout LoM
	Construction Operation	Impacts on soils can have significant impact both in	Topsoil shall be removed from all areas where physical disturbance of the surface will occur (up to a maximum of 30 cm depth or as specified by the EO).	As required

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Decommissioning Mine Infrastructure **Drilling monitoring boreholes** **General decommissioning activities** **General Surface Rehabilitation** **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing**	Decommissioning	terms of severity and scale. Impacts on soil can in turn affect land use and land capability.		
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Soils must be stripped from the area of activity. Topsoil's and subsoils should be stripped and stored separately. The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate significantly. Compaction of the removed topsoil must be avoided by prohibiting traffic on stockpiles. Stockpiles should only be used for their designated final purposes. The stockpiles will be vegetated where possible (rock stockpiles will not permit adequate vegetation growth) in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.	As required
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	To the greatest extent possible topsoil shall only be handled twice, only-once during the initial stripping of topsoil and a second time to replace it. Areas that are stripped should be optimised to limit unnecessary stripping. Storm water from upslope of the stripped areas should be diverted around these areas to limit the amount of storm water flowing over these areas. The timing of the topsoil stripping should be optimised to limit the time between stripping and construction/mining/deposition.	Throughout LoM
	Construction Operation	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Strip the topsoil and the remaining vegetation as per the rehabilitation guideline and place in the allocated locations for the various soil types.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Post Closure Monitoring and Maintenance **Re-vegetation**	Construction Operation	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Areas for stripping need to be delineated and stripping will only occur where soils are to be disturbed by activities that are described in the mine plan, and where a clearly defined end rehabilitation use for the stripped soil has been identified. Care must be taken to ensure that topsoil, subsoil and overburden is not unnecessarily contaminated with carbonaceous materials.	Throughout LoM
Site establishment – Camp **Site establishment – Permanent site office Infrastructure**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Topsoil and sub-soil stockpiles must be located such that the potential for erosion is minimised. Areas with existing erosion and stability issues must be avoided. If erosion occurs, corrective actions (erosion berms etc.) must be taken to minimize any further erosion from taking place. All other stockpiles such as subsoil and overburden (excluding topsoil stockpiles) should not exceed 60m in height. If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion. Only the designated access routes are to be used to reduce any unnecessary compaction. Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated. Implement land rehabilitation measures as defined in rehabilitation report.	Throughout LoM
Storm water management **Water management Infrastructure construction**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	There must be no contamination of topsoil. Prevent any spills from occurring. Machines must be parked within hard park areas and must be checked daily for fluid leaks.	Throughout LoM
Water Treatment	Construction Operation Decommissioning	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn	Topsoil stockpiles must be kept to a maximum height of 4m if space allows. The viability of topsoil decreases over time with a greater height of the stockpiles which would have cost implications during rehabilitation that should be considered.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Rehabilitation and Closure	affect land use and land capability.		
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Care must be taken to protect topsoil resources on site and thereby avoid the need to obtain additional topsoil from outside the site for rehabilitation. However, if additional topsoil needs to be sourced from outside the site, this shall be done with extreme caution not to introduce any alien or invasive species to the site. The topsoil shall be sourced from a location approved by, and a standard, acceptable to the EO.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Trucks, machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of leaks. All leaks will be cleaned up immediately using spill kits or as per the emergency response plan. For large spills a hazardous materials specialist shall be utilised.	Ongoing throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Accidental hydrocarbon spillages should be reported immediately, and then the affected soil should be removed, and rehabilitated or if this is not possible, disposed of at a waste sites designated to accept such waste. If soil (whether stockpiled or in its undisturbed natural state) is polluted, the first management priority is to treat the pollution by means of in situ bioremediation. The acceptability of this option must be verified by an appropriate expert and by the local water authority on a case by case basis, before it is implemented. If *in situ* treatment is not possible or acceptable then the polluted soil must be classified according to the Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste and disposed of at an appropriate, permitted, off-site waste facility.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	All activities should be limited to the necessary area of disturbance. This can be encouraged by pegging out the area of activity. Where required the compacted soils should be disked/ripped to an adequate depth and re- vegetated with an indigenous seed mix.	Throughout LoM
Mining and rehabilitation	Operation Decommissioning Rehabilitation and Closure	Impacts on alternative land uses are considered highly significant and can occur over a large area.	The post mining land use must be predetermined in order to ensure it is rehabilitated to suit the use of the land. The final landform must be used as a guide during role over mining to ensure that the site is free draining.	Established early during operations and implemented during rehabilitation
All mining activities	Planning	Subsidence impacts can affect the local area	Follow the subsidence reports guidelines (Geomech Consulting (Pty) Ltd Report No. GEOM13-2019-003) on which areas can be undermined without a significant subsidence risk.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Small scale and localised	Any equipment that may leak, and does not have to be transported regularly, shall be placed on an impermeable surface (e.g.: drip tray, bunded area, etc.) to catch any potential spillages of pollutants. Drip trays shall be of a size that the equipment can be placed inside it. Daily inspections shall be carried out to ensure such spill prevention measures are in place and remain effective. Drip trays shall be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility.	Throughout operations
	Construction Operation Decommissioning		Appropriate measures must be implemented to ensure that rainwater does not run into areas containing cement, oil, diesel etc. as this could result in a pollution threat. Storage areas for these substances should be placed on high-lying ground. During operation, the storm water management system shall ensure that water from dirty areas (such as coal contaminated areas) reports to the PCD's.	
	Construction		Servicing and maintenance of vehicles may only take place in the workshop area (subject to suitable spill prevention and containment measures). The workshop area should be lined with	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure		concrete or suitable material to prevent infiltration. If emergency repairs are required elsewhere on site, this shall be undertaken with the necessary spill prevention measures in place.	
	Construction Operation		Cement and liquid concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result, the Mine shall ensure that: • Concrete shall only be mixed on mortar boards or suitably lined areas, and not directly on the ground, • The visible remains of concrete, either solid, or from washings, shall be physically removed immediately and disposed of as waste. Washing of visible signs of concrete into the environment is not acceptable. • All excess aggregate shall also be removed.	
	Construction Operation Decommissioning Rehabilitation and Closure	Small scale and localised	All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner to prevent pollution of the environment or harm to people or animals. Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill.	
	Construction Operation Decommissioning Rehabilitation and Closure	High significance and potentially a moderate scale disturbance	Hazardous substances shall be confined to specific and secured areas, and in such a way that does not pose any danger of pollution even during times of high rainfall. Hazardous storage areas shall be bunded (impermeable) with adequate containment (at least 110% the total volume stored) for potential spills or leaks. Bunded storage areas shall be either provided with an oil separator or sump. Waste from spillages will then be removed and recycled or disposed of responsibly.	Throughout operations
	Construction Operation Decommissioning	High significance and potentially a moderate scale disturbance	All fuel storage areas shall be bunded to contain at least 110 % of the volume stored and will comply with the relevant environmental and safety regulations. Fuel storage areas must be provided with an impervious surface with the provision to contain any potential fuel spillages during refuelling (e.g. a sealed concrete slab which drains to a sump/oil separator). The applicant must ensure that employees and labourers do not smoke or take part in any	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Rehabilitation and Closure		activity that may results in sparks in the vicinity of fuels and other flammable substances to prevent ignition.	
	Construction Operation Decommissioning Rehabilitation and Closure	High significance and potentially a moderate scale disturbance	Refuelling may only take place within a dedicated area inside the mine that is subject to appropriate spill prevention and containment measures Refuelling and transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimise the potential for leakage and to prevent spillage onto the soil. Drip trays should be utilised in relevant locations (inlets, outlets, points of leakage, etc.) during transfer to prevent such spillage or leakage. Any accidental spillages shall be contained and cleaned up promptly.	
	Construction Operation Decommissioning	High significance and potentially a moderate scale disturbance	Any excess or waste material or chemicals should be removed from the site and should preferably be recycled (e.g. oil and other hydrocarbon waste products). Any waste materials or chemicals that cannot be recycled shall be disposed of at a suitably licensed waste facility.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	High significance and potentially a moderate scale disturbance	Hazardous waste may only be disposed of at a licensed hazardous waste disposal facility. A specialist waste contractor shall dispose of such waste and shall be required to provide waste manifests and safe disposal certificates. The 'cradle-to-grave' principle must be complied with.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Potential health risks are considered high significance	All relevant personnel on site must be properly trained concerning the proper use, handling and disposal of hazardous substances applicable to their line of work. If required, advice shall be obtained from the manufacturer with regard to the safe handling and storage of hazardous materials.	Throughout operations
	Construction Operation Decommissioning	Small scale and localised	The Mine EO shall maintain a list of all hazardous materials that would be present on site. The Mine EO shall develop and maintain a hazardous substance register for all hazardous materials that shall be kept on site during all phases of the project. The register shall be provided to the ECO upon request. Material Safety Data Sheets (MSDS) must be available on site at the point of use and readily accessible for all hazardous substances stored.	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Maintenance and operation of site infrastructure and facilities **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure** **Water management Infrastructure construction** **General Construction** **Mine area site preparation** **General Mine Management** **Mining**	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The mine shall develop and implement a waste management plan for the Mine which complies with the principles of the NEMWA and provides a mechanism for the effective management of waste throughout the LoM. This plan shall ensure the appropriate management of all solid waste, including construction debris (cement bags, wrapping material, timber, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste etc.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The waste management system shall provide for adequate waste storage (in the form of waste skips and bins with lids), waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	Waste generated on site should be recycled as far as possible and sold/given to interested contractors if possible. Recyclable waste should not be stored on site for excessive periods to reduce risk of environmental contamination.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The Mine shall implement a waste removal regime that ensures waste skips do not exceed their capacity before being removed from site for disposal.	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	Littering shall be strictly prohibited. The site shall remain in a neat and tidy condition at all times. If required, the mine shall make use of regular litter patrols to remove litter and ensure the site remains clean, neat and tidy.	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Mineral Processing **Maintenance and operation of site infrastructure and facilities**	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The mine shall maintain a waste register which shall be used to track all waste removed from site. Proof of appropriate waste disposal shall be kept on file at the site for auditing purposes.	Throughout operations
General decommissioning activities **Relevant Infrastructure removal** **Decommissioning**	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The mine will adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in the prescribed and correct manner.	Throughout operations
Site establishment – Permanent site office Infrastructure **Site establishment – Camp** **Water management**	Construction Operation Decommissioning Rehabilitation and Closure	Sewage has the potential to result in localized impacts of low to medium significance	There must be adequate provision for safe and effective sanitation (i.e. ablution facilities) at the mine and work sites and these shall conform to all relevant health and safety standards and codes. The Mine shall ensure compliance with the OHSA and MHSA in terms of sewage and sanitation (managed by safety department). Under no circumstances will pit latrines or soak away systems be allowed for raw sewage. Septic tanks are permitted on condition that they are closed units and are serviced regularly to prevent overflows. In the event that the mine constructs a waste treatment plant, the plant must comply with relevant legislation and norms and standards. Disposal or reuse of treated water must be in line with relevant licencing approvals. Portable toilets will be managed by reputable contractors and inspected daily for any potential leaks. The Contractor (or reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets. Chemical toilets shall be emptied/serviced frequently to avoid offensive odours (at least weekly). Toilets must be kept in a clean, neat and hygienic condition.	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Infrastructure construction **General Construction** **Mine area site preparation** **General Mine Management** **Mining** **Maintenance and operation of site infrastructure and facilities** **General decommissioning activities** **Relevant Infrastructure removal**			Ablution facilities must be easily accessible. Portable ablution facilities shall be placed outside areas susceptible to potential flooding and shall not be placed within 50m of any wetland or watercourse. Ablution facilities shall be located a sufficient distance from any offices or eating areas to prevent nuisance from offensive odours. Sanitary arrangements shall also be to the satisfaction of the EO. Disposal of sewage from chemical toilets shall be in a safe and responsible manner and at an approved facility specifically for that purpose. Proof of sewage removal and disposal shall be kept on file for auditing purposes.	
General decommissioning activities	Construction Operation	Noise has the potential to result in significant impacts to sensitive	The mine shall take reasonable measures to limit exceedingly noisy activities. Where noise is generated which may impact on sensitive receptors, the mine shall apply measures to control noise that cannot be avoided (e.g.: blasting). Mitigation measures to be applied shall include but is not limited to;	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure**	Decommissioning Rehabilitation and Closure	receptors at a small to medium scale	• Using the smallest/quietest equipment for the particular purpose; • Ensuring that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures; • All machines should be equipped with appropriate noise reduction equipment; • All machines should be roadworthy (including meeting maximum noise specifications); • The vehicles exhaust and baffle systems must be maintained regularly to ensure that the noise from these vehicles is within the required noise specification; • All plant and equipment must be operated in accordance with the specifications provided by the manufacturer; • Safety measures that generate noise, including reverse gear alarms, should be adjusted to minimise noise where possible; and • Blasting must be undertaken at a suitable time of day with surrounding sensitive receptors notified timeously of the intended blast schedule. Regular noise measurements must be undertaken if mining activities take place within 500 m from a potential noise-sensitive receptor. This is particularly important for blast events. Community involvement needs to continue throughout the project. Good public relations are essential. At all stages surrounding receptors should be educated with respect to the potential increase of noise from the mine (i.e.: when the potential increase is considered of concern to surrounding receptors). The information presented to stakeholders should be factual and should not set unrealistic expectations. Where possible, only operate during the day. If night-time activities are required, do not operate closer than 200m from any receptors (prevent a noise level exceeding 47 dBA at receptors). Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Quieter equipment will be sought where possible when purchasing new equipment. Silencers will be utilised where relevant. Point sources will be enclosed where possible. Acoustic screens will be considered if repeated I&AP complaints are received. A channel of communication should be established and promoted between the mine and surrounding stakeholders as well as the community. The mine must investigate any reasonable and valid noise complaint if registered by a receptor staying within 1,000 m from any mining activities.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Storm water management **Mine Infrastructure** **Mining** **Water management and treatment**			If necessary, use available material to develop a berm between activities and surrounding noise-sensitive receptors to break the line of sight as soon as possible. The berm should be grassed or rock cladded and fully engineered to ensure it is safe and structurally sound. Operations must comply with the noise standard of the Occupational Health and Safety Act (Act No 85 of 1993).	
General decommissioning activities **General Surface Rehabilitation** **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing**	Construction Operation Decommissioning Rehabilitation and Closure	Localised and low significance	Areas of high risk for spontaneous combustion will be inspected regularly for signs of possible combustion. An emergency procedure will be set up in the case of spontaneous combustion.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Localised and low significance	The EO shall evaluate the condition of the roads and if coal dust is being tracked off site to an unacceptable degree, the mine shall implement measures as necessary to avoid and reduce this impact.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Wide scale of disturbance and low to medium significance. Some localized high significant impacts.	It is important to note that dust could be a major disturbance, especially during the dry winter periods to people residing around the site. All reasonable measures must be utilised to minimise the generation of dust as a result of activities on site. Such measures shall include, but shall not be limited to; • Traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Post Closure Monitoring and Maintenance **Re-vegetation** **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure** **Storm water management** **Mine Infrastructure** **Water management Infrastructure construction** **Water Treatment**			• Regular and effective measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and/or chemical stabilisation. • As far as practically possible, avoid dust generating activities during periods of strong winds in the direction of sensitive receptors. • Increase dust suppression efforts during conditions conducive to excessive dust creation (e.g. dry and windy conditions). • Ensure vegetation establishment on rehabilitated areas as well as on topsoil stockpiles.	
	Construction Operation Decommissioning Rehabilitation and Closure	Wide scale of disturbance and low to medium significance. Some localized high significant impacts.	The mine shall comply with the National Dust Control Regulations, Promulgated under the National Environmental Management: Air Quality Act (Act 39 of 2004). Dust monitoring in and around the mine must be undertaken. If dust levels exceed the specified thresholds in terms of the dust control regulations, the Applicant shall appoint a suitably qualified specialist to identify sources of the excessive dust levels and to suggest suitable and reasonable mitigation measures.	Throughout LoM
	Construction Operation Decommissioning	Localised and low significance	The mine must ensure that no transported materials escape from vehicles. If necessary, the load bin of the vehicles shall be covered with a tarpaulin to prevent dust.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	No direct Impacts	The Mine shall maintain open and transparent communication with the community and surrounding landowners regarding air quality and shall supply monitoring records to the public upon request.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Health impacts have a localized but high significance	Employees will receive training on the use of personal dust respirators, whenever high dust levels are experienced.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Construction Operation Decommissioning Rehabilitation and Closure	Wide scale of disturbance and low to medium significance. Some localized high significant impacts.	Speed limits will be established and enforced on the mine to minimise dust generation.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Localised and low significance	Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions.	Throughout LoM
	Construction Operation	Localised and low significance	Due to the proximity of sensitive receptors to the proposed project activities, it is recommended that chemical suppressants be applied to unpaved haul and access roads to reduce the impacts from this source by 90% control efficiency.	Throughout LoM
	Construction Operation	Localised and low significance	Water sprayers on the crushing activities should be implemented to control the emission of this source by 50%.	Throughout LoM
	Construction Operation	Localised and low significance	Dust fallout rates must be below 1200 mg/m²/day in non-residential areas and 600 mg/m²/day in residential areas, averaged over 30 days.	Throughout LoM
	Construction Operation	Localised and low significance	Continuous monitoring of dustfall must be conducted as part of the Project's air quality management plan	Throughout LoM
	Construction Operation	Localised and low significance	Random carbonaceous stockpiles may not be allowed as this increases the risk of spontaneous combustion and subsequent air pollution.	Throughout LoM
General decommissioning activities	Construction Operation	Impacts on heritage affect a limited extent but have a high	The three burial grounds located in the mining footprints which are likely to be impacted directly by the planned mining activities, must be relocated after completion of a detailed grave relocation process. This would include a thorough stakeholder engagement component, adhering to the requirements of s36 of the NHRA and its regulations as well as the National Health Act and its regulations and the Mpumalanga Cemeteries, Crematoria and Exhumation	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure** **Storm water management** **Mine Infrastructure** **Water management Infrastructure construction**	Decommissioning	significance due to the value of heritage resources which are protected by law.	of Bodies Act. The other five graves or burial grounds that will not be impacted must be avoided and retained in situ with a buffer zone of 100m (Refer to 2020 HIA report completed by PGS) If fossil remains are discovered during any phase of construction, either on the surface or exposed by excavations, the Chance Find Protocol must be implemented by the ECO (site manager) in charge of these developments. These discoveries should be protected (if possible, in situ) and the ECO must report the discovery to SAHRA so that suitable mitigation (e.g. recording and collection) can be undertaken by a palaeontologist. Before any fossil material can be collected from the development site the specialist involved would need to apply for a collection permit from SAHRA. Fossil material must be housed in an official collection (museum or university collection), while all reports and fieldwork should meet the minimum standards for palaeontological impact studies proposed by SAHRA.	
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on heritage affect a limited extent but have a very high significance due to the value of heritage resources which are protected by law.	Should artefacts or archaeological items be observed in the area of disturbance, then all activity in this area should cease immediately, the area marked off and a specialist consulted prior to any further activity.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on heritage affect a limited extent but have a very high significance due to the value of heritage resources which are protected by law.	Eight burial grounds are present on the property (EFN001, EFN002, EFN003, EFN004, EFN007, EFN008, EFN010, EFN011). Burial grounds and graves have high heritage significance and are given a Grade IIIA significance rating. Fencing of the graves and burial grounds and strict avoidance of these sites must be implemented or alternatively they must be relocated.	Throughout LoM
	Construction	Impacts on heritage affect a	The Mine EO must be trained on potential heritage or palaeontological features which may be found on site and the implementation of the chance finds procedure. Should any potential	As required

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Water Treatment	Operation Decommissioning Rehabilitation and Closure	limited extent but have a very high significance due to the value of heritage resources which are protected by law.	heritage or palaeontological features be identified the relevant specialist must be notified and shall advise on the way forward.	
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on heritage affect a limited extent but have a very high significance due to the value of heritage resources which are protected by law.	In the event that graves, or cemeteries need to be relocated, a full grave relocation process must be undertaken that includes comprehensive social consultation.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and	Impacts on heritage affect a limited extent but have a very high significance due to the value of heritage resources which are protected by law.	If construction activities expose any fossil deposits (excluding coal deposits), a professional palaeontologist should be contacted to assess whether mitigation actions are necessary. If fossil remains are discovered during any phase of construction, the Chance Find Protocol must be implemented by the ECO in charge of these developments. These discoveries should be secured, and the ECO/site manager must alert SAHRA so that the proper mitigation (documented and collection) can be undertaken by a palaeontologist.	Throughout LoM
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities**	Construction Operation Decommissioning	Impacts on land capability have long term effects and can be of a high significance	The mine will ensure that overburden stockpiles are in accordance with the rehabilitation plan to allow for minimal handling when returning soils during rehabilitation.	Throughout LoM
	Construction Operation Decommissioning		The entire project area should be monitored every month for compaction and erosion. In cases where compaction and/or erosion does occur, action plans should be implemented to apply mitigation and to avoid these areas as much as possible in the near future. Soil samples should be taken on site by a soil scientist and sent away for fertility tests within the first month of rehabilitation. The results thereof should be compared to the results	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Mine area site preparation **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure** **Storm water management** **Water management Infrastructure construction** **Water Treatment**	Rehabilitation and Closure		obtained prior to construction and after construction to conclude the findings of the change in the top soil's chemical properties. Mitigation measures can be suggested by the relevant soil scientist thereafter to rectify any degradation. Thereafter, similar sampling should be carried out every year within the same season that the previous sampling has been done until closure is obtained. Compaction and erosion should be monitored within the first month to gain knowledge of areas impacted upon during the decommissioning phase. Rehabilitation of these sites should take place by means of the rehabilitation guidelines provided. Thereafter, similar monitoring and the accompanied mitigation measures should be applied every six months until closure is obtained.	
	Construction Operation Decommissioning Rehabilitation		While it is not anticipated that subsoil or overburden stockpiles will be able to be vegetated, topsoil stockpiles should be vegetated with indigenous seed mixtures to prevent soil erosion and to preserve the viability thereof.	Throughout LoM
	Rehabilitation		During rehabilitation care must be taken to return the correct soil types and depths to specific sections of rehabilitated land to enhance land capability potential post mining.	During Rehabilitation
	Rehabilitation		A post-mining land capability assessment should form part of a yearly monitoring program to assess the rehabilitated areas against the land capability targets set.	During Rehabilitation
	Construction Operation Decommissioning Rehabilitation and Closure		Re-vegetate rehabilitated areas as soon as possible to prevent soil erosion.	Throughout LoM
Maintenance and operation of site infrastructure and facilities	Construction Operation	Impacts on surface water can have a high significance and extent	The mine shall implement a storm water management plan as approved by the DHSWS. Clean and dirty water system infrastructure must be installed as per the storm water management plan which must take into consideration the design capacities and locations restrictions stipulated in GN 704 of the NWA (unless GN704 exemption is granted).	As soon as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Mine area site preparation	Decommissioning		Contaminated storm water run-off must be collected and routed to lined pollution control dams.	
Mineral Processing	Construction Operation Decommissioning		Where clean water is diverted away from construction and/or mining areas, its point of re-entry into the natural environment should be well protected against erosion and/or sedimentation.	
Post Closure Monitoring and Maintenance	Construction Operation Decommissioning		No wastewater may run freely into any of the surrounding environment or neighbouring properties. The Mine shall implement the storm water design in accordance with the approved Storm Water Management Plan.	
Re-vegetation **Site establishment – Camp**	Construction Operation Decommissioning Rehabilitation and Closure		All areas susceptible to erosion shall be suitably protected. Berms/drains shall be constructed where necessary to direct all runoff into the stormwater system. Care must be taken to avoid scouring and erosion and suitable measures should be placed in areas where runoff concentrates, in order to reduce the sediment load and slow down the runoff. All erosion damage shall be repaired as soon as possible as directed by the EO.	
Site establishment – Permanent site office Infrastructure	Construction Operation Decommissioning Rehabilitation and Closure		All storm water and erosion control mechanisms must be inspected frequently and shall be maintained on a regular basis to ensure they remain effective. Appropriate remedial action, including the rehabilitation of eroded areas, shall be undertaken under direction from the EO.	
Water management Infrastructure construction	Operation		Pipelines should be subjected to frequent patrols. An efficient system of reporting should be available to allow the immediate tripping of pumps should a leak be found	
	Construction		It is preferable to run the dirty water pipelines through areas already serviced by dirty water systems where possible	
	Construction		Where possible, the disturbance of land during the construction phase will be confined to areas which are planned to be disturbed during the operation of the mine.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Construction Operation		Topsoil stockpiles must be stabilised with vegetation to reduce erosion and siltation into streams and dams. Other stockpiles that cannot be vegetated must have adequate control measures such as berms in place to prevent siltation of surrounding areas.	
	Construction Operation Decommissioning Rehabilitation and Closure		Hydrocarbon spills will require immediate attention and should be disposed of at a licensed facility. All used hydrocarbons will be suitably stored before being recycled or disposed of.	
	Construction Operation		Storm water drainage and pollution control facilities will be constructed to manage the flow of water and separate clean and dirty water on site.	
	Operation Rehabilitation and Closure		A contingency plan must be put in place for the water treatment plant to cater for possible maintenance or load shedding events where the plant is not operational.	
	Construction Operation Decommissioning Rehabilitation and Closure		All licenses and permits required as per the National Water Act will be applied for as per the relevant water uses.	
	Construction Operation Decommissioning Rehabilitation and Closure		The mine shall ensure soil erosion control measures are established in all high-risk areas to reduce silt-loading in storm water runoff. Construct a down-stream drain and silt traps at the outlet of water diversion areas.	
	Construction Operation		Erosion control measures should be implemented on rehabilitated areas and vegetation established as soon as possible.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
	Decommissioning Rehabilitation and Closure			
	Construction Operation Decommissioning Rehabilitation and Closure		Excess water will only be discharged if it meets statutory requirements.	
	Construction Operation		Pollution control dam water levels must be regularly monitored. Steps and procedures must be put in place to manage situations where excess water builds up in the pollution control dams.	
Maintenance and operation of site infrastructure and facilities **Site establishment – Camp** **Site establishment – Permanent site office Infrastructure** **Mine Infrastructure**	Construction	Impacts on wetlands are considered to be highly significant due to the sensitivity of these areas. Impacts can range from localized to impacts which are large in extent	The mine shall limit the extent of the development footprint to exclude aquatic resources as far as possible. The pans or drainage lines that will be impacted by mining activities must be appropriately licenced by the DHSWS. **A buffer zone of 106 m in size has been calculated for all the wetlands on-site due to the high level of threats associated with open cast minin**g except for areas where approval has been obtained by DHSWS for a 41m buffer in which case the 41m buffer is applicable. No buffer zones are required for the underground mining activities due to the fact that very little to no surface impacts are associated with underground mining activities. If the buffer zone is not implemented then a wetland offset strategy must be developed. This strategy has been considered as a last resort according to the mitigation hierarchy due to the irrelevance of “avoidance”, “decreasing impacts” and “rehabilitation”.	Throughout LoM
	Construction Operation Decommissioning Rehabilitation and Closure		The mine shall implement an aquatic biomonitoring and water quality monitoring programme. Where target endpoints are not met, recommendations should translate directly into follow-up action that are recorded and auditable.	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Water management Infrastructure construction **Water Treatment**	Construction Operation Decommissioning Rehabilitation and Closure		No dirty water may be discharged into any wetland or water resource on site unless treated to the required standards.	Throughout LoM
General Surface Rehabilitation **Relevant Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Post Closure Monitoring and Maintenance**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on topography tend to be large in extent and can have a significant effect on the environment	Levelling out of the mine site area will be supervised by a qualified mine surveyor and the mine planning department.	Throughout LoM
			Where possible, the original topographic landscape and drainage/flow lines will be recreated so as to reduce loss of water in the natural catchments.	
			Berms and diversion trenches will be constructed as part of the stormwater management infrastructure to help separate clean and dirty water on site.	
			A post mining topographical plan should be developed during the start of the project in order to ensure compliance during and after mining.	
			Regularly monitor, especially after first heavy rain falls of the season, to ensure adequate surface water drainage, surface water flow and erosion.	
			There will be survey checks included as part of the rehabilitation planning to ensure that the planned post mining topography is being followed.	
			Topsoil depth should be related to the proposed post-mining land capability plans.	
			Prevent compaction of rehabilitated areas as far as possible.	
			Rehabilitated areas should be landscaped to prevent water logging and vegetated to prevent soil erosion.	
			Erosion control measures such as contour banks and cut off berms should be constructed, and soil vegetated in rehabilitated areas.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Site establishment – Camp **Site establishment – Permanent site office Infrastructure** **Storm water management** **Mine Infrastructure** **Water management Infrastructure construction**			Final profiling of the mining area will take place to ensure safety of people and livestock as well as to blend as far as possible into the final land use profile. Final profiling of the mining area will take place to ensure safety of people and livestock as well as to blend as far as possible into the final land use profile.	
Mine area site preparation **Site establishment – Camp** **Site establishment –**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance	On-site vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site so as to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic. In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the mine. Road conditions must be assessed regularly for signs of damage and repaired where necessary. All intersections with main tarred roads will be clearly signposted. Traffic warning signage should be erected at the site access points;	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Permanent site office Infrastructure **Water management Infrastructure construction**			Road signs and safety features will be maintained to ensure that the haul road crossings are visible to motorists.	
			All construction and mining vehicles using public roads shall be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport.	
			The existing site access creates a dog-legged intersection with Apex road. The site access road should be realigned to create one four-legged intersection.	
			Limit heavy vehicle speed to 40km/h along site access road(s)	
General Surface Rehabilitation	Rehabilitation and Closure	Visual impacts have an impact on the perception and sense of place in the area and although hard to quantify can have a significant impact over a large extent of the area.	Directional lighting and soft lighting will be utilised as far as possible. Screens will be considered if I&AP complaints are received.	Throughout LoM
Mine area site preparation	Construction Operation Decommissioning		Where possible, the mine may create suitable screening to reduce the visual impact of the mining operations and infrastructure.	
Mineral Processing	Construction Operation Decommissioning		Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions.	
Site establishment – Camp **Site establishment – Permanent site office Infrastructure**	Construction Operation Decommissioning Rehabilitation and Closure		Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Storm water management **Water management Infrastructure construction**				
Underground and Opencast Mining	Operation	Blasting and Vibration can have a significant impact which increases in significance with proximity to the blast	During blasting operations, vibration and noise readings must be recorded at sensitive receptors within 1km of a blast. These results must be kept in good order for future reference.	Throughout Operation
			Consult with Explosives suppliers and/or master blaster for guidance on using the correct product for the application.	
			Several pipelines, power lines and associated servitudes also cross the mining right areas including Rand Water steel pipes, a Sasol Pipeline and Eskom Power Lines. Relevant wayleaves and approvals must be obtained before mining in these areas.	
			Regulatory requirements indicate specific requirements for all non-mining structures and installations within 500 m from the mining operation. Various POI's are observed within the pit that needs consideration as well within 500 m from the mining area. The mine will have to apply for the necessary authorisations as prescribed in the various acts, and specifically Mine Health and Safety Act Reg 4.16 as well as recommendations regarding infrastructure within the pit areas. Calculated minimum safe distance is 447 m.	
			All blast designs shall comply with current legislation and shall be designed to minimise ground vibrations and air blast. . Recommended stemming length should range between 20 and 30 times the blast hole diameter.	
			All blast designs shall comply with current legislation and shall be designed to minimise ground vibrations and air blast.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
General decommissioning activities **General Surface Rehabilitation**	Construction Operation Decommissioning Rehabilitation and Closure	The mining impact on groundwater potentially affected a very large area and has a potentially high significance impact	Rainfall runoff should be separated into clean and dirty water (rainfall falling on the site should be allowed to drain quickly/freely, and contaminated water should be captured in the mine dirty water system and re-used where possible)	Throughout LoM
Maintenance and operation of site infrastructure and facilities	Construction Operation Decommissioning Rehabilitation and Closure		In the event of pollution caused as a result of construction or mining activities, the responsible party, according to section 20 of the National Water Act (Act No. 36 of 1998) shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas.	
Mine area site preparation **Mineral Processing**	Construction Operation Decommissioning Rehabilitation and Closure		Dumps and overburden stockpiles should be managed to minimise infiltration of contaminants to the groundwater zone. Mitigation that should be considered includes the management of the stockpile shape to control the ease with which water can run off from the stockpiles.	
Underground and opencast mining	Construction		The discard dump footprint and disposal areas as well as plant and stockpile areas should be fully recovered and disposed of at an appropriate barrier system in line with the waste assessment results to minimise the risk of contamination migration to local aquifers	
Post Closure Monitoring and Maintenance **Re-vegetation**	Planning		The geochemical character of the carbonaceous spoils material i.e. carbonaceous shale suggests a likely capacity for acid formation. However relatively low oxidisable sulphides deem the material insufficient to sustain long term acid generation. Thus, any material of carbonaceous character can also be used as backfill substance, however it is recommended that additional geochemical characterisation be conducted to confirm this.	
	Construction Operation Decommissioning		Due to the impact and reduction of baseflow reporting to the on-site wetland, it is recommended that a monitoring borehole(s) be drilled in order to evaluate perched water level recovery of the wetland following rehabilitation.	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Time Period for Implementation
Site establishment – Camp	Rehabilitation and Closure			
Site establishment – Permanent site office Infrastructure	Construction Operation		Due to mine inflow and dewatering anticipated, depletion of groundwater in storage in expected and the formation of a zone of depression, is inevitable. Development and implementation of an integrated groundwater monitoring program assessing regional groundwater levels will serve as early warning mechanism to implement mitigation measures. Should neighbouring water levels and yields be affected, necessary actions such as provision of alternative water supply and/or compensation should be taken to ensure continual water supply.	
Storm water management **Mine Infrastructure**	Planning		Groundwater flow modelling assumptions should be verified and confirmed. The calibrated groundwater flow model should be updated on a bi-annual basis as newly gathered monitoring results become available in order to be applied as groundwater management tool for future scenario prediction.	
Water management Infrastructure construction	Construction Operation Decommissioning Rehabilitation and Closure		The mine shall utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Record water usage by attaching meters to relevant pumps.	
	Construction Operation Decommissioning Rehabilitation and Closure		The preferred mitigation for groundwater remediation entails establishment of scavenger boreholes down-gradient of waste facilities and backfilled opencasts in combination with rehabilitation of the south-eastern discard dump.	
	Construction Operation Decommissioning Rehabilitation and Closure		Discard should preferably be placed in mined-out areas (i.e. backfilled to pit) and should be placed sufficiently deep below the long-term decant elevation.	

6 CLOSURE AND REHABILITATION

6.1 CLOSURE AND REHABILITATION GOALS AND OBJECTIVES

The goals and objectives for closure were determined based on the baseline environment and the land uses that will be established post mining. The rehabilitation plan is based on good industry practise and is based on the described objectives for rehabilitation and closure which in turn are based on the end land use objectives defined during the original EIA studies in consultation with landowners and key stakeholders. The recommendations in the Final Rehabilitation, Decommissioning and Closure Plan included as **Appendix B** to this EMPr must be adhered to.

According to the NEMA GNR 1147 the objective of the final rehabilitation, decommissioning, and closure plan, is to identify a post-mining land use that is feasible through-

- Providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning, and closure of the project;
- Outlining the design principles for closure;
- Explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- Detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
- Committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
- Identifying knowledge gaps and how these will be addressed and filled;
- Detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
- Outlining monitoring, auditing, and reporting requirements.

The vision, and consequent objective and targets for rehabilitation, decommissioning, and closure, aim to reflect the local environmental and socio-economic context of the project, and to represent both the corporate requirements and the stakeholder expectations as well as the legislative framework and regulations.

It is important to note that mining on this site pre-dates the current environmental closure and rehabilitation regulatory requirements. As such proactive planning for a defined closure vision was not factored into the early mining and progressive rehabilitation efforts. Therefore the closure vision presented herein aims to define a realistic and practically achievable closure vision within the restrictions presented by the current state of the mining operation.

The land is currently not used for any other productive use. The surrounding area has a varied land-use character, including:

- Heavy industrial: Highveld Industrial Park, Transalloys Smelter directly adjacent to the North and north east respectively.
- Mining: There is an abandoned opencast coal mining operation located along the north western boundary of the site.
- Cultivated land: Maize plantations directly to the north-north east.

- Grazing land: Open grasslands around the site are used for livestock grazing.
- Residential: The village of Clewer is located directly to the east of the site.
- Conservation: There is a game farm and lodge located to the south of the site area.

The final closure vision must consider the current and predicted future rehabilitation opportunities and constraints. These include consideration of the following:

- Availability of adequate topsoil to achieve a sustainable and stable vegetative growth medium;
- The ability to achieve a free draining final landform;
- The suitability of the water resources to support a final post closure land use; and
- The potential for integration of the final land use with the surrounding uses.

Refer to Final Closure and Rehabilitation Plan included in Appendix B for more details.

6.2 CONSULTATION WITH LANDOWNERS AND I&AP'S

Elandsfontein Colliery is an existing mine and several authorisation processes have been undertaken for the mine to date. The EIA processes undertaken have included extensive PPP and stakeholders have been given an opportunity to provide input into the EIA process including comments on the final land use objectives. The Stakeholder Engagement process is ongoing throughout the LoM and landowners will continue to be engaged with regards to the reinstatement of preferred land-uses post mining.

6.3 MINE CLOSURE PROCESS

6.3.1 CONSTRUCTION PHASE

Preparation for closure of the mine require that certain actions be undertaken during the construction phase and therefore the closure plan for Elandsfontein Colliery included the following actions during the construction phase:

- Removal of vegetation;
- Implementation of the Environmental Management Programme (EMPr); and
- The implementation of guidelines and conditions of the approved EMPr shall ensure that construction activities are limited to the approved construction footprint. Areas for the location of topsoil stockpiled and salvaged coal material were identified.

6.3.2 OPERATIONAL PHASE

During preparation for mine closure, certain aspects must be undertaken during the operational phase of Elandsfontein Colliery. Required actions undertaken during the operational phase include:

- Implementation of the EMPr;
- Management of mine sections; and
- Implementation of progressive rehabilitation.

Infrastructure and mine sections on site include underground sections, access/hauls roads, stockpiles, workshops, offices, change rooms and pollution control structures. All construction should take place within specified areas only to avoid impacts

on streams or other sensitive areas. Rehabilitation will commence during the final stages of the mine operation. The offices and other facilities will be removed and sold for re-use or disposed of as scrap as far as possible. Electrical and water supplies to the mining area will be terminated and made safe. Surface haul roads will be ripped and revegetated.

The prevention of land degradation through the adoption of appropriate soil conservation practices will be an integral component of site management and landscape reconstruction. In order to achieve the final landform design, slopes and surfaces will be stabilised to prevent subsequent rehabilitation and revegetation from being reduced and maintenance being prolonged. Final landform design will take the following factors into consideration:

- Erosion potential of material on site;
- Recognition of pre-mining surface and groundwater flow;
- Alignment with existing topographical features;
- Preparing and implementing an erosion and sediment control plan in accordance with relevant government guidelines;
- Recognition that unconsolidated material from disturbed areas will require greater protective measures to minimise erosion;
- Immediate revegetation of all bare soil areas should be undertaken. The species utilised for revegetation should be determined by a suitably qualified specialist;
- Create storm water discharge stilling dams or artificial wetlands on drainage lines to absorb extreme runoff events, settle entrained solids, passively treat water and control discharge.
- Monitoring to detect occurrences of soil erosion and landform irregularities to ensure prevention and minimisation.

6.3.3 DECOMMISSIONING PHASE

Following conclusion of mining decommissioning, final strip backfilling will take place and the area will be cleaned up and the sections to be rehabilitated will be made safe. This involves the following:

- Removal and dismantlement of all infrastructure and equipment. No facilities will remain on site unless with the written approval of the post-mining landowner, post-mining land user or relevant authority. This includes the removal of temporary office and change room structures, and any associated ablution facilities and pipelines. The remaining concrete foundations and buildings will be removed and inert material will be deposited into the final void, non-inert material will be dealt with in accordance with the Regulation 63 (c) of the MPRDA which states that, “where possible, dispose pollution, waste and mine residue in a responsible and sustainable manner”;
- Ripping of all haul/access roads and compacted areas to reduce compaction (followed by adding topsoil and revegetating);
- Removal of any waste/rubbish from waste collection and storage facilities for disposal at approved sites. Particular care will be required for residual toxic or hazardous material, although these volumes should be minimal;
- Removal of all concrete slabs, foundations and footings, unless these are required by the post-mining landowner or have been designated and approved for post-mining use by the relevant authority;
- Backfilling and levelling of all excavations to achieve final landform design;

- Topsoil and subsoil application to encourage re-establishment of vegetation;
- Seeding with appropriate seed mix in areas where natural vegetation establishment does not yield sufficient cover;
- Restricting and preventing access by the removal of access roads;
- Cleaning and removal of all PCD's and silt traps; and
- Cleaning and removal of all trenches.

Once the final landform has been established and stabilized, the mine will provide for a period of monitoring to verify the success of the rehabilitation programme. The length of the monitoring period will be determined in consultation with the appropriate regulators and would take the form of periodic inspections by the contractor and specialists but is generally assumed to last for at least 3 years for issues other than groundwater. Groundwater monitoring programmes could last for more than a decade and are largely dependent on the severity of mining impacts on groundwater quality.

The parameters that will be monitored after rehabilitation should subject to agreement with specialist and regulators, and include the following:

- Continued safety of the mine site;
- Alignment of final topography to the agreed final landform design;
- Restoration of soil fertility to a condition capable of sustaining end land-use;
- Re-establishment of adequate vegetation cover to create a self-sustaining system that suits the surrounding landscape;
- Preserve fauna and flora species identified in the EIA/EMPr as indicator species;
- Prevent and or reduce deterioration of surface and groundwater quality;
- Reinstate water drainage systems;
- Control of invasive alien species.

6.4 CLOSURE COSTING

In terms of the NEMA, MPRDA and the Income Tax Act, the financial provision for closure must be assessed annually in order for any additional infrastructure or negative impact to be incorporated into the financial provision costing during the annual assessment as the project progresses. This review must be informed by any adjustments of the Life of Mine plans, revisions of the EMPr and new legislative requirements and include the new mining areas that form part of this report as well. Depending upon the outcome of the review, annual contributions to the mine closure provision/ mine closure trust fund will be adjusted to ensure that enough funds are available for rehabilitation, decommissioning and closure.

Table 8 provides procedures for the decommissioning, closure and rehabilitation of the affected site.

Table 8: Decommissioning, Rehabilitation and Closure Actions

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Decommissioning					
General decommissioning activities **General Mine Management** **Decommissioning Mine Infrastructure** **Relevant Infrastructure removal**	Decommissioning	Decommissioning of infrastructure can result in negative impacts. The extent is localized to the extent of the infrastructure and mining footprint.	All infrastructure, equipment, plant and other items used during the mining period will be removed from the site (Section 44 of the MPRDA). Infrastructure should be removed down to foundations to prevent loss of soil productivity. All vehicles, equipment and other assets belonging to the mine must be removed from the property upon completion of the mining operation, including any excess aggregate, gravel, stone, concrete, temporary fencing and the like. Waste material, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a recognised and licensed landfill facility.	MPRDA In accordance with Rehabilitation and closure plan	During decommissioning activities
Rehabilitation					
General Surface/ Rehabilitation **Re-vegetation** **Storm water management**	Rehabilitation and Closure	Rehabilitation has limited negative impacts. The scale of the impact is limited to the disturbance footprint.	The current RSIP shall be updated to make it applicable to the new extension area. The Plan must be viewed as a dynamic document and shall be subjected to independent review on an annual basis (together with the quantum for financial provision). As a minimum, the Integrated Rehabilitation and Closure Plan shall include the following; • Desired end land use objectives. • Methodology and proposed schedule for progressive rehabilitation to be undertaken concurrently with mining operations.	MPRDA In accordance with Rehabilitation and closure plan	As soon as possible in operational phase and implemented throughout LoM Annually Updated

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Details of soil preparation procedures including proposed measures to improve soil fertility (if so required) and the sustainability thereof. • A list of the plant species that will be used in the rehabilitation process. Only indigenous species may be utilised, and these species should be representative of the relevant vegetation unit/landscape type of the area. • Procedures for ensuring vegetation growth and survival (watering, fertilisation etc.). • Details of proposed storm water and erosion control measures to ensure re-vegetation is successful and not hampered by scouring and erosion. • Monitoring procedures that will be implemented to assess re-vegetation efforts (duration and frequency of monitoring, criteria for determining success of rehabilitation). • Procedures for preventing the establishment of alien invasive vegetation in rehabilitated areas.		
			Upon completion of the mining operation and closure of the mine, the mine shall ensure that all cleared and/or disturbed areas (as a result of the mining activity) shall be rehabilitated in accordance with an Integrated Rehabilitation and Closure Plan.		
			Rehabilitation will include returning the slope to the minimum possible gradient (in line with surrounding landforms), the topsoil will be replaced for vegetation re-establishment and contour drains will be installed to prevent erosion where necessary.		
			The area must be rehabilitated using indigenous vegetation representative of the surrounding areas. Rehabilitation shall be overseen by a suitably qualified specialist who shall approve the indigenous seed mix to be used.		
			Any access road or portions thereof, constructed by the mine which will no longer be required by the landowner/tenant, shall be removed and/or rehabilitated to the satisfaction of the EM/EO and Regional Manager (DMRE).		

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			Erosion control measures shall be implemented where necessary (such as berms, brush packing, silt fences etc.). Erosion control and silt prevention measures shall be inspected regularly and shall be maintained whenever required to ensure they remain effective.		
			No alien or invader plant species should be introduced on site during rehabilitation. The weed management plan shall be implemented throughout the rehabilitation and closure phase. Regular monitoring of the rehabilitated area shall be undertaken, and all alien vegetation shall be eradicated and/or controlled prior to it setting seed. Weed management shall be to the satisfaction of the EM/EO and Regional Manager (DMRE).		
General Surface/ Rehabilitation	Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	If erosion occurs, corrective actions must be taken to minimize any further erosion from taking place and topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion.	In accordance with Rehabilitation and closure plan	During rehabilitation
			Only the designated access routes are to be used to reduce any unnecessary compaction. Compacted areas are to be ripped to loosen the soil structure and vegetation cover reinstated.		
			After the completion of the project the area is to be cleared of all infrastructure and topsoil to be replaced for rehabilitation purposes. The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate and stockpiles should only be used for their designated final purposes.		
			Compacted areas are to be ripped to loosen the soil structure and vegetation cover reinstated. Compacted areas must be ripped (perpendicularly) to a depth of 300 mm. A seed mix must be applied to rehabilitated and bare areas. Any gullies or dongas must also be backfilled and the area must be shaped to a natural topography. Trees (or vegetation stands) removed must be replaced. No grazing must be permitted to allow for the recovery of the area and a attenuation ponds may be created in channels to retain water in the catchment.		

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			The rehabilitated area must be assessed once a year for post mining land capability, compaction, fertility, vegetation cover and to identify and rectify any erosion.		
General Surface/ Rehabilitation	Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Disturbed surfaces will be re-vegetated as soon as they become available, by seeding with an appropriate seed mix. The ongoing rehabilitation should occur soon after the area has been mined out so that alternative land use can commence.	Adherence to Rehabilitation and Closure Plan	During rehabilitation
Mine Closure					
Closure	Rehabilitation and Closure	Very limited potential for impacts during closure. The Mine remains responsible for the mining right area until such time as a closure certificate is obtained.	Should the activity ever cease or become redundant the applicant shall undertake the required closure process in accordance with the MPRDA and the NEMA.	MPRDA, NEMA and associated regulations	In accordance with legislated timeframes in force at the time of closure.
Closure	Rehabilitation and Closure	Impacts on alternative land uses are considered highly significant and can occur over a large area.	Leasing options should be evaluated so that unmined land can be used for other uses such as grazing or cropping. Adequate fencing will be required to separate the land from miming areas for safety reasons.	MHSA	Closure
Acid Mine Drainage					
Underground and Opencast Mining	Construction Operation Decommissioning Rehabilitation and Closure	Acid Mine drainage is a highly significant impact in terms of its severity as well as potential extent.	The mine shall appoint specialists to develop detailed, site specific AMD management plan which shall be updated regularly (at least every 3 years).	NWA NEMA duty of care	As soon as possible during operation. AMD mitigation plan to be implemented as soon as possible.

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure		Where acid mine drainage is anticipated or detected, an Acid-Base Accounting Technique and Evaluation (ABATE) should be initiated.	GN704 DHSWS best practice guidelines	As required and ongoing until closure certificate s received
	Operation		AMD can be reduced through the addition of calcitic lime to the backfill material (to buffer pH) or treating decant water.		Operation
	Operation		If necessary, a pump-and-treat system can be established to continuously pump the water from the rehabilitated workings, treat to a suitable water quality and discharge to the environment as long as it meets the relevant DHSWS water quality guidelines.		Operation
	Operation Decommissioning Rehabilitation and Closure		Acid drainage control and treatment techniques can be broadly classified into physical, chemical and biological, and those using combinations of these. The mine must investigate further the best options for site specific treatment of AMD. Treatment techniques are usually reactive rather than pro-active, and are generally designed to: 1. Raise pH. 2. Lower toxic metal concentrations (e.g. precipitation, adsorption). 3. Lower aqueous sulphate concentrations. 4. Lower the toxicity / bioavailability of metals in solution (e.g. oxidation, reduction). 5. Oxidise the solution (e.g. Fe(II)-Fe(III), Mn(II)-Mn(IV), As(III)-As(V)). 6. Reduce the solution (e.g. SO_4^{2-}, H_2S). 7. Collect / dispose / isolate the metallic sludge generated.		As soon as possible during operation. AMD mitigation plan to be implemented as soon as possible.
	Rehabilitation and Closure		Provision must be made for the long-term treatment and/or management of water collecting in mined underground workings. Water that decants or is pumped from mined out areas will need to comply with target water quality variables and flow		As required and ongoing until closure certificate s received

Activities	Phase	Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			requirements of downstream watercourses (as stipulated by DHSWS).		
	Rehabilitation and Closure		After closure, mine water and/or decant needs to be treated to the required level before discharge into natural watercourses. The extent of treatment required, as well as the duration of treatment needs to be determined by water quality assessments. All remaining carbonaceous material should be removed and placed into the bottom of a mining area below the final post-mining groundwater level.		As required and ongoing until closure certificate s received
Post-Closure Monitoring					
Post Closure Monitoring and Maintenance **Water Treatment**	Rehabilitation and Closure	Very limited potential for impacts during closure. The Mine remains responsible for the mining right area until such time as a closure certificate is obtained.	The post-closure monitoring and management period following cessation of mining activities will be implemented by a suitable qualified independent party for a minimum of ten (10) years unless otherwise specified by the competent authority. The monitoring activities during this period will include but not be limited to: Regular ground and surface water monitoring; Air quality monitoring; Biomonitoring; Re-vegetation of disturbed areas where required; Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed mining activities and incorporated into post closure monitoring and management.	MPRDA and regulations	Minimum of ten (10) years post closure or as agreed upon with DMRE

7 ENVIRONMENTAL MONITORING

7.1 FUNCTIONAL REQUIREMENTS OF MONITORING PROGRAMMES

The purpose of monitoring is not merely to collect data, but to provide information necessary to make informed decisions on managing and mitigating potential impacts. Monitoring therefore serves the following functions:

- Serve as early warning system to detect any potential negative impacts;
- To provide information to feedback into management controls to avoid, prevent or minimise potential negative impacts;
- Provide quantitative data that can serve as evidence for the presence of negative impacts or the lack thereof;
- Allows for trending, modelling and prediction of future conditions or potential impacts;
- Based on the above, the mine must ensure that monitoring programmes comprise of the following (at a minimum) in order to obtain valuable environmental data;
    - Environmental aspect monitoring must be a formalised procedure;
    - All equipment used in monitoring must be correctly calibrated and serviced regularly;
    - Samples required for analysis will be sent to an independent and accredited laboratory;
    - Monitoring data must be stored;
    - Data must be checked and interpreted and tending undertaken on a quarterly basis;
    - Both the date and reports on environmental monitoring must be kept on record for the life of mine and where relevant provided to I&AP's; and
    - The general and site-specific parameters to be monitored must be identified by an independent specialist, the authorities and where relevant I&AP's.

7.2 LIST OF ASPECTS THAT REQUIRE MONITORING PLANS

The list of aspects that require on-going environmental monitoring includes the following:

- Air quality;
- Aquatic biomonitoring;
- Alien and invasive plant species;
- Blasting and vibration;
- Soil compaction;
- Surface water;
- Groundwater; and
- Rehabilitation.

As mines and the environment are both dynamic it is likely that future scenarios may require the monitoring of additional or unforeseen impacts. As such, the list provided is by no means conclusive and must instead be used as a guideline for the impacts that require monitoring.

7.3 MONITORING PLANS FOR ENVIRONMENTAL ASPECTS

The monitoring of various environmental aspects and the impact on them as a result of the mining activities shall take place by means of both quantitative and qualitative techniques in order to determine whether the requirements of the Environmental Management Programme are being complied with. The importance and value of detailed environmental monitoring networks cannot be overstated.

Environmental monitoring serves as a tool to track compliance, assist with potential liability identification, and mitigation throughout the life of the proposed project. This is achieved through the provision of actual evidence-based monitoring and reporting thereof. Monitoring is a continuous data-gathering, data interpreting, and control procedure that ranges from visual inspection to in-depth investigative monitoring and reporting. These monitoring plans need to be drawn into standalone plans that can be updated and amended as per authority requirements and additional data requirements identified during the mining activities. These plans need to include the site-specific roles and responsibilities for actions.

7.3.1 AIR QUALITY

Air quality monitoring in the form of dust sampling is undertaken at Elandsfontein Colliery. The results are compared to the National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) (NEMA: AQA): National Dust Control Regulations 2013 (NDCR, 2013). The dust fall rates as specified in the NDCR (600 mg/m²/day for residential areas and 1200 mg/m²/day for non-residential areas) are applicable for dust fallout measured by the ASTM D1739 method.

Given the potential dust impacts from operations it is considered “good practice” that dust control measures be implemented throughout the life of the project and it is recommended that the project proponent commit itself to dust management planning.

7.3.1.1 PERFORMANCE INDICATORS

Key performance indicators against which progress may be assessed form the basis for all effective environmental management practices. In the definition of key performance indicators careful attention is usually paid to ensure that progress towards their achievement is measurable, and that the targets set are achievable given available technology and experience.

Performance indicators are usually selected to reflect both the source of the emission directly and the impact on the receiving environment. Ensuring that no visible evidence of wind erosion exists represents an example of a source-based indicator, whereas maintaining off-site dust fall levels to below 600 mg/m²/day represents an impact- or receptor-based performance indicator. The NAAQS for particulate matter and NDCR represents receptor-based objectives.

7.3.1.2 RECEPTOR BASED PERFORMANCE INDICATORS

Based on the impacts from the proposed project it is recommended that the current dust fallout sampling undertaken at the mine be continued during proposed operations to ensure management measures implemented are effective and ambient air quality levels are not significantly different to baseline levels.

7.3.2 SURFACE WATER MONITORING

Surface monitoring is currently being undertaken at Elandsfontein Colliery in accordance with the requirements of the Integrated Water Use Licence (IWUL). The stated objectives of the current monitoring programme have been developed in alignment with section 9 of the NWA and are in correlation with the catchment management strategy, are as follows:

- To establish a continuous database specific to this mine representative of the life of mine;
- Assessing the general temporal condition of water quality of resources in the vicinity likely to be impacted upon by the mine;
- Identifying any potential pollution sources and determining their extent, in order to circumvent relevant legal liabilities potentially resulting from recorded impacts on the receiving aquatic environment;
- Quantifying and assessing any impacts in obstruction of legislative stipulations in order to develop mitigation or remedial plans where necessary; and
- To set out strategies, objectives, plans, guidelines and procedures for protection, use, development, conservation, management and control of water resources within the water management area.
- The monitoring plan must be amended to take in account the new mining areas.

- Surface water quality monitoring must be conducted on the both the Grootspruit and its tributary. The recommended monitoring locations are shown in
-
-

Figure 4. The mine currently monitors the recommended points as well as additional points. This is considered acceptable. The monitoring frequency must be monthly or more frequently if desired. The water quality samples must be analysed by an accredited laboratory. Monthly surface water samples are to be analysed for:

- Total Dissolved Solids
- Suspended Solids
- Nitrate as N
- Chlorides as Cl
- Total Alkalinity as $CaCO_3$
- Fluoride as F
- Sulphate as SO_4
- Total Hardness as $CaCO_3$
- Calcium Hardness as $CaCO_3$
- Magnesium Hardness as $CaCO_3$
- Calcium as Ca
- Magnesium as Mg

- Sodium as Na
- Potassium as K
- Iron as Fe
- Manganese as Mn
- Conductivity at 25° C (mS/m)
- pH-Value at 25 ° C (pH Units)
- Turbidity (NTU)
- Aluminium as Al

Water samples are to be analysed at a South African National Accreditation System (SANAS) Accredited Testing Laboratory. The quarterly, biannual and annual surface water assessments are evaluated by a registered Pri. Sci. Nat. Environmental Scientist. The quarterly reports must include basic representation of data, evaluated against appropriate water quality guidelines with related discussions. Surface water monitoring must continue in line with the current plan and any new requirements stipulated in the WUL..

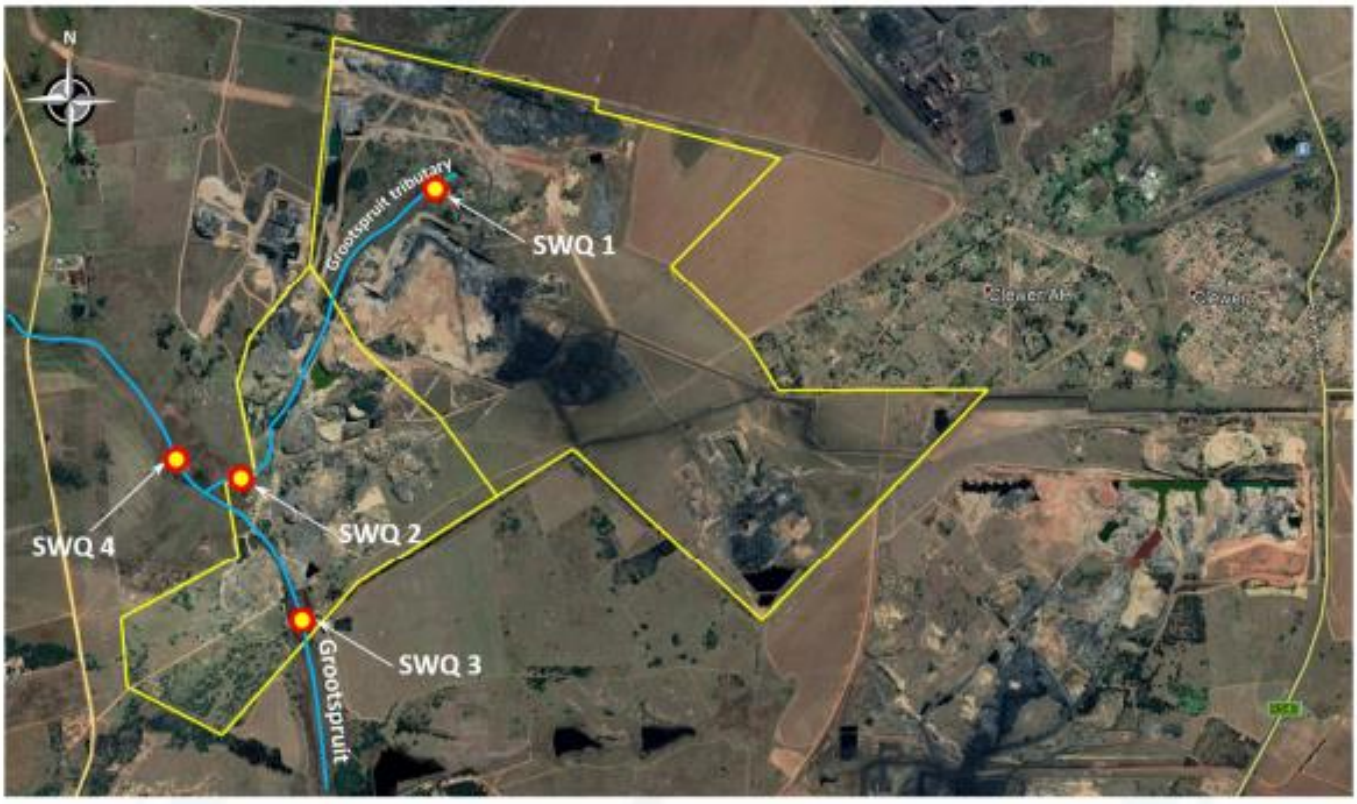

Figure 4: Minimum recommended surface water monitoring locations

7.3.3 GROUND WATER MONITORING

Groundwater monitoring boreholes should be analysed for the following chemical constituents:

- i. Physical and aesthetic determinants: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS) and Total Hardness.

- ii. Macro determinants: Total Alkalinity (MAlk), Sulphate (SO4), Nitrate (NO3), Chloride (Cl), Fluoride(F), Calcium (Ca), Magnesium (Mg), Potassium (K) and Sodium (Na).
- iii. Micro determinants: Aluminium (Al), Iron (Fe), Manganese (Mn), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Cobalt (Co) and Zinc (Zn).

Groundwater monitoring boreholes should be analysed for the following chemical constituents:

- i. Physical and aesthetic determinants: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS) and Total Hardness.
- ii. Macro determinants: Total Alkalinity (MAlk), Sulphate (SO4), Nitrate (NO3), Chloride (Cl), Fluoride(F), Calcium (Ca), Magnesium (Mg), Potassium (K) and Sodium (Na).
- iii. Micro determinants: Aluminium (Al), Iron (Fe), Manganese (Mn), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Cobalt (Co) and Zinc (Zn).

Table 9 summarises the proposed revised monitoring network and program along with relevant information. Newly suggested monitoring localities are conceptual only and it is suggested that a geophysical survey be conducted in order to target sub-surface lineaments/weathered zones acting as groundwater flow and contaminant transport pathways. Furthermore, existing monitoring boreholes which are blocked and/or inaccessible should be revisited in order to confirm adequacy for inclusion into the updated monitoring protocol.

Groundwater monitoring i.e. quality analysis should be conducted on a quarterly basis whereas water level monitoring is conducted on a monthly basis. Water quality reports summarising monitoring results should be submitted to the Regional Head of the Department within timeframes as stipulated in the WUL conditions.

Groundwater monitoring boreholes should be analysed for the following chemical constituents:

- i. Physical and aesthetic determinants: pH, Electrical Conductivity (EC), Total Dissolved Solids (TDS) and Total Hardness.
- ii. Macro determinants: Total Alkalinity (MAlk), Sulphate (SO4), Nitrate (NO3), Chloride (Cl), Fluoride(F), Calcium (Ca), Magnesium (Mg), Potassium (K) and Sodium (Na).
- iii. Micro determinants: Aluminium (Al), Iron (Fe), Manganese (Mn), Cadmium (Cd), Chromium (Cr), Copper (Cu), Nickel (Ni), Lead (Pb), Cobalt (Co) and Zinc (Zn).

Table 9: Groundwater monitoring points.

Locality	Latitude	Longitude	Description	Frequency of water quality monitoring	Frequency of water level monitoring
Existing Monitoring Boreholes					
ELNBH 01	-25.913370	29.108570	Existing Elandsfontein monitoring network	Quarterly	Monthly
ELNBH 02	-25.914220	29.101720	Existing Elandsfontein monitoring network	Quarterly	Monthly
ELNBH 03	-25.919940	29.086370	Existing Elandsfontein monitoring network	Quarterly	Monthly
ELNBH 07 S	-25.908100	29.099770	Existing Elandsfontein monitoring network	Quarterly	Monthly

ELNBH 06 D	-25.908230	29.099780	Existing Elandsfontein monitoring network	Quarterly	Monthly
ECBH 01	-25.913399	29.095491	Existing Elandsfontein monitoring network	Quarterly	Monthly
ECBH 02	-25.903170	29.096560	Existing Elandsfontein monitoring network	Quarterly	Monthly
ECBH 03	-25.903000	29.096330	Existing Elandsfontein monitoring network	Quarterly	Monthly
ECBH 04	-25.902000	29.097210	Existing Elandsfontein monitoring network	Quarterly	Monthly
ECBH 05	-25.903900	29.097910	Existing Elandsfontein monitoring network	Quarterly	Monthly
GW 05	-25.922730	29.106740	Existing Elandsfontein monitoring network	Quarterly	Monthly
BH 172	-25.923890	29.077950	Existing Elandsfontein monitoring network	Quarterly	Monthly
BH 173	-25.924160	29.078950	Existing Elandsfontein monitoring network	Quarterly	Monthly
FFBH 11	-25.984980	29.088820	Existing Elandsfontein monitoring network	Quarterly	Monthly
ELAND 3	-25.911966	29.086386	Existing Elandsfontein monitoring network	Quarterly	Monthly
ELAND 10	-25.909180	29.105893	Existing Elandsfontein monitoring network	Quarterly	Monthly
GRBH 01	-25.918850	29.100870	Existing Elandsfontein monitoring network	Quarterly	Monthly
GRBH 02	-25.928180	29.098130	Existing Elandsfontein monitoring network	Quarterly	Monthly
GRBH 03	-25.925730	29.103740	Existing Elandsfontein monitoring network	Quarterly	Monthly
Newly proposed monitoring boreholes					
AH-BH 01	-25.916530	29.062030	Neighbouring borehole - down-gradient	Quarterly	Monthly
AH-BH 03	-25.928350	29.071160	Neighbouring borehole - down-gradient	Quarterly	Monthly
AH-BH 04	-25.911130	29.111850	Neighbouring borehole - up-gradient	Quarterly	Monthly
AH-BH 05	-25.907560	29.111300	Neighbouring borehole - up-gradient	Quarterly	Monthly
EBH01	-25.895463	29.089447	Additional monitoring borehole up-gradient of opencast pits	Quarterly	Monthly
EBH02	-25.894391	29.08337	Additional monitoring borehole up-gradient of opencast pits	Quarterly	Monthly
EBH03	-25.899036	29.082896	Additional monitoring borehole down-gradient of opencast pits	Quarterly	Monthly
EBH04	-25.905111	29.079085		Quarterly	Monthly
EBH05	-25.912852	29.079919	Additional monitoring borehole down-gradient of opencast pits	Quarterly	Monthly
EBH06	-25.906897	29.088494	Additional monitoring borehole located down-gradient of ROM stockpile area	Quarterly	Monthly
EBH07	-25.923334	29.105526	Additional monitoring borehole located down-gradient of PCD area	Quarterly	Monthly
EBH08	-25.917974	29.098737	Additional monitoring borehole down-gradient of opencast pits.	Quarterly	Monthly
EBH09	-25.916614	29.077298	Wetland monitoring borehole.	Quarterly	Monthly
EBH010	-25.910801	29.089691	Additional monitoring borehole located down-gradient of ROM stockpile area	Quarterly	Monthly
EBH011	-25.901200	29.089069	Additional monitoring borehole located down-gradient of PCD area	Quarterly	Monthly

7.3.4 AQUATIC BIOMONITORING

Aquatic biomonitoring is currently being undertaken for the Elandsfontein Colliery as per conditions of the Water Use Licence. It is recommended that this biomonitoring programme be continued and consider the proposed new mining areas. In addition to this, it is recommended that wetland monitoring be conducted simultaneously with the biomonitoring programme. The purpose of aquatic biomonitoring is aimed at assessing the ecological integrity of wetlands and rivers at the time of sampling in relation to the pre-mining condition.

In situ measurements for pH, Electrical Conductivity (EC), Dissolved Oxygen Concentration (DO) and Temperature (Temp) are measured. The results obtained from the assessment of the water quality data were compared to benchmark criteria and Target Water Quality Ranges (TWQRs) for aquatic ecosystems.

The Present Ecological State (PES) of the river ecosystems are assessed and monitored by applying the South African Scoring System 5 (SASS5) with associated Invertebrate Habitat Assessment System (IHAS). The results of the SASS5 assessment are provided as Ecological Categories ranging from Natural (Category A) to Critically Modified (Category F) for each site assessed. The ecological state of the wetland systems should be further ascertained by applying the Diatom Assessment Protocol (DAP) as an indication of water quality as indicated by the biotic response of diatoms to the ambient environment.

An aquatic biomonitoring programme is an essential management tool. The monitoring programme should be designed to enable the detection of potential negative impacts brought about by the proposed project. **Table 10** highlights some important aspects to monitor in reference to aquatic biota for the duration of the programme.

Table 10: Aquatic and Wetland Ecology Monitoring Plan

Monitoring objectives	Frequency of monitoring	Parameters to be monitored
Overall Aquatic PES **Wetland PES, functioning and EIS**	Bi-annual	Standard aquatic ecology (Ecostatus) methods Wetland WET-series
Determine if water quality deterioration is occurring.	Bi-annual	SASS5 and ASPT scores should not decrease as and be related to mining activities.
Determine if water/habitat quality deterioration is occurring.	Bi-annual	Monitor for presence of fish.

7.3.5 ALIEN AND INVASIVE CONTROL

Thirteen (13) category 1b invasive species were recorded within the current mining areas and must therefore be removed by implementing an alien invasive plant management programme in compliance of section 75 of the NEMBA. Alien and invasive species monitoring must be undertaken on the areas that have been disturbed by the mine, namely the operating area and the remaining extent of the future mining areas that are still considered to be greenfield. The priority is to remove alien vegetation from areas disturbed by mining activities, and then to manage the remaining undisturbed areas within the operations area. The Category 1b species are shown **Table 11.** An invasive species survey and eradication control plan must be developed for the entire mining area, including the future mining areas, by a suitably qualified individual and implementation of the plan must be ongoing throughout the LoM.

Table 11: Alien and invasive plant species recorded within the mining areas.

Species	NEMBA Category
Campuloclinium macrocephalum	Category 1b

Cirsium vulgare	Category 1b
Cortaderia selloana	Category 1b
Cortaderia selloana	Category 1b
Datura ferox	Category 1b
Datura stramonium	Category 1b
Eucalyptus camaldulensis	Category 1b
Melia azedarach	Category 1b
Pennisetum clandestinum	Category 1b
Solanum mauritianum	Category 1b
Solanum sisymbriifolium	Category 1b
Tamarix ramosissima	Category 1b
Verbena bonariensis	Category 1b

7.3.6 SOIL MONITORING

7.3.6.1 MONITORING DURING THE CONSTRUCTION PHASE

The entire project area should be monitored every three months for compaction, erosion and subsidence. In cases where compaction, subsidence and/or erosion does occur, action plans should be implemented to apply mitigation.

7.3.6.2 MONITORING DURING THE OPERATIONAL PHASE

Soil samples should be taken on site by a soil scientist and sent away for fertility tests within the first month of the operational phase. By comparing the fertility results after the construction phase to the fertility of the topsoil prior to construction, conclusions can be made regarding the degradation of the soil's chemical properties. Mitigation measures should be suggested by a soil scientist thereafter to rectify any degradation.

Compaction and erosion monitoring should take place every six months up until the start of the decommissioning phase. Refer to the mitigation measures to attend to any degradation.

7.3.6.3 MONITORING DURING THE DECOMMISSIONING PHASE

The entire project area should be monitored every month for compaction and erosion. In cases where compaction and/or erosion does occur, action plans should be implemented to apply mitigation and to avoid these areas as much as possible in the near future.

7.3.6.4 MONITORING DURING THE REHABILITATION AND CLOSURE PHASE

Soil samples should be taken on site by a soil scientist and sent away for fertility tests within the first month of rehabilitation. The results thereof should be compared to the results obtained prior to construction and after construction to conclude the findings of the change in the top soil's chemical properties. Mitigation measures can be suggested by the relevant soil scientist thereafter to rectify any degradation. Thereafter, similar sampling should be carried out every year within the same season that the previous sampling has been done until closure is obtained.

Compaction and erosion should be monitored within the first month to gain knowledge of areas impacted upon during the decommissioning phase. Rehabilitation of these sites should take place by means of the rehabilitation guidelines provided. Thereafter, similar monitoring and the accompanied mitigation measures should be applied every six months until closure is obtained.

A post-mining land capability assessment should form part of a yearly monitoring program to assess the rehabilitated areas against the land capability targets set.

7.3.7 BLAST MONITORING

A monitoring programme for recording blasting operations is recommended. The following elements should be part of such a monitoring program:

- Ground vibration and air blast results;
- Blast Information summary;
- Metological information at time of the blast;
- Video Recording of the blast;
- Fly rock observations.

Most of the above aspects do not require specific locations of monitoring. Ground vibration and air blast monitoring requires identified locations for monitoring. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Proposed positions were selected to indicate the nearest points of interest at which levels of ground vibration and air blast should be within the accepted norms and standards as proposed in this report. The monitoring of ground vibration will also qualify the expected ground vibration and air blast levels and assist in mitigating these aspects properly. This will also contribute to proper relationships with the neighbours.

Eleven monitoring positions were identified as possible locations that will need to be considered. Not all points will be required at once but active monitoring and observation of where blasting is done will dictate the requirements for the areas around the pit. Some of these points may be applicable to more than one location to be monitored – specifically regarding the railway line and Eskom pylons – roving station may be applied. Monitoring positions are indicated in **Figure 5.** These points will need to be re-defined after the first blasts done and the monitoring programme defined.

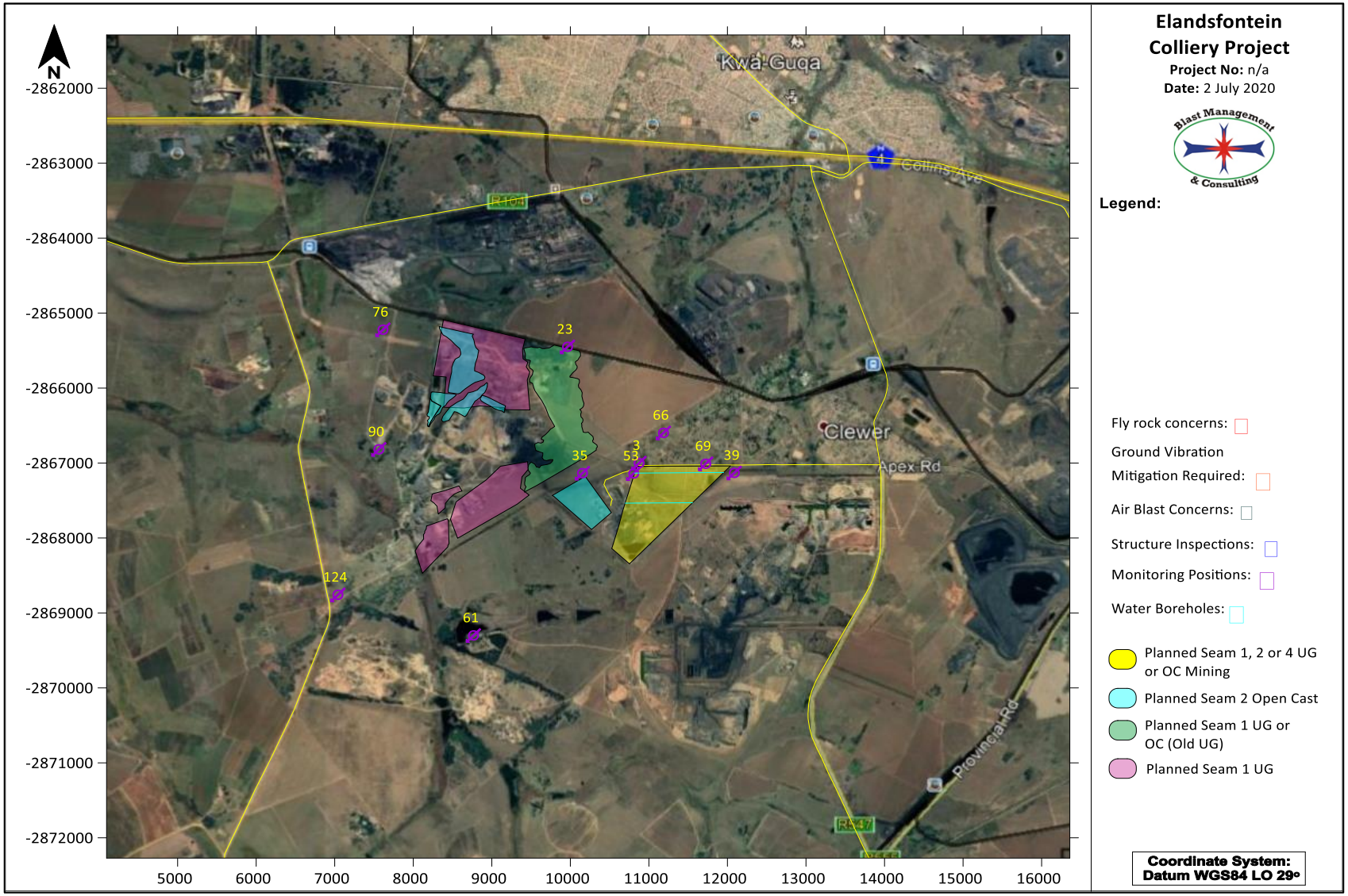

Figure 5: Preliminary blast monitoring locations

7.3.8 REHABILITATION MONITORING

The purpose of a monitoring, maintenance and aftercare programme is to ensure that the rehabilitation and closure objectives are met, and that the rehabilitation process is followed. The frequency of monitoring must be adequate to identify potential gaps in the effectiveness of the mine closure strategy. A monitoring programme must be implemented during the operational and closure phases of the mine. The following identified aspects require continuous monitoring during the operation and closure phases:

- Alignment of the final landform design with that of the actual topography and landscape;
- Placing of the correct topsoil depth in order to encourage successful rehabilitation of vegetation communities;
- Erosion status of the mine site;
- Surface drainage and surface water quality;
- Groundwater quality;
- Successful re-vegetation and basal cover proportions;
- Rehabilitation effectiveness;
- Fauna and flora re-colonisation; and
- Control of invasive vegetation species.

Existing and newly drilled boreholes must be monitored on a quarterly basis in order to assess the impact of ROM stockpiles and the PCD on the groundwater quality. Monitoring of these boreholes also serves to evaluate the dewatering status and potential groundwater contamination from the pit. The following measures should be taken into account in order to ensure that groundwater and surface water quality objectives are met:

- All identified springs must be monitored in order to assess the contribution of groundwater flow from the mine.
- Groundwater levels of all boreholes which supply drinking water to the mine must be monitored on a weekly basis;
- Natural drainage lines and catchments should be restored during the decommissioning phase;
- Rehabilitation of the PCD should be implemented during the winter-period as the majority of water should have evaporated at the time;
- Contaminated soils and impermeable layers of the PCD should be removed and disposed of at an appropriate facility;
- Groundwater and surface water should be continuously monitored after operation ceases until a definite trend is established and understood;
- Boreholes should remain on site to allow continuous monitoring to take place; and
- The PCD and trenches should be the last infrastructure to be removed.

8 UNDERTAKING

The EAP herewith confirms:

a) The correctness of the information provided in the reports;

b) The inclusion of comments and inputs from stakeholders and I&AP's;

c) The inclusion of inputs and recommendations from the specialist reports where relevant; and

d) That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the EAP

Date: __3 March 2021___

9 SUPPORTING INFORMATION

The following supporting information is included as Appendices to this report:

Appendix A: CV of EAP

Appendix B: Final Rehabilitation, Decommissioning and Closure Plan