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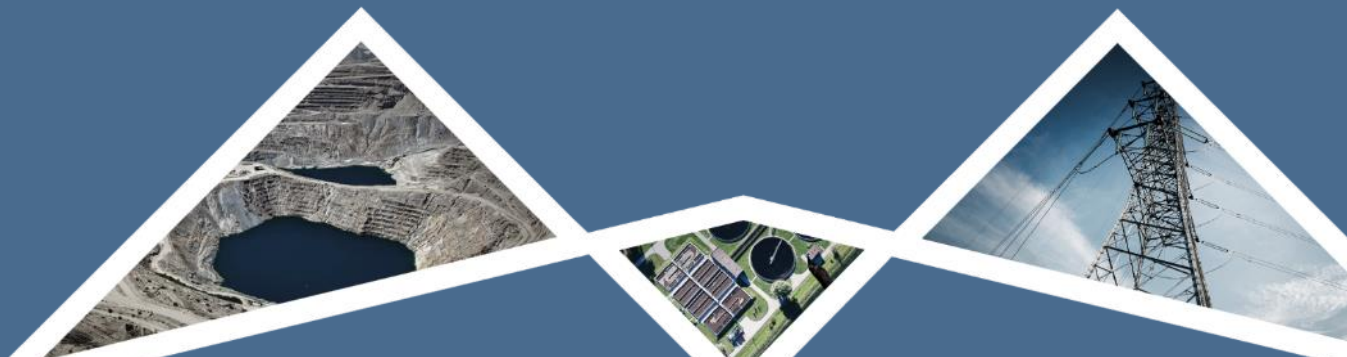
ENVIRONMENTAL MANAGEMENT PROGRAMME

ELOFF PHASE 3 (MP30/5/1/2/2/10169MR)



DOCUMENT DETAILS

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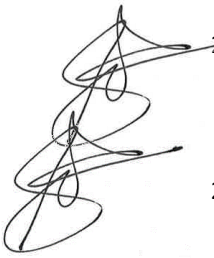
DOCUMENT TITLE:	ELOFF PHASE 3 EMPr
COMPANY:	ELOFF MINING COMPANY (PTY) LTD
MINING RIGHT:	MP30/5/1/2/2/10169MR

DOCUMENT CONTROL

	NAME	SIGNATURE	DATE
COMPILED:	John von Mayer		2020/01/27
CHECKED:	Liam Whitlow		2020/02/06
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REVISION AND AMENDMENTS

REVISION DATE:	REV # 1	Draft EMPr
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1 INTRODUCTION

1.1 REPORT STRUCTURE

This report is a new Environmental Management Programme (EMPr) for Eloff Phase 3 and as such is compliant with the requirements of the National Environmental Management Act (Act 107 of 1998) (NEMA) Regulations. Table 1 below provides a summary of the NEMA requirements in terms of Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (GNR 982)(EIA Regulations), and an indication in which section the supporting information and documentation can be found.

Table 1: Report Structure

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;	Section 1.6
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 4
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 2
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 v. Where relevant, operation activities;	Section 4
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;	Section 6

Environmental Regulation	Description	Section in Report
	ii. Comply with any prescribed environmental management standards or practices; iii. Comply with any applicable provisions of the ac regarding closure, where applicable; and iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 4.1
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	4.3
Appendix 4(1)(1)(i):	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 4.1 and 4.4
Appendix 4(1)(1)(j):	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 6
Appendix 4(1)(1)(k):	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 4.4
Appendix 4(1)(1)(l):	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Section 3.4
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 3.7
Appendix 4(1)(1)(n):	Any specific information that may be required by the competent authority.	N/A

1.2 INTRODUCTION TO THE PROJECT

Eloff Mining Company (Pty) Ltd has been granted a Mining Right (MP30/5/1/2/2/10169MR), in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002 – MPRDA) as amended, for the mining of the Eloff Coal Resource (Eloff Project) and further applied for Environmental Authorisation ("EA") for the mining of coal and associated activities for Phase 1 Pit 1 of the Eloff Project which has been granted on the 25th April 2019. In addition to the above, Eloff Mining Company wishes to apply for EA for the development of Eloff Phase 3 ("Phase 3 Project") opencast mining pit and associated infrastructure on the south-eastern part of the Eloff Project mining right area. The proposed Phase 3 Project covers an extent of approximately 251 hectares (ha) over portions 14, 15, 16, 18, 19, 20, 22, 23, 24 and 59 of the farm Strydpan 243 IR, and is located approximately

7.5km south-east of the town Delmas in Victor Khanye Local Municipality, within the Nkangala District Municipality, Mpumalanga Province.

1.3 MINE INFRASTRUCTURE

The proposed Phase 3 Project is anticipated to use a standard truck and shovel mining method based on strip mining design and layout. The existing Coal Handling and Processing Plant (CHPP) at the adjacent Kangala Colliery will be utilised, and it is anticipated that no new surface infrastructure such as offices, dams, stores facility, workshops, or change house will be required for the project

1.4 DESCRIPTION OF THE PROPERTY

Table 2 indicates the farm portions that fall within the proposed Eloff Phase 3 Project ("Phase 3 Project") including details on the location of the proposed opencast mining pit as well as the distance from the proposed project area to the nearest towns.

Table 2: Property details

Farm Name	**Mining Right holder** Eloff Mining Company is applying for EA and IWULA for the proposed Phase 3 Project which entails an opencast mining pit located on the following farms: • Portions 14, 15, 16, 18, 19, 20, 22, 23, 24 and 59 of farm Strydpan 243 IR.		
Application Area (Ha)	The proposed Phase 3 Project covers an extent of approximately 251 hectares (ha)		
Magisterial District	Nkangala District Municipality.		
Distance and direction from nearest towns	The proposed project area is located approximately 7.0km south-west of the town Delmas and approximately 6.0km south-east of the town Eloff in the Victor Khanye Local Municipality, within the Nkangala District Municipality, Mpumalanga Province. The geographic coordinates at the centre of the site are approximately: 26°12'35.76" S and 28°38'43.20" E.		
21-digit Surveyor General Code for each Portion	**Farm Name:**	**Portion:**	**21 Digit Surveyor General Code**
	Strydpan 243 IR	14	T0IR00000000024300014
	Strydpan 243 IR	15	T0IR00000000024200015
	Strydpan 243 IR	16	T0IR00000000024300016
	Strydpan 243 IR	18	T0IR00000000024300018
	Strydpan 243 IR	19	T0IR00000000024300019
	Strydpan 243 IR	20	T0IR00000000024300020
	Strydpan 243 IR	22	T0IR00000000024300022
	Strydpan 243 IR	23	T0IR00000000024300023

	Strydpan 243 IR	24	T0IR00000000024300024
	Strydpan 243 IR	59	T0IR00000000024300059

Figure 1 indicates the locality of the proposed Phase 3 Project and the existing Kangala Coal Mine where the infrastructure (plant etc) is located.

1.5 SENSITIVE AREAS

Several “no-go” or very high sensitivity areas were identified within the proposed mining area. Sensitive wetland areas were buffered by 100m to reduce the impact on wetlands. It should also be noted that relocation of structures occurring within 100m from the edge of the mining area will need to take place, as recommended by the blasting specialist. The combined sensitivity map includes individual sensitivities according to heritage, biodiversity, blasting and vibration, wetlands, surface water and soil land type features in and around the project area. The sensitivities related to hydrogeology (groundwater), visual, air quality, social, land use and climate change were excluded as their effects cannot be directly or accurately measured to ascertain sensitivity. Climate change effects occur over time and at a very broad scale influencing several features and thus, it is not possible to assign sensitivity at project area level. Groundwater features are continuous in nature and their sensitivity or vulnerability dependant on various entities (e.g. water travel time, contamination migration, plume stability, soil, etc.) making it difficult to directly and accurately measure or assign sensitivity at project area level. Furthermore, land use economics and social impacts pertain to the economic value of different land uses in an area which cannot be allocated sensitivity criteria due to their variability. Lastly, the exclusion of visual and air quality sensitivity as part of the combined sensitivity map does not mean that there will be no visual sensitivities, but indicates that the entire site and its surroundings is already visually impacted upon by similar activities as the proposed development (i.e. as the Kangala Colliery pit activities decrease including their visual impacts, they will be replaced by the similar activities with similar visual impacts at the proposed new extension site), and thus the project area and its immediate surroundings cannot be assigned different levels of sensitivity. The sensitivity map is provided in Figure 2.

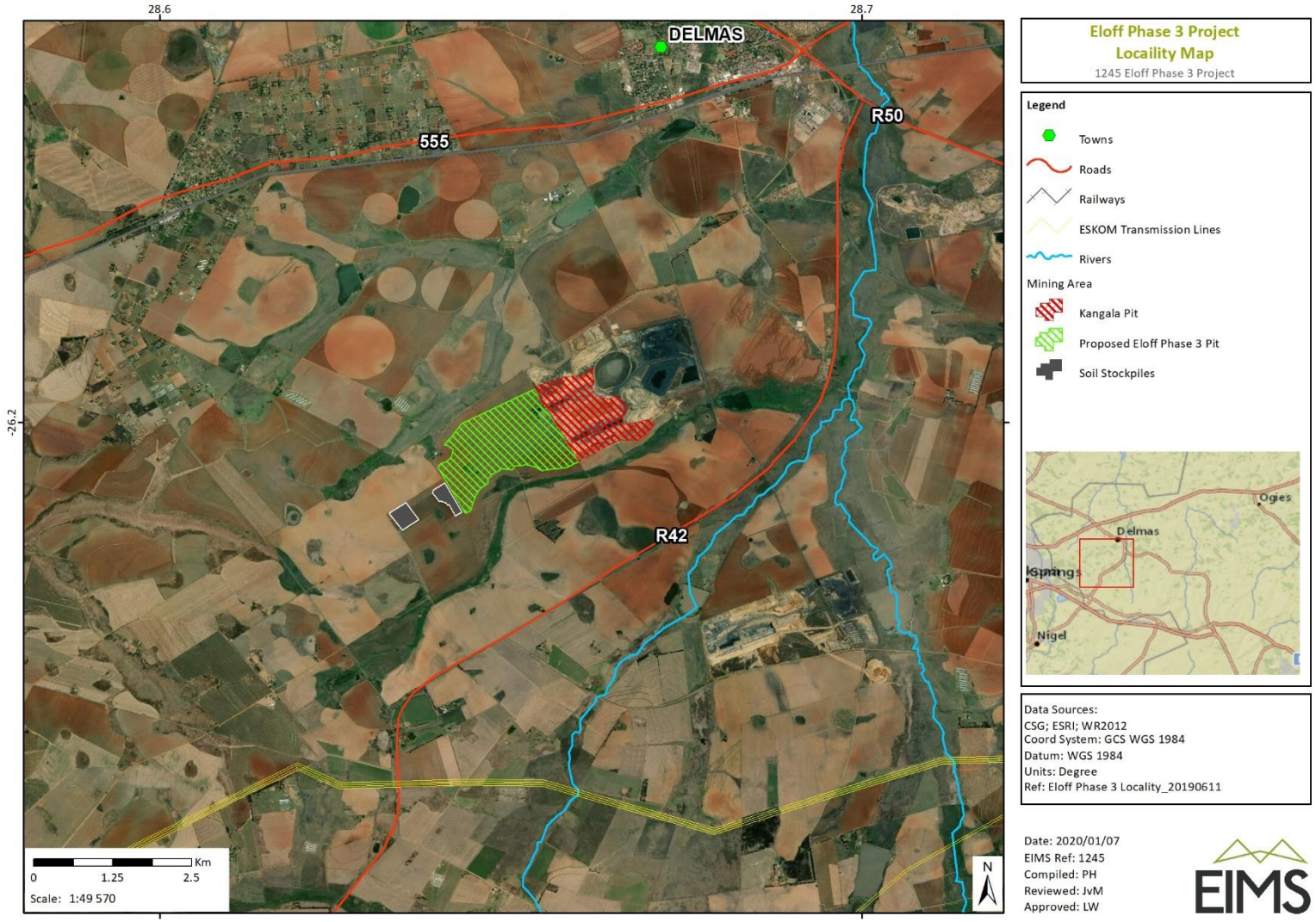

Figure 1: Locality of the Eloff Phase 3 Coal Mine.

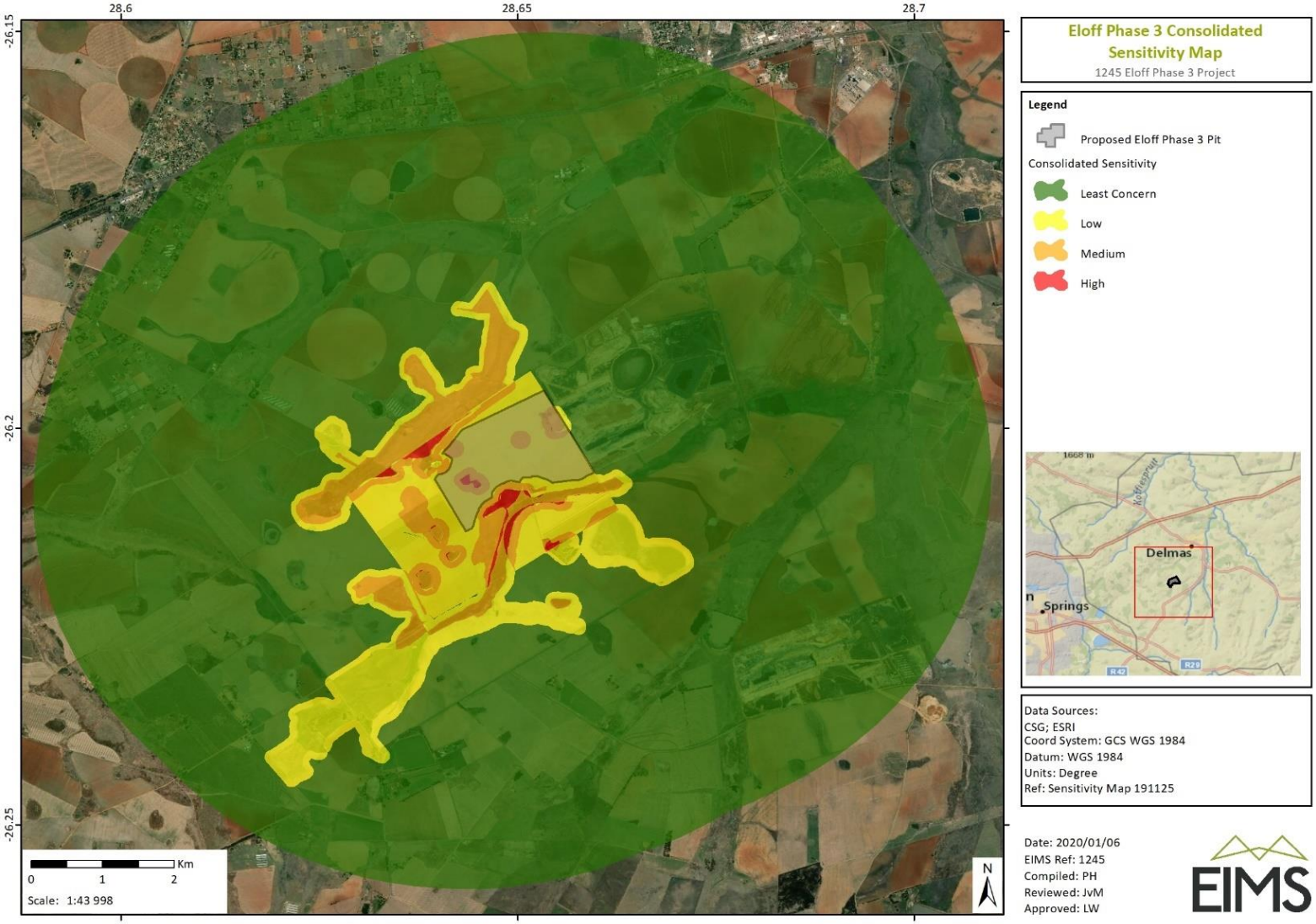

Figure 2: Sensitivity Map

1.6 DETAILS OF THE EAP

EIMS has been appointed by Eloff Mining Company as the Independent EAP and to assist in preparing and submitting the EA application, Scoping and EIA Reports, and undertaking a Public Participation Process (PPP) in support of the proposed Phase 3 Project. The contact details of the EIMS consultant who compiled this EMPr are as follows:

- Name of the consultant: John von Mayer
- Tel No.: 011 789 7170
- Fax No.: 011 787 3059
- E-mail address: kangala@eims.co.za

1.7 EXPERTISE OF THE EAP

1.7.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations (GN R. 982) as amended, an independent EAP, must be appointed by the applicant to manage the application. EIMS has been appointed by the Applicant as the EAP to assist with compiling the necessary reports and undertaking the statutory consultation processes, in support of the proposed Phase 3 Project. EIMS is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, as well as Section 1 of the NEMA. This includes, *inter alia*, the requirement that EIMS is:

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

1.7.2 SUMMARY OF EAP'S PAST EXPERIENCE

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 20 years' experience in conducting EIA's, including many EIA's for mines and mining related projects. Please refer to the EIMS website (www.eims.co.za) for examples of EIA documentation currently available. John von Mayer is a senior consultant at EIMS and has been involved in numerous significant projects the past 10 years. He has experience in Project Management, small to large scale Environmental Impact Assessments, Environmental Auditing, Water Use Licensing, and Public Participation.

2 ENVIRONMENTAL MANAGEMENT PRINCIPLES

It is extremely important for effective environmental management that the mine be aware of the general principles upon which sound environmental management is based and that these principles are considered in all aspects of the mines' operation. NEMA establishes a general framework for environmental law, in part by prescribing national environmental management principles that must be applied when making decisions that may have a significant impact on the environment. These principles are briefly summarised in the sections that follow.

2.1 HOLISTIC PRINCIPLE

The Holistic principle, as defined by NEMA (Section 2(4)(b)) requires that environmental management must be integrated, acknowledging that all elements of the environment are linked and inter-related and it must take into account the effect of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option (defined below). Holistic evaluation does not mean that a project must be looked at as a whole. It rather means that it must be accepted that there is a whole into which a project is introduced. If the indications are that the project could have major adverse effects, the project must be reconsidered and where appropriate re-planned or relocated to avoid an adverse impact or to ensure a beneficial impact.

2.2 BEST PRACTICABLE ENVIRONMENTAL OPTION

When it is necessary to undertake any action with environmental impacts, the different options that could be considered for the purpose must be identified and defined. The Best Practicable Environmental Option (BPEO) is defined in NEMA as *"the option that provides the most benefit or causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term."* Other guidelines typically used for environmental management in terms of other legislation include: BPM which is the Best Practicable Means and BAT which is the Best Available Technology. In South Africa, the DWA (then DWAF, DWS and now DWHS) adopted a BPEO guideline in 1991 for water quality management and in 1994 in the Minimum Requirements document for waste management.

2.3 SUSTAINABLE DEVELOPMENT

The concept of sustainable development was introduced in the 1980's with the aim to ensure that the use of natural resources is such that our present needs are provided without compromising the ability of future generations to meet their own needs. The constitution of South Africa is built around the fact that everyone has the right to have the environment protected through reasonable legislative and other measures that secure ecologically sustainable development. The National Environmental Principles included in the NEMA require development to be socially, environmentally and economically sustainable.

2.4 PREVENTATIVE PRINCIPLES

The preventative principle is fundamental to sustainable development and requires that the disturbance to ecosystems and the pollution, degradation of the environment and negative impacts on the environment be avoided, or, where they cannot be altogether avoided, are minimised and remedied.

2.5 THE PRECAUTIONARY PRINCIPLES

The precautionary principle requires that where there is uncertainty, based on available information, that an impact will be harmful to the environment, it is assumed, as a matter of precaution, that said impact will be harmful to the environment until such time that it can be proven otherwise. The precautionary principle requires that decisions by the private sector, governments, institutions and individuals need to allow for and recognise conditions of uncertainty, particularly with respect to the possible environmental consequences of those decisions.

In terms of the Minimum Requirements for the Handling and Disposal of Hazardous Waste, 1994, the precautionary principle is defined as, *"Where a risk is unknown; the assumption of the worst-case situation and the making of provision for such a situation."* Here the precautionary principle assumes that a waste or an identified contaminant of a waste is *"both highly hazardous and toxic until proven otherwise."*

In the context of the EIA process in South Africa, the precautionary principle also translates to a requirement to provide sound, scientifically based, information that is sufficient to provide the decision-making authority with reasonable grounds to understand the potential impacts on the environment, the extent thereof and how impacts could be mitigated. If such information is not adequate for this purpose, the relevant authority cannot be satisfied as is required and then the authority should require that further information be collected and provided.

2.6 DUTY OF CARE AND CRADLE TO GRAVE PRINCIPLE

In terms of the NEMA Section 28, "Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment." By way of example, the principle of "duty of care" in terms of waste management emphasises the responsibility to make sure that waste is correctly stored and correctly transported, as it passes through the chain of custody to final point of disposal. This means that waste must always be stored safely and securely. The company removing and disposing of waste also holds the responsibility to hold the relevant licenses, and that waste is transported alongside the necessary paperwork.

"Cradle to Grave" refers to the responsibility a company takes for the entire life cycle of a product, service or program, from design to disposal or termination. In terms of the DWS Minimum Requirements for the Handling and Disposal of Hazardous Waste, 1994, "any person who generates, transports, treats or disposes of waste must ensure that there is no unauthorised transfer or escape of waste from his control. Such a person must retain documentation describing both the waste and any related transactions. In this way, he retains responsibility for the waste generated or handled." This places responsibility for a waste on the generator, and is supported by the "Cradle to Grave" principle, according to which a "manifest" accompanies each load of Hazardous Waste until it is responsibly and legally disposed. This manifest is transferred from one transporter to the next along with the load, should more than one transporter be involved. Once the waste is properly disposed of at a suitable, permitted facility, a copy of the manifest must be returned to the point of origin." Duty of Care offers one strategy to implement sustainable development.

2.7 POLLUTER PAYS PRINCIPLE

The "polluter pays principle" holds that the person or organisation causing pollution is liable for any costs involved in cleaning it up or rehabilitating its effects. It is noted that the polluter will not always necessarily be the generator, as it is possible for responsibility for the safe handling, treatment or disposal of waste to pass from one competent contracting party to another. The polluter may therefore not be the generator, but could be a disposal site operator or a transporter. Through the 'duty of care' principle, however, the generator will always be one of the parties held accountable for the pollution caused by the waste. Accordingly, the generator must be able to prove that the transferral of management of the waste was a responsible action. The polluter pays principle acceding to NEMA dictates that *"the cost of remedying pollution, environmental degradation and consequent adverse effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects must be paid for by those responsible for harming the environment."*

2.8 DUTY OF CARE RESPONSIBILITIES

The principle of duty of care is especially important to understand when it comes to pollution that arises as a result of mining. Notwithstanding any licences or permits that may exist, the mine still has a responsibility to take suitable measures should pollution arise as a result of the mining activities.

Training and awareness should be fostered in all staff working to ensure that they can perform their duties. Failure to comply with the provisions in the EMPr and NEMA would be a contravention of the Act. The relevant sections of NEMA are provided below, to outline the duty of care and responsibility that the applicant and all employees have towards the environment. The NEMA Section 28 makes provision for Duty of care and remediation of environmental damage. The binding principals are described below:

1. Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

2. Without limiting the generality of the duty in subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises on which or in which-

    a) any activity or process is or was performed or undertaken; or

    b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.

3. The measures required in terms of subsection (1) may include measures to-

    a) investigate, assess and evaluate the impact on the environment;

    b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;

    c) cease, modify or control any act, activity or process causing the pollution or degradation;

    d) contain or prevent the movement of pollutants or the cause of degradation;

    e) eliminate any source of the pollution or degradation; or

    f) remedy the effects of the pollution or degradation.

4. No person may-

    a) unlawfully and intentionally or negligently commit any act or omission which causes significant or is likely to cause significant pollution or degradation of the environment;

    b) unlawfully and intentionally or negligently commit any act or omission which detrimentally affects or is likely to affect the environment in such manner; or

    c) refuse to comply with a directive issued under this section.

Any person who contravenes or fails to comply with subsection (14) is guilty of an offence and liable on conviction to a fine not exceeding R10 million or to imprisonment for a period not exceeding 10 years or to both such a fine and such imprisonment.

3 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. Operational risks and impacts are usually managed through the implementation of the Environmental and Social Management System (ESMS) and Health and Safety (HS) system. A ESMS is an important requirement for establishing and maintaining effective environmental management and should be undertaken during the planning phase of the Project. As such the Applicant shall be

required to ensure all the aspects listed in this section are included as part of the ESMS existing on the mine. Adequate resources (people, financial and technical) need to be made available to ensure effective establishment, implementation, maintenance and continual improvements of the ESMS. The roles and responsibilities for these key environmental personnel should be clearly defined and communicated throughout the organisation. The ESMS should include the requirement to constantly monitor environmental performance and assess the adequacy of environmental resources provided for the mine. If required, the mine would need to procure further environmental resources to ensure the successful implementation of the ESMS and EMPr. The development and implementation of an ESMS will guide compliance with relevant regulatory and other requirements.

3.1 ESMS FRAMEWORK

The Eloff Phase 3 ESMS will be based on:

- The mine's corporate vision;
- South African legal requirements; and
- Mining best practice.
- The ESMS to be developed for the mine should incorporate and provide for:
- A project specific Environmental Policy;
- Organisational capacity and competency;
- The ESMS shall identify roles and responsibilities of key role players;
- The ESMS shall incorporate a mechanism for ongoing identification of risks and impacts.
- Integration of the ESMS with the HS management system may be undertaken to form a holistic SHE risk management system;
- The ESMS shall comprise appropriate management plans and procedures to ensure effective operational control;
- The ESMS shall provide for emergency response and also make provision for emergency protocols;
- Effective communication (both internal and external) is a key requirement for successful implementation of the ESMS and an appropriate communication procedure to this effect shall be developed;
- The ESMS shall involve engagement between the client, its workers, local communities directly affected by the project (the affected communities) and where appropriate, other stakeholders. It is therefore imperative that there is integration between Stakeholder Engagement procedures and the ESMS;
- The ESMS shall make provision for ongoing compliance monitoring, performance assessment and external audits; and
- The ESMS shall make provision for internal auditing and continual improvement which should be incorporated into internal management review processes. The ESMS should provide for setting and reviewing objectives and targets to demonstrate continual SHE improvements associated with the project.

Ultimately an effective ESMS should provide for effective management of social and environmental risks and impacts whilst maintaining legal compliance and meeting international standards of best practise where these are feasible and appropriate.

3.1.1 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; and
- 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.

3.1.2 GRIEVANCE MECHANISM

Eloff Mining Company shall establish a specific mechanism for dealing with grievances prior to construction commencing. 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.

3.1.3 INTERNAL GRIEVANCE PROCEDURE

Eloff Mining Company 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.

3.2 DOCUMENT CONTROL

A formal document control system should be established during the development of the ESMS. 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;
- Ensure that documents of external origin necessary for the ESMS are identified and their distribution controlled; and
- Prevent unintended use of obsolete documents and apply suitable identification to them if they are retained for any purpose.

3.3 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 maintained. Eloff Mining Company is therefore required to develop and maintain a procedure for the identification, storage, protection, retrieval, retention and disposal of records as part of the ESMS. Records must be legible, identifiable and traceable.

3.4 AUDITING AND REPORTING PROCEDURES

The Holdershall develop and 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 list below presents 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.

3.5 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; and
- **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 Holder/EM on a regular basis (at least quarterly), and the Holder/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.

3.6 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. An example of a Major environmental incident would be a significant spillage (e.g. 500 litres) of fuel into a watercourse.
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. An example of a Medium environmental incident would be a large spill of fuel (e.g. 20 – 50 litres) onto land.
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. An example of a minor incident is day to day spills of fuel or oil onto the ground where the spill is less than one or two litres.

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.

3.7 ENVIRONMENTAL AWARENESS PLAN AND TRAINING

Training and environmental awareness is an integral part of a complete EMPr and ESMS. 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 holder must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner and are capable of complying 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 holder 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 importance of the correct stripping and stockpiling procedures with regards to the various soil types, as proposed by the soil specialist, to ensure replacement of soil in the same sequence as it has been removed and to restore the production of the soil system as a whole;
- 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.

3.7.1 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 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.

3.7.2 MANNER IN WHICH RISKS WILL BE DEALT WITH TO AVOID POLLUTION OR DEGRADATION

Eloff Mining Company will be required to develop an ESMS which provides a mechanism for ongoing assessment of operational risks and impacts associated with their activities and any new activities that may arise. The impacts and risks identified will be managed through the framework of internal procedures which specify the mechanisms and actions required to effectively manage the risks and impacts on the ground. Where any unexpected events occur that have the potential to result in environmental damage, these shall be manged through the emergency response procedure. The framework for the emergency response procedure is provided below.

3.7.3 EMERGENCY RESPONSE PLAN

Eloff Mining Company (the Holder) 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 the understanding the cause and effect. Best practise is to intervene with the ultimate factors were 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.

3.7.3.1 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 sufficient fire-fighting equipment available on site at all times. 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).

3.7.3.2 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. 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.

3.7.3.3 SPILL RESPONSE PROCEDURE

All 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 including in induction training);
- Take immediate action to contain or stop the spill where it is safe to do so;

- Contain the spill and prevent its further spread (e.g. earth berm or oil absorbent materials for spill to land or by deploying booms and/or absorbent material for a spill to water);
- Dispose of any contaminated soil or materials according to appropriate waste disposal procedure (waste from spills of hazardous materials shall be disposed of as hazardous waste at a suitably licensed waste disposal facility);
- The 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 (DWS, DEA and DMR), 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.

3.7.3.4 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.

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.

4 COMPLIANCE MONITORING

4.1 RESPONSIBLE PERSONS

This section includes details as to the roles and responsibilities of 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 Control Officer (ECO)	Responsible for external compliance monitoring	Acts as an assurance of environmental compliance Review EO reports Conduct inspections and report on environmental compliance Advise EM in corrective actions for non-compliance Recommendations for improvement Environmental training and support	Reports to EM

Environmental Resource	Key Responsibility	Tasks	Reporting
		Quarterly reporting	
Environmental Officer (EO)	The EO is responsible for **internal** 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 Environmental record keeping	Reports to EM
Independent Environmental Auditor (IEA)	Responsible for external compliance audits and annual Performance Assessments	Conducting Auditing Recommendations for improvement	Reports to authorities

4.2 METHOD OF MONITORING IMPACT MANAGEMENT ACTIONS

Eloff Mining Company is required to develop an auditing and reporting procedure. The purpose of the auditing and reporting procedure is to clearly define the requirements for compliance monitoring and audits and the reporting of the information gathered. 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. Eloff Mining Company 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 framework for compliance monitoring and auditing is summarised in the sections below.

Table 5: Proposed framework for compliance monitoring and audits

Resource	Document	Implementation		Checking/Monitoring/Audit		Reporting			
		Responsible Party	Frequency	Responsible Party	Type	Frequency	To	Type	Frequency
Environmental Manager	ESMS Procedures	Eloff Mining Company	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	EMP/EMPr's	Eloff Mining Company	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	IWULA	Eloff Mining Company	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	NEMA EA	Eloff Mining Company	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	Other Licences, Permits or Approvals	Eloff Mining Company	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
Environmental Officer	ESMS Procedures	Eloff Mining Company	Weekly	Yes	Site Inspection	Weekly	Environmental Manager	Report	Monthly
	EMP/EMPr's	Eloff Mining Company	Weekly	Yes	Site Inspection	Weekly	Environmental Manager	Report	Monthly
	IWULA	Eloff Mining Company	Weekly	Yes	Site Inspection	Weekly	Environmental Manager	Report	Monthly

Resource	Document	Implementation		Checking/Monitoring/Audit		Reporting			
		Responsible Party	Frequency	Responsible Party	Type	Frequency	To	Type	Frequency
	NEMA EA	Eloff Mining Company	Weekly	Yes	Site Inspection	Weekly	Environmental Manager	Report	Monthly
	Other Licences, Permits or Approvals	Eloff Mining Company	Weekly	Yes	Site Inspection	Weekly	Environmental Manager	Report	Monthly
Environmental Control Officer	ESMS Procedures	External ECO	-	Yes	Sample Audit	Monthly	Environmental Manager	Audit Report	Quarterly
	EMP/EMPr's	External ECO	-	Yes	Sample Audit	Monthly	Environmental Manager	Audit Report	Quarterly
	IWULA	External ECO	-	Yes	Sample Audit	Monthly	Environmental Manager	Audit Report	Quarterly
	NEMA EA	External ECO	-	Yes	Sample Audit	Monthly	Environmental Manager	Audit Report	Quarterly
	Other Licences, Permits or Approvals	External ECO	-	Yes	Sample Audit	Monthly	Environmental Manager	Audit Report	Quarterly
	ESMS Procedures	External ECO	-	No					

Resource	Document	Implementation		Checking/Monitoring/Audit		Reporting			
		Responsible Party	Frequency	Responsible Party	Type	Frequency	To	Type	Frequency
Independent Environmental Auditor	EMP/EMPr's	Auditor	-	Yes	Performance Assessment	Annual	Environmental Manager		Annual
	IWULA	Auditor	-	Yes	Audit	Annual	Environmental Manager		Annual
	NEMA EA	Auditor	-	Yes	Audit	Annual	Environmental Manager		Annual
	Other Licences, Permits or Approvals	Auditor	-	Yes	Audit	As Per Licence			As Per Licence

4.3 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;
- 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; and
- Quarterly Audit Reports: The ECO must compile quarterly compliance reports (audits) which are to be submitted to the applicant for his review and correction of non-compliance issues. It is the responsibility of the ECO to report any non-compliance, which is not correctly rectified.

4.4 MECHANISMS FOR MONITORING COMPLIANCE

Table 6 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 6: 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	Daily inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Environmental Manager	As Required
		Site Inspections and Audits	Environmental Officer	Weekly inspections
				Monthly Reports
			Environmental Control Officer	Monthly Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment
Opencast Mining	All Impacts Identified during the EIA	Site Inspections and checklists	Environmental Officer	Daily inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Environmental Manager	As Required

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

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
				Monthly Reports
			Environmental Control Officer	Monthly Audit Reports
			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	Environmental Manager	As Required
		Site Inspections and Audits	Environmental Officer	Bi-Monthly inspections
				Bi-Monthly Reports
			Environmental Control Officer	Bi-Annual Audit Reports
			Independent Environmental Auditor	Annual Performance Assessment

4.5 EMPR AUDITING

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. An EMPr audit report shall be submitted to the Department of Mineral Resources (DMR) on an annual basis (each year of mining and before applying for closure). The holder of the mining right may appoint an independent qualified person for the monitoring and to compile a report, but the responsibilities remain the holders. The performance assessment will include:

- The period when the performance assessment was conducted;
- The scope of the assessment;
- The procedures used for conducting the assessment;
- Interpreted information gained from monitoring the EMPr (e.g. ECO reports);
- Evaluation criteria used during the assessment; and
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMPr and how it can be rectified.

4.6 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. 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 ECO should be responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It shall be the responsibility of the Applicant/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 and shall notify the ECO of such changes.

It is recommended that a risk assessment protocol must be developed and implemented by the ECO 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 affected with written approval from the competent authority and in accordance with the then-in-effect relevant legal processes.

5 IMPACT MANAGEMENT OUTCOMES

This section of the EMPr provides the impact management outcomes identified for the Eloff Phase 3 mine project. The impact management objectives, including the standard to be achieved, are summarised in Table 7 below.

Table 7: Impact Management Outcomes

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Surface Rehabilitation **Mine area site preparation** **Opencast mining** **Site establishment** **Water management**	Alteration of topography	Topography and Landform	Construction Operation Decommissioning Rehabilitation and Closure	Control through site planning and design	Original topography and landform serve as a reference for rehabilitation. Alignment with the approved final rehabilitation, decommissioning and closure plan.
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Opencast mining** **Site establishment** **Storm water management** **Water management**	Altered drainage patterns	Topography and Landform	Construction Operation Decommissioning Rehabilitation and Closure	Control through proper soil management procedures	Rehabilitation, decommissioning and closure plan DWS best practice Guidelines
Opencast mining **Post Closure Monitoring and Maintenance** **Water management**	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 as calculated by engineers and in consultation with DWS/DMR

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Opencast mining	Impacts on Geology	Geology	Operation	Modify through mine planning, design and rehabilitation	MPRDA Rehabilitation and Closure Plan
General Surface Rehabilitation **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Site establishment** **Storm water management** **Water management**	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
Infrastructure removal **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Site establishment** **Storm water management** **Water management**	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

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **General Surface Rehabilitation** **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment** **Storm water management** **Water management**	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 Modify through soil treatment if required	Hazardous Substances Act NWA NEMA Duty of Care NEMWA Incident reporting procedures DWS minimum standards for waste disposal
General Surface Rehabilitation **Maintenance and operation of site infrastructure** **Mine area site preparation** **Opencast mining** **Site establishment** **Storm water management** **Water management**	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

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General Surface Rehabilitation **Maintenance and operation of site infrastructure** **Mine area site preparation** **Opencast mining** **Site establishment** **Storm water management** **Water management**	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
Infrastructure removal **Mine area site preparation** **Opencast mining** **Site establishment** **Water management**	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 **Infrastructure removal** **Mine area site preparation** **Opencast mining**	Interference with existing land uses	Land Use	Planning and Design Construction Operation	Avoid through implementation of EMPr mitigation measures (e.g.	Stakeholder Engagement Plan Rehabilitation and Closure Plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Site establishment – Camp **Site establishment – Permanent Infrastructure** **Storm water management** **Water management**			Decommissioning Rehabilitation and Closure	communication with landowners)	Grievance Mechanism
General Surface Rehabilitation **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Opencast mining** **Post Closure Monitoring and Maintenance** **Site establishment** **Site visits** **Storm water management** **Water management**	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
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Opencast mining** **Site establishment** **Storm water management**	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

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Water management					
General Surface Rehabilitation **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Site establishment** **Site visits** **Storm water management** **Water management**	Introduction/invasion by alien (non-native) species	Fauna and Flora	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Control through implementation of EMPr mitigation measures (e.g. alien vegetation management plan) Avoid/Stop through preventative measures (e.g. limit extent of disturbance)	NEMBA TOPS Alien vegetation management plan Hazardous Substances Act SANS 10206
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment** **Water management**	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	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				mitigation measures (water treatment when required)	
Maintenance and operation of site **Water management**	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 water usage and recycling)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines.
General Surface Rehabilitation **Opencast mining** **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 DWS best practice guidelines

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **Opencast mining** **Re-vegetation** **Site establishment** **Water management**	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 DWS 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) Remedy through water treatment when required	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines Rehabilitation and closure plan AMD mitigation Strategy
Maintenance and operation of site **Mine area site preparation** **Opencast mining**	Pollution of groundwater/ decreased water quality	Groundwater	Construction Operation Decommissioning	Avoid and control through implementation of preventative measures	NWA GN704 NEMA Duty of Care

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Post Closure Monitoring and Maintenance **Re-vegetation** **Site establishment**			Rehabilitation and Closure	Control through implementation of mitigation measures (AMD mitigation strategy, progressive rehabilitation)	NEMA Polluter Pays Principle DWS best practice guidelines Rehabilitation and closure plan AMD mitigation Strategy
Maintenance and operation of site **Opencast mining** **Water management**	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) Remedy/modify through wetland rehabilitation	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines Rehabilitation and closure plan
Maintenance and operation of site **Opencast mining** **Site establishment** **Water management**	Loss and disturbance of wetland habitat	Wetlands	Construction Operation Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. wetland delineation	NWA GN704 NEMA Duty of Care

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				and mine planning, limitation area of wetland disturbance – i.e.: avoid wetlands and wetland buffer areas) Remedy/modify through wetland rehabilitation	NEMA Polluter Pays Principle DWS 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 DWS best practice guidelines Rehabilitation and closure plan

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **Infrastructure removal**	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 DWS minimum standards for waste disposal
General decommissioning activities **General Surface Rehabilitation** **Infrastructure removal** **Maintenance and operation of site** **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment**	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 cleanup and waste disposal Modify through soil treatment if required	Hazardous Substances Act NWA MSDS OHSA MHSA NEMA Duty of Care NEMWA Incident reporting procedures

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Storm water management **Water management**					DWS minimum standards for waste disposal
General decommissioning activities **Maintenance and operation** **Opencast mining** **Site establishment**	Sewage spills/contamination	Environmental Pollution	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. location of toilets, spill prevention, waste management)	NWA NEMA Duty of Care NEMA Polluter Pays Principle OHSA MHSA
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
Mine area site preparation **Opencast mining** **Site establishment** **Water management**	Destruction/damage of palaeontological resources	Heritage	Construction Operation Rehabilitation and Closure	Avoid and control through implementation of preventative measures	NEMA MPRDA NHRA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
					SAHRA permitting requirements
General Surface Rehabilitation **Mine area site preparation** **Opencast mining** **Site establishment** **Storm water management** **Water management**	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, watching brief, chance finds procedure) Stop through relocation of graves if required	NEMA MPRDA NHRA SAHRA permitting requirements
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	Avoidance and control through mitigation measures	Labour Act

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Mine area site preparation **Opencast mining**			Decommissioning Rehabilitation and Closure	(e.g. recruitment procedure, grievance mechanism) Control through implementation of stakeholder engagement plan	Basic Conditions of Employment Act SLP Commitments
General Construction Management **General Mine Management** **Opencast mining** **Site establishment**	Loss of sense of place	Social	Construction Operation Decommissioning Rehabilitation and Closure	Modify through reduction of visual impact	Rehabilitation and Closure Plan
General Construction Management **General Mine Management**	Relocation	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** **Opencast mining**	Social vices	Social	Construction Operation Decommissioning Rehabilitation and Closure	Avoidance and control through mitigation measures (e.g. recruitment procedure, grievance	Labour Act Basic Conditions of Employment Act SLP Commitments Code of Conduct

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				mechanism, code of conduct) Control through implementation of stakeholder engagement plan	Livelihood restoration plan
General Construction Management **General Mine Management** **Opencast mining**	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** **Opencast mining**	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
General Construction Management **General decommissioning activities** **General Mine Management** **Maintenance and operation** **Opencast mining**	Employment Opportunities	Socio-Economic	Planning and Design Construction Operation Decommissioning	Maximise employment opportunities through implementation of SLP	SLP Commitments

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Site establishment **Water management**			Rehabilitation and Closure		
General Construction Management **General Mine Management** **Opencast mining**	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
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** **Mine area site preparation** **Opencast mining**	Health and safety 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	OHSA MHSA SLP Commitments Grievance Mechanism

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Re-vegetation **Site establishment** **Water management**				mitigation measures in EMP	
General Construction Management **General decommissioning activities** **General Mine Management** **Maintenance and operation** **Mine area site preparation** **Opencast mining** **Re-vegetation** **Site establishment** **Water management**	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** **Opencast mining** **Site establishment**	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 and recommendations on air blast

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Opencast mining	Fly Rock	Health and Safety	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 and recommendations on air blast Blast Procedures Emergency response procedure
Mine area site preparation **Opencast mining** **Site establishment** **Water management**	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
Mine area site preparation **Opencast mining** **Site establishment**	Increased traffic	Transportation, Infrastructure and Traffic	Construction Operation	Avoid and control through implementation of EMPr mitigation measures (e.g.	National Road Traffic Act OHSA MHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Water management				speed limit enforcement, vehicle maintenance)	
Mine area site preparation **Mineral Processing** **Opencast mining.**	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** **Opencast mining** **Site establishment** **Storm water management** **Water management**	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 landuse objectives
General decommissioning activities **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing**	Greenhouse gas emissions	Air Quality	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. vehicle maintenance,	NEMAQA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Opencast mining **Re-vegetation** **Site establishment** **Water management** **General Surface Rehabilitation** **Storm water management**				progressive rehabilitation)	
Drilling monitoring boreholes **General decommissioning activities** **General Surface Rehabilitation** **Infrastructure removal** **Mine area site preparation** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment** **Storm water management** **Water management**	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** **Infrastructure removal**	Disturbing and/or nuisance noise	Noise	Planning and Design Construction Operation	Avoid through preventative measures (e.g. communication with landowners, timing of activities)	ECA noise regulations SANS 10103 OHSA MHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Maintenance and operation of site Mine area site preparation **Opencast mining** **Re-vegetation** **Site establishment** **Storm water management** **Water management**			Decommissioning Rehabilitation and Closure	Control through implementation of EMPr mitigation measures (e.g. Noise abatement measures)	
Opencast mining	Air Blast	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 and recommendations on air blast Blast Procedures Emergency response procedure
Opencast mining	Ground Vibration and	Blasting and Vibration	Operation	Avoid and control through implementation of preventative	Explosives Act MHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	human perception			measures (e.g. blast procedures, monitoring, communication with landowners, emergency response procedures)	OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration and recommendations on air blast Blast Procedures Emergency response procedure
Opencast 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 and recommendations on air blast Blast Procedures Emergency response procedure

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Opencast 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, communication with landowners)	Explosives Act MHSA OHSA MPRDA United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration and recommendations on air blast Blast Procedures Emergency response procedure
Opencast 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 and recommendations on air blast Blast Procedures

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
					Emergency response procedure

6 IMPACT MANAGEMENT ACTIONS: MANAGEMENT PROGRAMME

Table 8 below provides measures for management of the environmental aspects that are impacted on during the different phases of the project.

Table 8: Description of the proposed impact management actions.

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Environmental Management System					
General Mine Management	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall develop an effective Environmental and Social Management System (ESMS) that is appropriate to the nature and scale of the project. The ESMS should include and provide for the following as a minimum: • Environmental Policy; • Ongoing Identification of risks and impacts; • Social and Environmental Management programs; • Organisational capacity and competency; • Emergency preparedness; • Stakeholder engagement; and • Monitoring and review.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
General Mine Management	Planning and Design	No direct physical disturbance	The mine shall appoint a suitably qualified and competent ECO who shall preferably be independent from the Applicant. The ECO must preferably have a tertiary qualification in an	Shall adhere to the ESMS developed to ensure	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Construction Operation Decommissioning Rehabilitation and Closure		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.	compliance with the regulatory framework	
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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
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 (if utilised) operating on behalf of the Mining Right Holder.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
General Mine Management	Planning and Design Construction	No direct physical disturbance	The mine shall ensure that all sub-contractors (if utilised) abide by the requirements of the EMPr through the inclusion of the EMPr and applicable environmental requirements in contractual agreements for all sub-contractors.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure				
Emergency Response					
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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
Health and Safety					

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	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.	OHS and MHSA	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	OHS and MHSA	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.	OHS and MHSA	Throughout LoM
General Mine Management	Construction Operation Decommissioning	Health and safety risks are classified as high significance due to	The mine shall undertake safety audits to ensure compliance with: Occupational Health and Safety Act (Act No. 85 of 1993) and associated regulations; and	OHS and MHSA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Rehabilitation and Closure	the value of human life	Mine Health and Safety Act (Act 29 of 1996) as amended and associated regulations.		
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 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.	OHS and MHSA	Throughout LoM
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	Health risks are classified as high significance due to the value of human life	The mine shall develop and implement an infectious diseases management plan to address health issues with the workforce. The mine shall align the strategy with a community HIV strategy.	OHS	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	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).	OHS and MHSA	Throughout LoM
Site Access and Security					
General Mine Management	Construction Operation Decommissioning	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 so as to minimise excessive environmental disturbance to the soil and vegetation off site, and to minimise disruption of traffic.	OHS and MHSA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Rehabilitation and Closure				
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.	OHS and MHSA	Throughout LoM
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. The mine must discourage drug taking and excessive alcohol consumption by implementing a zero tolerance to workers being under the influence when reporting for duty or while on the job.	OHS and MHSA	Throughout LoM
Environmental Awareness					
General Mine Management	Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	All employees and visitors to the site must undergo a visitors 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.	NEMA	Throughout LoM
Land Use, Social and Socio-Economic					

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Enter into formal employment contracts with casual labour and the construction staff to ensure that they are aware that employment is for a limited period only and that it is unlikely that the mine will employ construction staff on the mine when in operation. Communicate redeployment with current operational staff and in the media to prevent word spreading of new job opportunities at the mine. There should be no employment at the gate. Rather establish a formal process for employing casual day labour (if required) and communicate this process in the local newspaper, including contact details and employment requirements;	Adherence to corporate policies (e.g.: SLP) and compliance with legislation including Labour Act and Employment Act	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	A stakeholder engagement plan will assist Eloff Mining Company 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.	Adherence to corporate policies (e.g.: SLP) and compliance with legislation including Labour Act and Employment Act	Throughout LoM
General Mine Management	Planning	No direct physical disturbance	Set up a communication forum with local farmers where representatives could voice concerns related to the mining activities. Communicate the mine's grievance mechanism (that forms part of the mine's Stakeholder Engagement Plan) to local stakeholders (e.g. through the local media), including how to access the grievance mechanism and the mine's commitment to address grievances lodged through this system;	Adherence to corporate policies	Prior to construction

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	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 so as to encourage the growth of businesses.	Adherence to corporate policies and compliance with legislation including Labour Act and Employment Act SLP Commitments	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.	Adherence to corporate policies and compliance with legislation including Labour Act and Employment Act SLP Commitments	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.	SLP commitments	Throughout LoM
General Mine Management	Planning Construction Operation	No direct physical disturbance	The mine should develop an updated Local Economic Plan as part of an updated SLP for the project in consultation with the local community. The mine must ensure that the current allocation as per the Mine Works Programme for the updated SLP is in line with the targets of the Mining Charter of 2018 and	SLP commitments	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Decommissioning Rehabilitation and Closure		monitor and manage the social contribution of multinational suppliers (in-house as well as suppliers to contractor and direct service providers).		
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.	Compliance with legislation including Labour Act and Employment Act	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	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 response to such grievances. 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; • 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.).	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Developed as early as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			The grievance mechanism must be communicated to all stakeholders and communities. The mine should communicate the mine's grievance mechanism through the local media and ensure that stakeholders know how to access the grievance mechanism. Grievances must be addressed timeously.		
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	Households to be relocated should be sufficiently compensated and assisted with the relocation process. A form of compensation should also be considered for individuals who are residing at the affected homestead but who do not form part of the formal household (e.g. farm workers who may reside in a separate homestead but who will lose their employment if the households were to relocate).	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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. The mine should also keep a register of local suppliers.	Adherence to corporate policies and compliance with legislation including Labour Act and Employment Act SLP Commitments	Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning	No direct physical disturbance	The mine should set requirements in construction tender documents for companies to house their workers and employees during construction and implement the undertakings of the mine in its SLP to improve housing and living conditions of employees.	Adherence to corporate policies and compliance with legislation including Labour Act and Employment Act	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Rehabilitation and Closure			SLP Commitments	
General Mine Management	Construction Operation	No direct physical disturbance	The mine should erect notice boards to inform neighbouring properties of construction processes and timeframes - notably to alert them to activities such as blasting.		Throughout construction and operation
General Mine Management	Construction Operation	No direct physical disturbance	The mine shall comply with the SLP and where possible, conduct agricultural training programmes with community members and employees to encourage the continuation of agricultural activities in the area. It is recommended that production methods should be considered to minimise impacts on the agricultural sector as far as possible in dialogue with the local agricultural community.	SLP	Throughout LoM
General Mine Management	Construction Operation	No direct physical disturbance	The mine shall encourage the continuation of agricultural activities in the area surrounding the mining activities that are not affected by mining.	SLP	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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
General Mine Management	Planning Construction	No direct physical disturbance	The mine should establish a forum where adjacent farmers are met on regular basis (monthly) to discuss issues related to construction phase.	Shall adhere to the ESMS developed to ensure	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure			compliance with the regulatory framework	
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.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
General Mine Management	Operation Decommissioning, Closure	No direct physical disturbance	Where retrenchments are unavoidable, they should be managed humanely according to legislative requirements. As per SLP requirements, develop mechanisms to assist employees, prior to retrenchment date, in the transition phase after closure of the operations. This includes offering portable skilled development programmes during the operational phase of the mine, providing assistance in accessing available and suitable jobs with other local mines or companies.	SLP	When retrenchments are required
General Mine Management	Operation	No direct physical disturbance	The mine should develop a resource use plan with the specific objective to minimize the project's energy and water use as far practical.		Throughout LoM
General Mine Management	Construction Operation	No direct physical disturbance	The mine should run periodic awareness campaigns to make workers aware of the risks associated with drug taking, excessive alcohol consumption and indiscriminate	OHSA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			relationships as well as offer voluntary counselling and testing services at the mine clinic.		
General Mine Management	Planning Construction Operation	No direct physical disturbance	The mine needs to assist with finding jobs for agricultural employees that may be entrenched as a result of the cessation of farming on the affected land portion.		Throughout LoM
General Mine Management	Planning Construction Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine needs to comply with all the new regulations in the mining charter as this is designed, amongst others, to increase local content and BBBEE procurement.	Mining Charter	Throughout LoM
General Mine Management	Planning Construction Operation	No direct physical disturbance	It is assumed that the employees currently in employment at the Kangala Colliery will be transferred to the new mine. An important consideration is to ensure that current employees' pension funds remain intact and is, if possible, enhanced.	OHSA SLP	Throughout LoM
Site Establishment					
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	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework OHSA	Throughout construction

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance Standards with	Time Period for Implementation
Earthworks **Fencing** **Fuel Storage and re-fueling** **Hazardous substances management** **Site security** **Soil Management** **Truck and heavy machinery operation** **Utilization of portable toilets and**			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. All temporary fences erected by the Mine shall be removed and the site restored on completion of construction, unless otherwise agreed in writing with the Applicant. 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 . 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	MHSA NEMA MPRDA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
generation of sewage **Vegetation clearance**			within 100m of the 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 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 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.		
			Site camps/construction camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and this equipment must be readily accessible.		
			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 fire place and an appropriate safety representative should be present at all times during burning of the fire. All fires shall be fully extinguished after use.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Flora					
Drilling monitoring boreholes **General Surface Rehabilitation** **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	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)	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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 flora	An experienced, qualified environmental control officer must be on site when construction begins to identify floral species that will be directly disturbed and to relocate flora that are found during construction (this specifically includes any floral SCC);	NEMBA Threatened or Protected Species (TOPS) regulations National Forests Act DAFF permitting requirements	Prior to commencement of activities or disturbance
Mineral Processing	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. Incorporate herbaceous vegetation into soil stockpiles to maintain a seed bank. Limit activity to area of	NEMBA TOPS regulations National Forests Act	Prior to commencement of activities or disturbance

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Filling Opencast Voids			disturbance and revegetate impacted areas as soon as possible.	DAFF permitting requirements	
Post Closure Monitoring and Maintenance **Site establishment – Camp**	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	It is recommended that areas to be mined be specifically demarcated so that during the construction phase and operational phase, only the demarcated areas be impacted upon. All working areas inside the new pit must be clearly demarcated from surrounding natural areas and no persons should be allowed to enter these areas under any circumstances. The wetlands to the south and north of the project area along with their buffers should be protected from human interference. All disturbances must be within the mine footprint area, and all waste rock taken to the existing Kangala Colliery.	NEMA	Throughout LoM
Site establishment – Permanent Infrastructure **Site visits**	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 prior to the commencement of the construction activities. The area 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 project.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
Storm water management	Construction Operation	Impacts on flora may occur over a large area (active mine areas) and has the potential	All soil stockpiles shall be kept free of any weeds or alien invader plant species.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Water management		to be a relatively high significance			
Infrastructure construction **Water Treatment**	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. Use an appropriate control for each species. Some species may require manual and herbicide control.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
Fauna					
Drilling monitoring boreholes **General Surface Rehabilitation**	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 killing of fauna is prohibited within the boundaries of the mining area, as well as neighbouring areas.	Induction training shall comply with ESMS Framework	Throughout LoM
Infrastructure removal **Maintenance and operation of site**	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	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.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
infrastructure and facilities	Rehabilitation and Closure			compliance with the regulatory framework	
Mine area site preparation **Mineral Processing** **Filling Opencast Voids** **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 or destruction of any species be required, the necessary permits shall be obtained.	NEMBA TOPS Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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 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 there are spillage procedures in place so that any exposure to biophysical environment is limited. Ensure that the appropriate training is given to staff and management.	NEMA,1998 Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	During LoM
Site establishment – Camp **Site establishment – Permanent Infrastructure**	Planning Construction Operation	Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected	Faunal species should be given the chance to escape or move away from disturbances during construction. If any faunal species do not move off naturally then the ECO should be consulted to identify the correct course of action. This is particularly relevant to the presence of African Grass Owls which were recorded in the project area. If environmental authorisation is granted for the current wetlands to be mined, then the mining of these areas must be done outside of the breeding season of this species. African Grass Owls chicks' critical fledging period is from March to May and wetlands in	In accordance with Rehabilitation and closure plan	During construction and operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site visits		species are impacted upon	the project area should not be mined during this period and/or a relevant specialist should thoroughly inspect any wetlands that are to be mined for the presence of this species.		
Storm water management **Water management** **Infrastructure construction**	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. No construction workers or mine employees may collect or remove firewood or medicinal plants or other plants/crops/fruits from the site or areas adjacent to the site. Disciplinary action must be taken if any flora or fauna is wilfully disturbed or killed. Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during all the phases going forward. The intentional killing of any animals including snakes, lizards, birds or other animals should be strictly prohibited.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
	Planning and Design Construction	Impacts on fauna has the potential to be a relatively high significance especially where	No domestic animals are to be allowed into the project area under any circumstances, especially any dogs and cats. Any and all feral cats which may enter the project area must be removed immediately by an appropriate specialist.	NEMA NEMBA CARA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Operation Decommissioning Rehabilitation and Closure	threatened or protected species are impacted upon		Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
	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	Pest control plan must be put in place and implemented.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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	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.	Internal speed limits for haul roads and declared legal speed limits for public roads.	Throughout LoM
	Planning and Design Construction Operation Decommissioning	Impacts on fauna has the potential to be a relatively high significance especially where threatened or	Any red data species, recorded within the areas that will be cleared for the newly opencast mining areas should be relocated within vegetated or 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	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		protected species are impacted upon	species survey prior to commencement and relocate species where possible or required.	compliance with the regulatory framework	
	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 willfully disturb the movement of any mammals, birds, amphibians, insects or reptiles on the mine site.	NEMA NEMBA CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	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	All livestock must be kept out of the wetland and grassland areas in order to prevent overgrazing of potential SCC avifauna habitat	NEMA NEMBA	Throughout LoM
Soils and Land Capability					
Decommissioning Mine Infrastructure	Construction Operation Decommissioning	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land	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 defined in the soil stripping guideline in the FDRCP (Appendix B).	CARA NEMA GN704 In accordance with Rehabilitation and closure plan	As required

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Drilling monitoring boreholes		use and land capability.			
Filling Opencast Voids **General decommissioning activities**	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. Topsoils and subsoils should be stripped 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 (details contained in rehabilitation plan) in order to reduce the risk of erosion, prevent weed growth and to reinstitute the ecological processes within the soil.	CARA NEMA In accordance with Rehabilitation and closure plan	As required
General Surface Rehabilitation **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation**	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.	Stockpiles must not exceed a maximum height of 5 m (practical tipping height for dump trucks) in order to prevent compaction, under no circumstance will vehicles be permitted to drive on the soil stockpiles. This will compact the soil stockpiles and render them.	CARA NEMA In accordance with Rehabilitation and closure plan	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	There must be no contamination of topsoil. Prevent any spills from occurring. Machines must be parked within hardpark areas and must be checked daily for fluid leaks.	MPRDA CARA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Mineral Processing **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment – Camp** **Site establishment – Permanent Infrastructure** **Storm water management**		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.	Stockpiles should be re-vegetated as quickly as possible to reduce or prevent erosion. Stockpiles should be demarcated and logged, as to make sure the right stockpiles (soil types) are used when rehabilitating. If possible try limit the slopes on the stockpiles to 1:3 to reduce erosion losses, or place a smaller berm around the edge of each stockpile to contain any erosion which will limit soil losses and increase chances of re-vegetation.	MPRDA CARA	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.	Stockpiles should be demarcated and logged, as to make sure the right stockpiles (soil types) are used when rehabilitating.	CARA	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.	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 ECO.	NEMBA NEMA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Water management Infrastructure construction **Water Treatment**	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.	NEMA NWA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Ongoing throughout LoM
	Operation 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.	It is recommended that rollover mining (concurrent backfilling) be conducted for the project, minimising the required footprint area of the mining blocks.	In accordance with Rehabilitation and closure plan DWS minimum requirement for waste disposal	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.	Activity should be limited to 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 indigenous vegetation.	In accordance with Rehabilitation and closure plan	Throughout LoM
Land use					

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	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.	In accordance with Rehabilitation and closure plan	Established early during operations and implemented during rehabilitation
Pollution Prevention					
	Construction Operation Decommissioning Rehabilitation and Closure		Any equipment that may leak, and does not have to be transported regularly, shall be placed on watertight drips trays to catch any potential spillages of pollutants. The 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.		
	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 reports to the PCD's.		
	Construction Operation Decommissioning		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 concrete or alternatively plastic under gravel. If		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Rehabilitation and Closure		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 into the ground is not acceptable); and • 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 so as 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	NEMA Polluter Pays Principle NEMA Duty of Care	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			spillages will then be removed and recycled or disposed of responsibly.	NEMA NWA OHSA MHSA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
	Construction Operation Decommissioning Rehabilitation and Closure	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 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.	NEMWA DWS minimum requirement for waste disposal	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	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.	NEMA Polluter Pays Principle NEMA Duty of Care NEMWA DWS minimum requirement for waste disposal	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.	MSDS specifications OHSA MHSA	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.	OHSA MHSA	Throughout operations
Waste Management					
Maintenance and operation of site	Construction Operation Decommissioning	Waste has the potential to pollute the environment and	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	NEMWA NEMA cradle to grave	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
infrastructure and facilities **Site establishment – Camp**	Rehabilitation and Closure	can vary from localized to large scale impacts.	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.	DWS minimum requirement for waste disposal Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
Site establishment – Permanent Infrastructure **Water management Infrastructure construction** **General Construction** **Mine area site preparation** **General Mine Management**	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.	NEMWA NEMA cradle to grave DWS minimum requirement for waste 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.	Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduce risk of environmental contamination	NEMWA NEMA cradle to grave DWS minimum requirement for waste disposal	Throughout operations
	Construction Operation Decommissioning Rehabilitation and Closure	Waste has the potential to pollute the environment and can vary from	The Mine shall implement a waste removal regime that ensures waste skips do not exceed their capacity before being removed from site for disposal.	NEMWA NEMA cradle to grave	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Opencast mining		localized to large scale impacts.			
Mining **Mineral Processing**	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.	NEMWA NEMA cradle to grave	Throughout operations
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.	NEMA cradle to grave	Throughout operations
General decommissioning activities **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.	NEMA cradle to grave	Throughout operations
Sewage and Sanitation					

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site establishment – Permanent Infrastructure **Site establishment – Camp** **Water management Infrastructure construction** **General Construction** **Mine area site preparation** **General Mine 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, french drain systems or soak away systems be allowed. Septic tanks are permitted on condition that they are closed units and are serviced regularly to prevent overflows. The Contractor should inform all site staff to the use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. A minimum of one toilet must be provided per 10 persons. 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. Toilets must be easily accessible. Toilets 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 ECO.	NEMWA NWA NEMA cradle to grave	Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Opencast mining **Mining** **Maintenance and operation of site infrastructure and facilities** **General decommissioning activities** **Infrastructure removal**			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.		
Noise					
General decommissioning activities **General Surface Rehabilitation**	Construction Operation Decommissioning Rehabilitation and Closure	Noise has the potential to result in significant impacts to sensitive receptors at a small to medium scale	Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised. Ensure a good working relationship between mine management and all potentially noise-sensitive receptors.	SANS10103 ECA Noise Regulations World Bank EHS guidelines	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance Standards with	Time Period for Implementation
Infrastructure removal **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Opencast mining** **Filling Opencast Voids** **Site establishment – Camp**			Communication channels should be established to ensure prior notice to the sensitive receptor if work is to take place close to them (especially if work is to take place within 300 m from them at night). Information that should be provided to potentially sensitive receptor(s) includes: • Proposed working dates, the duration that work will take place in an area and working times; • The reason why the activity is taking place; • The construction methods that will be used; and • Contact details of a responsible person where any complaints can be lodged should there be an issue of concern. All employees and contractors should receive induction that includes an environmental awareness component (noise). This is to allow employees and contractors to realize the potential noise risks that activities (especially night-time activities) pose to the surrounding environment. 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 possible. Point sources will be enclosed where possible. Acoustic screens will be considered if I&AP complaints are received. No active environmental noise monitoring is recommended due to the low significance for a noise impact to develop. However, should a reasonable and valid complaint be registered, the mine must investigate this noise complaint. It	OHSA MHSA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site establishment – Permanent Infrastructure **Storm water management** **Mine Infrastructure** **Mining** **Water management and treatment**			is recommended that the noise investigation be done by an independent acoustic consultant. Measurements should be collected as defined in SANS 10103:2008 for a minimum duration of 10 minutes to investigate a noise complaint (reasonable and valid). Measurements should include sound level descriptors such as LAeq,i (National Noise Control Regulation requirement), LA90,f (background noise level as used internationally) and LAeq,f (Noise level used to compare with IFC noise limit). Spectral frequencies should also be measured to define the potential origin of noise. When a noise complaint is being investigated, measurements should be collected during a period or in conditions similar to when the receptor experienced the disturbing noise event. When a noise complaint is registered, the following information must be obtained: • Full details (names, contact numbers, location) of the complainant; • Date and approximate time when this non-compliance occurred; • Description of the noise or event; and • Description of the conditions prevalent during the event (if possible).		
Air Quality					
General decommissioning activities	Construction Operation	Air quality impacts are potentially of high significance	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	NEMAQA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
General Surface Rehabilitation **Infrastructure removal** **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation** **Site establishment – Camp** **Site establishment**	Decommissioning Rehabilitation and Closure		minimise the generation of dust as a result of activities on site. Such measures shall include, but shall not be limited to; • Regular water sprays and chemical suppression on unpaved roads to ensure at least 90% control efficiency. • Monthly physical inspection of road surface, daily visual observation of entrained dust emissions from unpaved road surfaces. • Controlled blasting techniques to be used to ensure minimal dust generation. • Blasting only to be conducted on cloudless days, if possible. • Water sprays on drilling activities. • Addition of chemical surfactants to water sprays to lower water surface tension and increase binding properties. • Drilling to be controlled through water sprays or vacuum packs • Increase in-pit material moisture content. • Drop height from excavator into haul trucks to be kept at a minimum for ore and waste rock. • Tipping onto ROM storage piles to be controlled through water sprays, should significant amounts of dust be generated. • Keep material handled by dozers and wheeled loaders moist to achieve a control efficiency of 50%, especially during dry periods. • Regular clean-up at loading areas. • Water sprays at ROM stockpile. • Cover disturbed areas with previously collected topsoil and replant native species.	Dust regulations	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
– Permanent Infrastructure **Storm water management** **Mine Infrastructure** **Open Cast Mining** **Water management Infrastructure construction**			• Rock cladding with larger pieces of waste rock is recommended to reduce wind erosion emissions from the overburden storage piles. • Revegetation of overburden stockpile is recommended.		
	Construction Operation Decommissioning Rehabilitation and Closure	Wide scale of disturbance and 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). 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.	NEMAQA Dust regulations	Throughout LoM
	Construction Operation Decommissioning	Localised and low significance	The mine must ensure that no transported materials escape from the construction and mine vehicles (no spillage on roads or dust clouds). If necessary, the load bin of the vehicles shall be covered with a tarpaulin to prevent dust.	NEMAQA Dust regulation	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.	NEMAQA Dust regulation	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.	NEMAQA Dust regulation	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	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.	NEMAQA Dust regulation	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.	NEMAQA Dust regulation	Throughout LoM
	Construction Operation	Localised and low significance	Coal will not be left lying around as this increases the risk of spontaneous combustion.	NEMAQA Dust regulation	Throughout LoM
Heritage and Palaeontology					
General decommissioning activities **General Surface Rehabilitation** **Infrastructure removal**	Construction Operation Decommissioning	Impacts on fossil resources are limited to the extent of the pit. The palaeontological sensitivity of the Vryheid formation is rated Very High	In the event that fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be implemented by the ECO in charge of these developments.	NHRA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Maintenance and operation of site infrastructure and facilities **Mine area site preparation** **Mineral Processing** **Opencast mining** **Post Closure Monitoring and Maintenance** **Re-vegetation**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on heritage affect a limit extent and have a low significance	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.	NHRA Development Facilitation Act	Throughout LoM
	Planning and Design Construction	Impacts on heritage affect a limit extent but have a very high significance due to the value of heritage resources which are protected by law.	The three burial grounds will be impacted directly by the planned mining expansion. These burial grounds must be relocated after completion of a detailed grave relocation process, that includes 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 regulation.	NHRA National Health Act	Throughout LoM
Site establishment – Camp **Site establishment – Permanent Infrastructure** **Storm water management** **Mine Infrastructure**	Planning and Design Construction	Impacts on heritage affect a limit extent but have a very high significance due to the value of heritage resources which are protected by law.	Structures older than 60 years are protected under Section 34 of the NHRA. One farmstead (KG6) will require a formal process of application for a destruction permit issued by the Mpumalanga Provincial Heritage Authority as required by S34 of the NHRA.	NHRA Development Facilitation Act	As soon as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Open Cast mining **Water management Infrastructure construction**					
Surface Water					
Maintenance and operation of site infrastructure and facilities	Construction Operation Decommissioning	Impacts on surface water can have a high significance and extent	The mine shall ensure that the storm water management plan (Appendix A) is approved by DWS and implemented for the mining area. Clean and dirty water system infrastructure must be installed as per the detailed storm water management plan which must take into consideration the design capacities and locations restrictions stipulated in GN 704 of the NWA.	NWA GN704	As soon as possible and implemented throughout LoM
Mine area site preparation **Mineral Processing**			Coal and product stockpiles must be kept on a compacted area that will minimise infiltration of seepage. Levelling and compaction must be undertaken. Shallow seepage and contaminated storm water run-off must be collected and routed to lined pollution control dams. The pollution control dams must be sized in accordance with Government Notice 704 of the South African National Water Act.	DWS best Practice Guidelines Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
Opencast mining **Post Closure Monitoring**	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. The Applicant shall ensure compliance with the requirements of the National Water Act and GN704		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
and Maintenance **Re-vegetation** **Site establishment – Camp**	Construction Operation Decommissioning Rehabilitation and Closure		All areas susceptible to erosion shall be protected by ensuring that there is no undue soil erosion resultant from construction and/or mining activities. 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 ECO.		
Site establishment – Permanent 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 ECO.		
Open Cast mining **Water management Infrastructure construction**	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 collected and recycled.		
	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.		
	Construction Operation		All licenses and permits required as per the National Water Act will be applied for as per the relevant water uses.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance Standards with	Time Period for Implementation
	Decommissioning Rehabilitation and Closure				
	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. Clean out silt build up in trenches and silt traps over dry season or more frequently if needed. Conduct construction activities in the dry winter months as far as possible.		
	Construction Operation Decommissioning Rehabilitation and Closure		Erosion control measures should be implemented on rehabilitated areas and vegetation established as soon as possible.		
	Construction Operation Decommissioning Rehabilitation and Closure		Silt traps should be inspected and emptied on a regular basis.		
	Construction Operation Decommissioning		Allow for in-pit sumps to be installed to prevent ponding of water within the opencast pit to minimise contamination. Water should be pumped on a continuous basis to minimise chemical contact time with surrounding rock. Water will be		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance Standards	with	Time Period for Implementation
	Rehabilitation and Closure		pumped from the sump to the lined Kangala PCD and re-use for the CHPP and dust suppression			
	Construction Operation Decommissioning Rehabilitation and Closure		Opencast pit water should be reused in dust suppression processes where possible in order to avoid poor quality water being discharged into the environment			
	Construction Operation Decommissioning Rehabilitation and Closure		Update the mine water balance on a regular basis. Update flow metering system. Additional flow meter installations and measurements are recommended to confirm water volumes at: • From PCD to CHPP; • Water in slurry volumes pumped to discard facility; • Discard facility decant to PCD; and • Dust suppression abstraction points.			
	Construction Operation		Pollution control dam water levels must be constantly monitored. Steps and procedures must be put in place to manage situations where excess water builds up in the pollution control dams. This could include pumping to the transfer sump. Pollution control dams must be operated empty as far as practicable and cannot fulfil the same role as water storage dams, unless specifically designed to fulfil both purposes. Water reuse from the pollution control dams should be maximised.			

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Construction Operation Decommissioning Rehabilitation and Closure		Mining will adhere to regulations stipulated in the water license.		
Wetlands					
Maintenance and operation of site infrastructure and facilities	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 (apart from wetlands to be destroyed that fall within the pit area footprint). Any infrastructure and all stormwater controls and mining related facilities or activities should be constructed outside of the wetland environments.	NWA GN704 Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
Opencast mining **Site establishment – Camp**	Construction Operation Decommissioning Rehabilitation and Closure		The mine shall implement an aquatic bio-monitoring and water quality monitoring programme. Where target endpoints are not met, recommendations should translate directly into follow-up action that is recorded and auditable.		Throughout LoM
Site establishment – Permanent site Infrastructure	Construction Operation Decommissioning Rehabilitation and Closure		Separate clean and dirty water. Clean water must be diverted and directed around working areas, and measures or structures created to manage the discharge to avoid scouring and erosion. No dirty water may be discharged into any wetland or water resource on site unless treated to the required standards.		Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Mine Infrastructure	Planning and Design		The extent of the footprint area for the proposed stockpiles must be demarcated and pegged and kept to an absolute minimum.		Throughout LoM
Open Cast mining	Planning and Design		Transport routes must prioritise existing routes, and the upgrade of these routes before any new routes are considered		Throughout LoM
Water management Infrastructure construction	Construction Operation Rehabilitation Decommissioning		Any possible contamination of topsoil by hydrocarbons, concrete or concrete water must be avoided. Spill kits must be available and on hand to clean these spills		Throughout LoM
	Construction Operation Rehabilitation Decommissioning		Drip trays or any form of oil absorbent material must be placed underneath mining vehicles/machinery and equipment (in operation and not storage) when not in use		Throughout LoM
	Construction Operation Rehabilitation Decommissioning		No servicing of equipment on site unless absolutely necessary. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages.		Throughout LoM
	Construction Operation Rehabilitation Decommissioning		All contaminated soil / yard stone shall be removed and be placed in containers. A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site. Alternatively, the mine may undertake or contract the disposal		Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			of contaminated soil at a licenced and registered facility if necessary.		
	Planning and Design Construction		Prior to construction, fences or other effective barriers should be erected in such a manner to prevent access and damage to the wetland and associated buffer areas. Where fences cannot be erected, these sensitive areas must be clearly demarcated, and sign posted.		Prior to construction
	Planning and Design Construction		Demarcate footprint areas to be cleared to avoid unnecessary clearing. Exposed areas which are not going to be utilised in the future must be ripped and vegetated to increase surface roughness.		Prior to construction and throughout construction
	Planning and Design Construction Operation Decommissioning		Create energy dissipation at discharge areas to prevent scouring. Temporary and permanent erosion control methods may include silt fences, retention basins, detention ponds, interceptor ditches, seeding and sodding, riprap of exposed areas, erosion mats, and mulching		Throughout LoM
	Planning and Design Operation Rehabilitation Decommissioning Closure		Limited the extent (or size) of the void, rehabilitation must be concurrent. All voids must be backfilled.		Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Rehabilitation Decommissioning Closure		Compacted areas which are not going to be utilised in the future must be ripped (perpendicularly) to a depth of 300mm. A seed mix must be applied to rehabilitated and bare areas. Any gullies or dongas must also be backfilled. The area must be shaped to a natural topography. No grazing must be permitted to allow for the recovery of the area.		Throughout LoM
	Rehabilitation Decommissioning Closure		Rehabilitation of the area and shaping of the topography must minimise the ingress of water into the mining area. Additionally, measures must also be considered to implement constructed wetlands at likely decant areas.		During rehabilitation
	Decommissioning Closure Post Closure		Groundwater models of the mining activities must be updated following the completion of the mining activities. Following the completion of the mining activities, groundwater studies must redetermine whether mine water decant will occur and the quality of the potential decants. Should groundwater decant occur, the quality of the water should be determined and the effect upon the surface water determined. If the water quality is outside of the parameters stipulated in the resource quality objectives (RQO's) a water management and treatment process should be implemented.		As soon as possible upon completion of mining
	Decommissioning		Decommission cut-off berms and drains last. Debris must be placed in preferential flow paths		During decommissioning
Topography and Landform					
General Surface Rehabilitation	Construction Operation	Impacts on topography tend to be large in	Levelling out of the mine site area will be supervised by a qualified mine surveyor, the mine planning department and in conjunction with an environmental consultant.	In accordance with Rehabilitation and closure plan	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Infrastructure removal **Maintenance and operation of site infrastructure and facilities** **Mine area site preparation** **Mineral Processing** **Opencast mining** **Filling Opencast Voids** **Post Closure Monitoring**	Decommissioning Rehabilitation and Closure	extent and can have a significant effect on the environment	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 facility 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. This plan must be adhered to at all stages of the project. Monitor, especially after first heavy rain falls to ensure adequate surface water drainage. Overburden will be temporarily stockpiled and will be placed back into the pit once the coal has been mined out (roll over mining method), this will assist in obtaining as close as possible the original natural topography. The overburden should be replaced in a manner that replicates the previous topography, and ensures that the final topography has a surface that is free-draining. There will be survey checks included as part of the rehabilitation planning to ensure that the planned post mining topography is being followed. All vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site so as	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance Standards	with	Time Period for Implementation
and Maintenance			to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic.			
Site establishment – Camp			Topsoils and subsoils should be stockpiled separately.			
Site establishment – Permanent Infrastructure			Soil horizons should be replaced in the same order as they occur in nature to prevent mixing of soil horizons.			
Storm water management			Topsoil depth should be related to the proposed post-mining land capability plans.			
Mine Infrastructure			Rehabilitated areas should not be compacted more than is necessary, and activity, particularly that of heavy machinery and vehicles, on these areas should be limited.			
Open Cast mining			Rehabilitated areas should be landscaped to prevent water logging and vegetated to prevent soil erosion.			
Water management			Erosion control measures such as contour banks and cut off berms should be constructed and soil vegetated in rehabilitated areas.			
			Accidental hydrocarbon spillages should have sawdust applied immediately, and rehabilitated or if this is not possible then the affected soil should be removed to a licensed waste disposal site and the area rehabilitated. A spillage collection system must be installed to prevent water quality contamination. A soil and water clean-up strategy must be developed in terms of unexpected spills.			

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Infrastructure construction			Final profiling of the last cut will take place to ensure the area is rehabilitated to as close as possible its natural state as possible.		
			Former Digital Terrain Models's will be used to establish what contours were present prior to mining taking place and these will be used to help shape the area to the final topographic landform.		
			Regular surveys will be undertaken to ensure the rehabilitation conforms to the final topographical plan and that no final void will be left.		
Transportation, Infrastructure and Traffic					
Mine area site preparation **Opencast mining** **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	The mine shall ensure that the internal haul roads are adequately maintained, including monthly scraping and removal where required. Together with road maintenance, the storm water system to direct storm water that falls within the roads shall be kept maintained and settlement ponds shall be cleared of silt on a regular basis. Any/all spillage of mine product or by product will be cleared and added back onto the RoM stockpile.	Road Traffic Act OHSA MHSA	Throughout LoM
			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		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
– Permanent Infrastructure **Open Cast mining** **Water management Infrastructure construction**			will be the responsibility of the Applicant. Road conditions must be assessed regularly for signs of damage. All intersections with main tarred roads will be clearly signposted. Road signs and safety features such as rumble strips will be maintained to ensure the writing is legible and 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.		
Visual					
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.	Final shaping will be implemented, such that, the final profile of the rehabilitated mining areas is formed to emulate natural contours of the area.	In accordance with Rehabilitation and closure plan	Throughout LoM
Mine area site preparation	Construction Operation Decommissioning		Directional lighting and soft lighting will be utilised to ensure that only areas required to be lit are lit. Screens will be considered if I&AP complaints are received.	Closure and final land use objectives	
Opencast mining			It is proposed that as little existing vegetation as possible be removed during mining.		
Site establishment	Construction Operation		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	Compliance with Standards	Time Period for Implementation
Storm water management **Water management Infrastructure construction**	Decommissioning Rehabilitation and Closure				
Blasting and Vibration					
Opencast Mining	Operation	Blasting and Vibration can have a significant impact which increases in significance with proximity to the blast	Blast designs should be reviewed prior to first blast planned and done. The geology for the pit area and the required drill depths should be confirmed. Due to stripping of topsoil that will take place there may be variances in required final depths and thus design applied. Calculated minimum safe distance is 266 m. The final blast designs that may be used will determine the final decision on safe distance to evacuate people and animals. This distance may be greater pending the final code of practice of the mine and responsible blaster's decision on safe distance. The blaster has a legal obligation concerning the safe distance and he needs to determine this distance.	Explosives Act No. 26 of 1956 and amended No. 15 of 2003 . Mine Health and Safety Act 29 Of 1996: Regulation 17. (7a;8a;9a And 10) And Regulation 4.16(2).	Prior to operation
			It is always good to conduct a first test blast to confirm levels and ground vibration and air blast. It is recommended that such a blast be done and detail monitoring done and used to help define blasting operations going forward. This test blast can be based on the existing design and only after this blast it may be necessary to define if changes are required or not.		Operation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			The current proposed stemming lengths used provides for some control on fly rock. Consideration can be given to increase this length for better control. Specific designs where distances between blast and point of concern are known should be considered. Recommended stemming length should range between 20 and 30 times the blast hole diameter. In cases for better fly control this should range between 30 and 34 times the blast holes diameter. Increased stemming lengths will also contribute to more acceptable air blast levels.		
			The R42 is in the nearest provincial road to the project area and needs to be considered. This provincial road is at closest point at 1757 m in the vicinity of the project area. No specific actions are required for this road. There are gravel roads that link the different farming areas and running through the pit area. These routes are specifically of concern when blasting is done. There may be people and animals on these routes and will require careful planning to main safe blasting radius. Road closures will be required when blasting closer than 500 m from these roads.		
			The option of pre-mining photographic survey of all structures up to 1500 m from the pit areas is recommended.		
			It is recommended not to blast too early in the morning when it is still cool or when there is a possibility of atmospheric inversion or too late in the afternoon in winter. Do not blast in fog. Do not blast in the dark. Refrain from blasting when wind is blowing strongly in the direction of an outside receptor. Do not blast with low overcast clouds. These 'do nots' stem from the influence that weather has on air blast. The energy of air		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			blast cannot be increased but it is distributed differently and therefore is difficult to mitigate. It is recommended that a standard blasting time is fixed and blasting notice boards setup at various routes around the project area that will inform the community of blasting dates and times.		
			Video of each blast will help to define if fly rock occurred and from where. Immediate mitigation measure can then be applied if necessary. The video will also be a record of blast conditions.		
Groundwater					
General decommissioning activities **General Surface Rehabilitation**	Construction Operation Decommissioning Rehabilitation and Closure	The mining impact on groundwater has a potentially high significance impact	The mine must take all reasonable measures to avoid and limit pollution of ground water resources as a result of site activities. Pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, waste water containing organic waste, detergents, solid waste, coal handling, storage and disposal and litter etc. The Applicant shall comply with the requirements relating to hazardous materials and spill management presented in this EMPr. The site should be maintained to be free draining. Where relevant, areas should be compacted/shaped.	NEMA Duty of care NWA GN704 DWS best practice guidelines	Throughout LoM
Maintenance and operation of site infrastructure and facilities	Construction Operation Decommissioning Rehabilitation and Closure		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 then be captured in the mine dirty water system and re-used where possible	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Mine area site preparation **Mineral Processing**	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.		
Opencast mining **Filling Opencast Voids**	Construction Operation Decommissioning Rehabilitation and Closure		It must be ensured that the appropriate pump capacity is present at the mine in order to deal with potential significant water inrushes from barrier pillar inflows. The excess water will have to be pumped out of the mine workings and a plan must be in place to deal with this water.		
Post Closure Monitoring and Maintenance	Operation Decommissioning Rehabilitation and Closure		All mined areas should be flooded as soon as possible to bar oxygen from reacting with remaining pyrite.		
Re-vegetation **Site establishment – Camp**	Operation Rehabilitation and Closure		During backfill of the opencasts carbonaceous rocks (especially shale) and any discard should be placed in the deepest part of the pit (as far as practically possible) and below the long-term pit water level in order to ensure that it is flooded and that pyrite oxidation is minimized. Soft overburden and weathered rock must be placed at the top of the backfill in order to minimize oxygen diffusion into the pit.		
	Construction Operation		Runoff into the opencast should be diverted away from the pit as much as possible. Water accumulating within the opencast workings will be pumped to a lined pollution control facility		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site establishment – Permanent Infrastructure			from where it will be re-used in the operation. Poor quality runoff from dirty areas should be contained and diverted to the pollution control dams for re-use.		
Storm water management	Operation		The mine shall ensure that the groundwater monitoring program is implemented. All identified boreholes shall be monitored throughout the LoM for ground water level and water quality. Regular groundwater monitoring must be implemented to assess status versus baseline qualities.		
Mine Infrastructure	Construction Operation Decommissioning Rehabilitation and Closure		The numerical model should be updated once every three (3) years or after significant changes in mine schedules or plans by using the measured water ingress and water levels to recalibrate and refine the impact predictive scenario. Updates to the model should be carried out more frequently if significant changes are made to the mine schedule or plan. It is recommended that the geochemical assessment is updated during the life of the mine in order to calibrate and validate its results and to construct an effective closure plan.		
Water management Infrastructure construction	Operation Decommissioning Rehabilitation and Closure		Treating of decanting mine water to acceptable water quality levels should be achieved by the installation of a treatment plant. The level to which the decant water is treated depends on the use of the water after treatment, but should be determined in consultation with the DWA.		
	Construction Operation Decommissioning Rehabilitation and Closure		All monitoring boreholes which are to be mined out and / or are not operational should be grouted and sealed to prevent cross contamination of aquifers.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	Construction Operation Decommissioning Rehabilitation and Closure		If it can be proven that the mining operation is indeed affecting the quantity of groundwater available to certain users, compensation of affected parties should be considered. This may be done through the installation of additional boreholes for water supply purposes or providing an alternative water supply. Should it be proven that the mining activities impact on any boreholes, an alternative water supply will need to be provided		
	Operation Decommissioning Rehabilitation and Closure		As much as possible coal must be removed from the opencast mine during the operational phase.		

7 CLOSURE AND REHABILITATION

7.1 CLOSURE AND REHABILIATION 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. Further to this, the ongoing stakeholder engagement as per the ESMS will allow for continued consultation with landowners with regards to the reinstatement of preferred land uses post mining.

7.2 CONSULTATION WITH LANDOWNERS AND I&AP'S

The adjacent Kangala mine 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 with respect to Eloff Phase 3.

7.3 MINE CLOSURE

In order to align with the defined closure plan and final land use objective, the mine will need to implement a series of actions which addresses the mines infrastructure, facilities and rights area, as well as ongoing maintenance and management thereof. These actions and obligations apply to all infrastructure, activities and aspects both within the mine lease area and off the mine lease area which were associated with the mining activities and over which the mine has responsibility. With respect to the Eloff Phase 3 pit and associated mine area, it is understood that the mining activities related to the storage of waste rock, mineral processing, and product storage and distribution fall within the operational control of the existing Kangala Mine. It is understood that the rehabilitation of these Kangala managed facilities fall withing the control of the Kangala Mine and will consequently need to be addressed within the mine closure and rehabilitation provisions of the Kangala Mine. These activities or components would specifically include the following:

- Dismantling of processing plant and related structures which fall within the Kangala Mines area of operational control;
- Demolition of associated buildings, structures, and facilities (including any associated housing and offices, contractors' yards/ facilities, fencing, etc);
- Rehabilitation of access roads;
- Rehabilitation of overburden and spoils;
- Rehabilitation of the Kangala waste facilities (including the discard facility, the PCD's, etc);
- General surface rehabilitation within the Kangala Mine;
- Ongoing water management within the Kangala Mine area (including the Kangala rehabilitated pit and the associated waste facilities); and
- Aftercare of the Kangala Mine area.

The closure components which are applicable to the Eloff Phase 3 Mine include the following:

- Preparation and planning for closure- This includes all of the tasks leading up to the finalisation of the closure plan for implementation.
- Dismantling and removal of any on site infrastructure- It is not at present expected that there will be any significant on-site infrastructure or facilities as the majority will be shared with the Kangala

Mine. This component may include small temporary facilities such as site offices (if required), mobile water pumps and surface pipelines, etc.

- Rehabilitation of access roads- the main haul road leading from the Eloff Pit to the Kangala operations, as well as the access route to the soil stockpile areas. It is anticipated that certain of these access roads will be retained as smaller local access to the site to allow for controlled access during closure and post closure monitoring and maintenance.
- Rehabilitation of the open cast area as well as the access ramps and final voids - it is planned at present that a final void will not be retained for post closure. In this regard this component will include the backfilling of the final void as well as the access ramp/s. One of the key components of the rehabilitation of the open cast is to ensure a suitable and sustainable final landform.
- Rehabilitation of the soil stockpile areas.
- General surface rehabilitation- including soil amelioration and planting of vegetative cover for the affected natural areas, and planting of crops on the defined arable land areas.
- Implementation of the wetland offset strategy- this will include:
    - Buffer zone establishment;
    - Alien invasive species removal and control;
    - Revegetation; and
    - Offset protection.
- Removal of fencing required during the mining operations- it is understood that the mine area, including the soil stockpile areas, will be fenced during operations. This fencing will need to be removed at closure to avoid unnecessary post closure maintenance and management costs.
- Management of water within the mine area- this will include the management and maintenance of surface water controls, as well as ongoing closure phase monitoring of the water resources. The management of polluted mine water into the post-closure phase will be included and dealt with as a residual and latent impact.
- Maintenance and aftercare- Maintenance and aftercare is typically applied during the closure period (i.e. once active rehabilitation and closure is completed and ending once a closure certificate is obtained). Typically, aftercare and maintenance includes general maintenance activities including, soil amelioration (incl fertilization), ongoing monitoring, control of alien invasive, and surface stability and settlement actions. It should be noted that for the purposes of this report and the associated financial provisions, that the relevant monitoring and maintenance/ aftercare actions are included in the other closure components listed in the Closure Plan.

Further detail with respect to closure actions as well as the current Closure Costing is included in the Rehabilitation, Decommissioning and Closure Plan included as Appendix B.

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Table 9 provides procedures for the decommissioning, closure and rehabilitation of the affected site.

Table 9: Decommissioning, Rehabilitation and Closure Actions

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
Planning and preparation for Closure	- Develop FRDCP for consideration in the EA decision making. - Appointment of dedicated rehabilitation specialist to ensure ongoing implementation of rehabilitation and closure actions and plans (incl, ARP and FRDCP). - Ensure that sensitive environmental areas and soil stockpile areas are clearly demarcated to prevent unnecessary disturbance. - Develop a change management procedure to manage the impact of any changes to the mine plan. - Develop a site specific operational stormwater management plan.	- Annual review and update to FRDCP- including review of monitoring data and updated risk assessment. - 3 yearly review and update of hydrogeological model. - Regular consultation with I&AP's on closure planning and rehabilitation progress, and any intrusive activities. - Application for EA, WML and/or WUL (as applicable to implement closure plan) for decommissioning and closure activities (at least 18 months prior to scheduled closure). - Regular awareness training on rehabilitation and closure commitments to all site staff and contractors- including sensitivity of flora an faunal species, noise control.	- Implementation of final FRDCP. - Develop a post closure water balance and SWMP.	- Implementation of final FRDCP. - Implementation of SWMP.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
		- Implementation and assessment of environmental monitoring as defined in this FRDCP. - Implement a site specific operational stormwater management plan			
Dismantling and removal of any on site infrastructure	- Conclusion of formal agreement between Kangala and Eloff addressing the allocation of liabilities- and consequent relevant financial provisioning.	Annual assessment of obsolete infrastructure or facilities which can be decommissioned and removed- update annual rehabilitation plan.	- Removal of all services, structures, machinery, and infrastructure unless these are specifically required for post-mining land-use, post-mining SDF projects or have been requested by the post-mining landowner. - Establish formal agreements for any infrastructure handed over for third party use, and management. - All infrastructure should be broken down to natural	Ongoing rehabilitation monitoring and maintenance until relinquishment.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			ground level. Inert materials to be buried in the final void or at a suitably licenced facility. - Areas where infrastructure was demolished should be assessed through a risk based system to determine if there is any residual contamination of risk and appropriate remediation measures implemented. - Apply SSSPA to areas that are to be rehabilitated. - Implementation of the waste management plan. - A waste and infrastructure hierarchical principal should be applied to all decommissioned infrastructure or		

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			wastes, as follows: Reduce, re-use, recycle, dispose. - Topsoil rehabilitation as per the SSSPA. - Monitor and manage dust generated from decommissioning activities to relevant standards.		
Rehabilitation of access roads	Develop mine layout plan to utilise existing access routes where possible.	Restrict vehicular movements to designated access and haulage routes to avoid unnecessary soil compaction.	- Conclude final closure layout plan defining access roads required for ongoing monitoring, management and maintenance. - Retained access roads to be designed in accordance with relevant engineering standards and specifications- including specific management of stormwater.	- Ongoing rehabilitation monitoring and maintenance until relinquishment. - Restrict vehicular movements to designated access routes to avoid unnecessary soil compaction.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			- Restrict vehicular movements to designated access and access routes to avoid unnecessary soil compaction. - Closure, decommissioning, and rehabilitation of all access roads (incl associated structures, signage, culverts, etc) unless these are specifically required for post-mining land-use, post-mining SDF projects or have been requested by the post-mining landowner. - Deep rip all compacted areas prior to rehabilitation.		

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			- Topsoil rehabilitation as per the SSSPA. - Revegetation as per the revegetation plan. - Apply dust suppression (e.g. water sprays) where necessary.		
Rehabilitation of the open cast area	Develop a post-mining surface landform design (considering defined objectives and targets) for rehabilitated box-cut, mine pit, and final void. The landform design must consider: - Volumes of coal removed. - Expected bulking factors. - Long term material settlement factors. - Land capability commitments: o Slopes not to exceed 18-22	- Progressive backfilling and rehabilitation aligned with the post closure mine plan and landform design. - Reduce slope length on rehabilitated areas with excessive slope length by increasing drainage density, where possible. - Manage erosion and sedimentation. - Manage the effects of surface settlement on the re-profiled landscape. - Assess the effects of changes to mine plan on final landform, and	- Reduce slope length on rehabilitated areas with excessive slope length by increasing drainage density, where possible. - Manage the effects of surface settlement on the re-profiled landscape. - Develop a post mining landform stormwater management plan.	Ongoing rehabilitation monitoring and maintenance until relinquishment.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
	degrees where possible. - Water management requirements: o Increased infiltration to pit area up to recovery of natural water level. o Reduced surface water infiltration to pit area once natural ground water levels have recovered. o Post closure stormwater management.	where relevant amend landform design to comply with defined objectives. - Monitoring, including measurement of real bulking, settlement, assessment of material balances, rehabilitated soil surveys, drainage patterns and densities. - Assess findings of monitoring (incl bulking, settlement, and soil surveys) and where relevant amend landform design to comply with defined objectives.	- Ensure that the final landform is safe for humans and animals. - If a final void of pit lake feature is used then the black soils identified in the pre-mining soils assessment should be stockpiled and used in the rehabilitation of this water management feature.		
Rehabilitation of mine affected surfaces	- Develop a soil stripping, stockpiling, placement and amelioration plan (SSSPA). - Soil survey of areas to be disturbed.	- The removal and/or disturbance of topsoil's must be avoided as far as possible and limited to the pre-defined areas of disturbance. - Implement SSSPA. - Annual audit of SSSPA.	- Implement SSSPA. - Annual audit of SSSPA. - Monitoring, including soil surveys.	- Ongoing rehabilitation monitoring (including soil surveys) and maintenance until relinquishment	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
		- Strip a suitable distance ahead of mining, to avoid soil loss and contamination. - Stripped black soils (e.g. Katspuit and Westleigh) should be stockpiled and used for rehabilitation of low-lying areas and/or drainage systems. - Ensure surface stabilization of soil stockpiles to avoid material loss and erosion. - No dust suppression with dirty/ contaminated water. - Monitoring, including review and assessment of soil balances, soil surveys (stripped, stockpiles, and placed). - Stripped soils to be utilised for Eloff Phase 3 rehabilitation only and not pirated for other uses- without specialist assessment and agreement to ensure final land use objective are met. - Monitoring and removal of fly rock/ blast/ throw rock or other contaminants from soil (virgin	- Soil amelioration activities. - No dust suppression with dirty/ contaminated water.	- Soil amelioration activities. - Comply with land capability commitments.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
		soils/ placed soils and stockpiles) areas. - Soil amelioration activities.			
	- Develop final post closure mine plan. - Develop a Biodiversity Monitoring and Action Plan, including revegetation management plan for the rehabilitated areas which are defined as natural areas. - Develop an Invasive Species Control and Eradication Plan.	- Implement SSSPA. - Develop and implement a Biodiversity Monitoring and Action Plan, including revegetation management plan for the rehabilitated areas which are defined as natural areas. Where possible establish suitable indigenous tree species on upper surfaces and slopes. - Develop and implement an Invasive Plant Species Control and Eradication Plan. - Prevent intentional introduction of exotic or invasive species. - Commence with crop cultivation on rehabilitated land as soon as possible- as determined by soil surveys. - Prevent erosion (wind/water) through implementation of temporary control measures.	- Comply with land capability commitments. - Implement Invasive Plant Species Control and Eradication Plan (mine area as well as adjacent defined natural and wetland areas). - Prevent intentional introduction of exotic or invasive species. - Continue with crop cultivation. - Prevent erosion (wind/water) through implementation of temporary control measures.	- Comply with land capability commitments. - Implement Invasive Plant Species Control and Eradication Plan. - Continue with crop cultivation. - Ongoing rehabilitation monitoring and maintenance until relinquishment. - Restrict access of livestock to the defined natural areas- unless specifically required for defoliation as instructed by a	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
		- Restrict access of livestock to the defined natural areas- unless specifically required for defoliation as instructed by a suitably qualified rehabilitation specialist.	- Restrict access of livestock to the defined natural areas- unless specifically required for defoliation as instructed by a suitably qualified rehabilitation specialist.	suitably qualified rehabilitation specialist.	
Rehabilitation of soil stockpile areas	Ensure correct placement of soil stockpiles to: - reduce surface water flows and velocities and associated erosion risks. - Minimise disruption and disturbance by mining or other activities. - Avoid areas of high arable land capability, wetland areas, or high biodiversity value, if feasible.	- Stockpile footprints to be effectively demarcated to restrict activities which may disturb/ contaminate the stockpiles (e.g. vehicular movement). Compaction an contamination of the stockpiles must be prevented. - Once established the soil stockpiles must not be moved until soil placement for rehabilitation is undertaken.	- Stockpile footprints following removal of all soils for rehabilitation, must be landscaped (shaped and levelled) to natural contours , ripped to loosen all soil, and revegetated. - Fertility of the topsoil would need to be assessed and rectified/ ameliorated if required.	- Ongoing rehabilitation monitoring and maintenance until relinquishment. - Manage and remediate surface erosion.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			- The rehabilitated area must be re-vegetated in accordance with the post closure mine plan and monitored for success. - Manage and remediate surface erosion.		
General surface rehabilitation	- Develop final post closure mine plan. - Develop a soil stripping, stockpiling, placement and amelioration plan (SSSPA). - Develop a post-mining surface landform design. - It is crucial that the current exposed farmland be managed to prevent unnecessary soil loss, contamination or alien invasive infestation.	- Implement SSSPA. - Control of alien invasive species. - Commence with crop cultivation on rehabilitated land as soon as possible- as determined by soil surveys. - Develop and implement a Revegetation management plan for the rehabilitated areas which are defined as natural areas. - Develop and implement an Invasive Plant Species Control and Eradication Plan. - Soil amelioration activities.	- Implement SSSPA - Implement revegetation plan for natural areas. - Control of alien invasive species. - Continue with crop cultivation on rehabilitated arable. - Soil amelioration activities. - Manage and remediate the effects of surface settlement on the re-	- Ongoing rehabilitation monitoring and maintenance until relinquishment. Including but not limited to: Alien invasive monitoring and management, erosion control and remediation, vegetation growth and supplementation). - No domestic animals are to be	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
		- Minimise mine disturbed areas and retain as much natural vegetative cover as far as reasonable possible. - Control access and unnecessary disturbance to rehabilitated areas. - Monitoring of progressively rehabilitated areas (i.r.o landform, soils, revegetation) and amend annual and final rehabilitation plan as required. - No domestic animals are to be allowed into the project area under any circumstances, especially any dogs and cats. Any and all feral cats which may enter the project area must be removed immediately by an appropriate specialist; and - Pest control plan must be put in place and implemented.	profiled landscape- maintain free draining surface. - Manage and remediate surface erosion. - Control access and unnecessary disturbance to rehabilitated areas. - No domestic animals are to be allowed into the project area under any circumstances, especially any dogs and cats. Any and all feral cats which may enter the project area must be removed immediately by an appropriate specialist; and - Pest control plan must be put in place and implemented.	allowed into the project area under any circumstances, especially any dogs and cats. Any and all feral cats which may enter the project area must be removed immediately by an appropriate specialist; and - Pest control plan must be put in place and implemented.	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
Implementation of wetland offset strategy.	Develop a wetland offset strategy.	Implement wetland offset strategy, including rehabilitation measures.	Monitoring and maintenance of wetland offsets.	Monitoring and maintenance of wetland offsets.	
Fencing		Maintenance of fencing to control access to rehabilitated areas including wetland areas and associated buffers (e.g. by grazing animals, or vehicles).	- Removal of all fencing and barrier structures not required for post-closure management. - A waste and infrastructure hierarchical principal should be applied to all decommissioned fencing or materials, as follows: Reduce, re-use, recycle, dispose. - Maintenance of fencing to control access to rehabilitated areas including wetland areas and associated buffers (e.g. by	Maintenance of fencing to control access to rehabilitated areas including wetland areas and associated buffers (e.g. by grazing animals, or vehicles).	

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			grazing animals, or vehicles).		
Water management	- Develop numerical groundwater model. Utilise model to define and assess: - Extent and timing of groundwater cone of depression. - Extent and timing of mine affected water pollution plume. - Extent and timing of potential decant of mine affected water.	- Continue monitoring including general water quality and water levels in surrounding areas, water inflow volumes to the pit. - Update numerical groundwater model – every 3 years. - Amend the mine closure plan where necessary based on the results. - Material most likely to generate acidic leachate should be placed in the deepest parts of the pit, or at least below the pre-mining groundwater elevation to minimise the oxidation of metal sulphides (pyrite). - Implement and monitor the Groundwater Management Plan.	- Continue monitoring including general water quality and water levels in surrounding areas, water inflow volumes to the pit, and water levels and quality within the rehabilitated pit. - Installation of dedicated plume monitoring boreholes- downgradient groundwater flow direction and sampled at quarterly intervals to monitor plume migration. - Installation and monitoring of an in pit borehole to monitor the rate at	- Update and implement groundwater management plan. - Update numerical groundwater model. Specific attention to be placed on long term water liability assessment. - Amend the residual and latent impacts risk assessment and closure plan associated financial provisions. - Implement and monitor the Groundwater	- Continue groundwater monitoring. - Installation, operation, and maintenance of groundwater interception trenches or boreholes to prevent polluted baseflow contributions to local streams. - Installation, operation, and maintenance of pit water abstraction borehole. - Installation, operation, and maintenance of

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			which the pit fills with groundwater. - Update numerical groundwater model (including monitoring results) – every 3 years. - Amend the mine closure plan where necessary based on the results. - The pit should be flooded as quickly as possible to minimise oxidation/ AMD. - Once the pit is flooded, surface water should be diverted away from it. - Implement and monitor the Groundwater Management Plan. - Establishment and monitoring of	Management Plan. - Install plume interception boreholes and/or trenches as required.	water treatment facility for treatment and discharge of polluted mine water.

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			dedicated plume monitoring boreholes, as well as rehabilitated pit borehole.		
	- Develop a post-mining surface landform design to ensure free draining profile, promoting natural runoff and avoidance of ponding. - Develop and implement an operational phase stormwater management plan to comply with the requirements of GN704 of the National Water Act).	- Implement and monitor post mining landform design. - Surface inspections to ensure runoff to drain onto downstream drainage areas. - Revegetate as soon as reasonably possible. - Continue surface water monitoring programme. - Implement an operational phase stormwater management plan to comply with the requirements of GN704 of the National Water Act). - Develop a post closure phase stormwater management plan to inform the closure planning.	- Continue surface water monitoring programme. - Implement and monitor a post closure phase stormwater management plan to comply with the requirements of GN704 of the National Water Act)- where necessary implement crest berms, top surface paddocking, silt traps. - Manage and remediate the effects of surface settlement on the re-profiled landscape-	- Continue surface water monitoring programme. - Implement and monitor a post closure phase stormwater management plan to comply with the requirements of GN704 of the National Water Act). - Manage and remediate the effects of surface settlement on the re-profiled landscape- maintain free draining surface.	- Continue surface water monitoring programme.

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
			maintain free draining surface. - Manage and remediate surface erosion. - Surface inspections to ensure runoff to drain onto downstream drainage areas. - Revegetate as soon as reasonably possible.	- Manage and remediate surface erosion. - Surface inspections to ensure runoff to drain onto downstream drainage areas. - Supplement revegetation where necessary.	
Social and economic change management	- Public review and comment on rehabilitation, decommissioning and closure planning. - Develop SLP in accordance with relevant regulations and guidelines, and in consultation with local municipality and other authorities. - Develop a land owner agreement with landowners predicted to be affected by	- Regular consultation with I&AP's on closure planning and rehabilitation progress, and any intrusive activities. - Provide clear communication to the stakeholders to ensure awareness of the mine's limitations in terms of funding and that funding will cease upon mine closure.	- Continued implementation of SLP obligations and commitments. - Implement approved retrenchment mechanisms as per the approved SLP. - Assist employees in accessing available and suitable employment opportunities with		

Closure component	Planning (pre-commencement)	Mining/ Progressive Rehabilitation (LOM-~10 years)	Decommissioning and Rehabilitation (1-3 years)	Closure (up to relinquishment (3-5 years)	Post Closure (post closure certificate - ~50-100yrs)
	the cone of depression that provides for suitable compensation for loss of water availability.	- Develop mechanisms to assist employees during the transition to closure. - Implement SLP obligations including defined skills development programmes focusing on non-mining supply links to facilitate easier transitioning to local suppliers and industries. - Selection of development programmes that can become self-sufficient by generating its own income (e,g, agricultural support programmes, investments in local infrastructure projects, development of classrooms at local schools). A suitable handover protocol must be developed for ongoing maintenance and sustainability of any development projects. - Establish formal entity and associated business plan to implement the farming land uses within the rehabilitated land.	other mining companies or within the local agricultural sector. - Continue implementation of farming activities and ramp up of farming entity.		

8 ENVIRONMENTAL MONITORING

8.1 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.

8.2 LIST OF ASPECTS THAT REQUIRE MONITORING PLANS

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

- Air quality;
- Blasting and vibration;
- Aquatic biomonitoring;
- Flora and fauna;
- Monitoring of soil stockpiles (rehabilitation);
- Sinkhole formation;
- Surface water;
- Groundwater; and
- Post-closure.

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.

8.3 MONITORING PLANS FOR ENVIRONMENTAL ASPECTS

The monitoring of various environmental aspects and the impact on them as a result of the proposed project shall take place by means of both quantitative and qualitative techniques in order to determine whether or not the requirements of the EMPr 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. In essence, monitoring is a continuous data-gathering, data interpreting, and control procedure that ranges from visual inspection to in-depth investigative monitoring and reporting.

8.3.1 AIR QUALITY

Air quality monitoring in the form of dust sampling is undertaken at Kangala mine. The dust sampling is undertaken at five directional buckets. 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 dustfall 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.

The proposed operations have been assessed during this study with all emissions quantified and dispersion simulations executed. As a result of the air quality assessment, it is found that the acceptability of proposed operations in terms of NAAQS and NDCR necessitates the implementation of an effective local dust management plan. 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. The remainder of this section presents the functional requirements for the air quality monitoring.

8.3.1.1 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 dustfall levels to below 600 mg/m²/day represents an impact- or receptor-based performance indicator. The NAAQS for particulate matter and NDCR represent receptor-based objectives.

8.3.1.2 RECEPTOR BASED PERFORMANCE INDICATORS

It is recommended that the existing dustfall monitoring network be expanded for the proposed Eloff project to continue the dustfall monitoring program during the operation of the mine.

The location of the proposed new dust buckets EL-001 to EL-003 is provided in Figure 3. Should dustfall at the Delmas residential receptor (EL-003) exceed the NDCR, it is recommended that a 3-month PM10 sampling campaign be undertaken to assess whether a permanent PM10 sampler should be installed and to inform decision-making on additional mitigation measures that may be applied to the activities at the proposed Eloff Project or whether a permanent PM10 sampler should be installed at EL-003. This should be undertaken during construction.

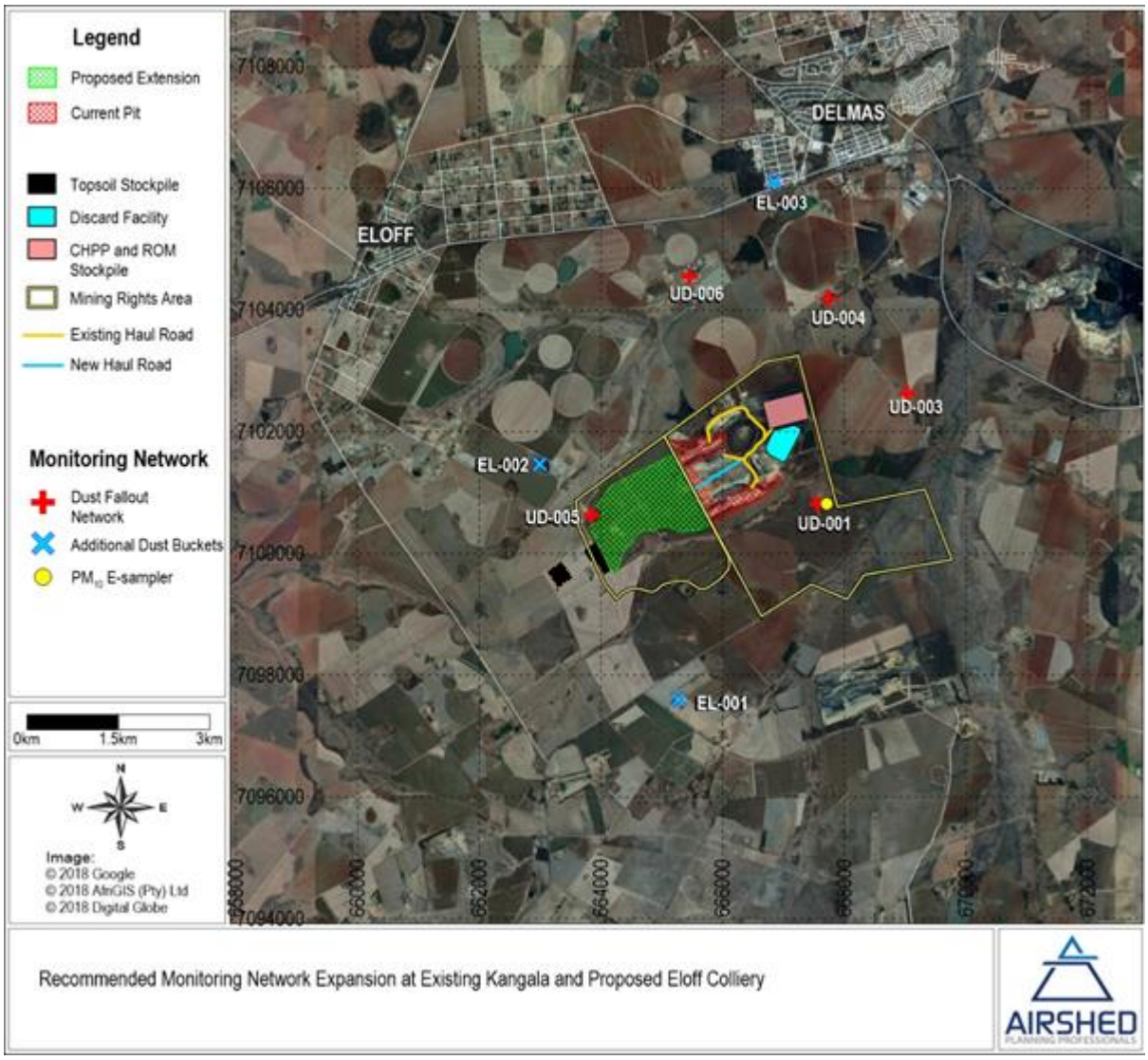

Figure 3: Recommended dust monitoring network[1]

Table 10 provides more detail as to the proposed air quality monitoring programme.

Table 10: Ambient air monitoring, performance assessment and reporting programme

Monitoring Strategy Criteria	Dustfall monitoring
Monitoring objectives	Assessment of compliance with dustfall limits within the main impact zone of the operation. Facilitate the measurement of progress against environmental targets within the main impact zone of the operation. Temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation. Tracking of progress due to pollution control measure implementation within the main impact zone of the operation. Informing the public of the extent of localised dust nuisance impacts occurring in the vicinity of the mine operations.

[1] Note: these are preliminary recommended positions only and may be revised with input from a specialist.

Monitoring Strategy Criteria	Dustfall monitoring
Monitoring location(s)	Three extra single dust buckets with recommended positions as provided in the section above. Should dustfall at the Delmas residential receptor (EL-003) exceed the NDCR, it is recommended that a 3-month PM10 sampling campaign be undertaken to assess whether a permanent PM10 sampler should be installed at this site.
Sampling techniques	Single Bucket Dust Fallout Monitors. Dust fallout sampling measures the fallout of windblown settle able dust. Single bucket fallout monitors to be deployed following the American Society for Testing and Materials standard method for collection and analysis of dustfall (ASTM D1739). This method employs a simple device consisting of a cylindrical container exposed for one calendar month (30 days, ±2 days). Continued monitoring at existing directional buckets for Kangala.
Accuracy of sampling technique	Margin of accuracy given as ~200 mg/m^2/day.
Sampling frequency and duration	On-going, continuous dust fallout monitoring to be implemented facilitating data collection over 1-month averaging period.
Commitment to Quality Assessment/ Quality Control (QA/QC) protocol	Comprehensive QA/QC protocol implemented.
Interim environmental targets (i.e. receptor-based performance indicator)	Maximum total daily dustfall (calculated from total monthly dustfall) of not greater than 600 mg/m^2/day for residential areas. Maximum total daily dustfall to be less than 1 200 mg/m^2/day on-site (non-residential areas).
Frequency of reviewing environmental targets	Annually (or may be triggered by changes in air quality regulations).
Action to be taken if targets are not met	(i) Source contribution quantification. (ii) Review of current control measures for significant sources (implementation of contingency measures where applicable).
Procedure to be followed in reviewing environmental targets and other elements of the monitoring strategy (e.g. sampling technique, duration, procedure) **Procedure**	Procedure to be drafted in liaison with I&APs through the proposed community liaison forum. Points to be taken into account will include, for example: (i) trends in local and international ambient particulate guidelines and standards and/or compliance monitoring requirements, (ii) best practice with regard to monitoring methods, (iii) current trends in local air quality, i.e. is there an improvement or deterioration, (iv) future development plans within the airshed (etc.)
Progress reporting	At least annually to the necessary authorities and community forum.

8.3.2 SURFACE WATER MONITORING

It is recommended to include localities INJ11 and INJ11 into the current Kangala monitoring network plan. The monitoring network plan will then include 15 monitoring localities of which 12 are surface water localities and three (3) are process water localities. The spatial distribution of the sampling localities is shown in Figure 4. The analysis recommended for the surface and process water is shown in Table 10. Quarterly reporting is required.

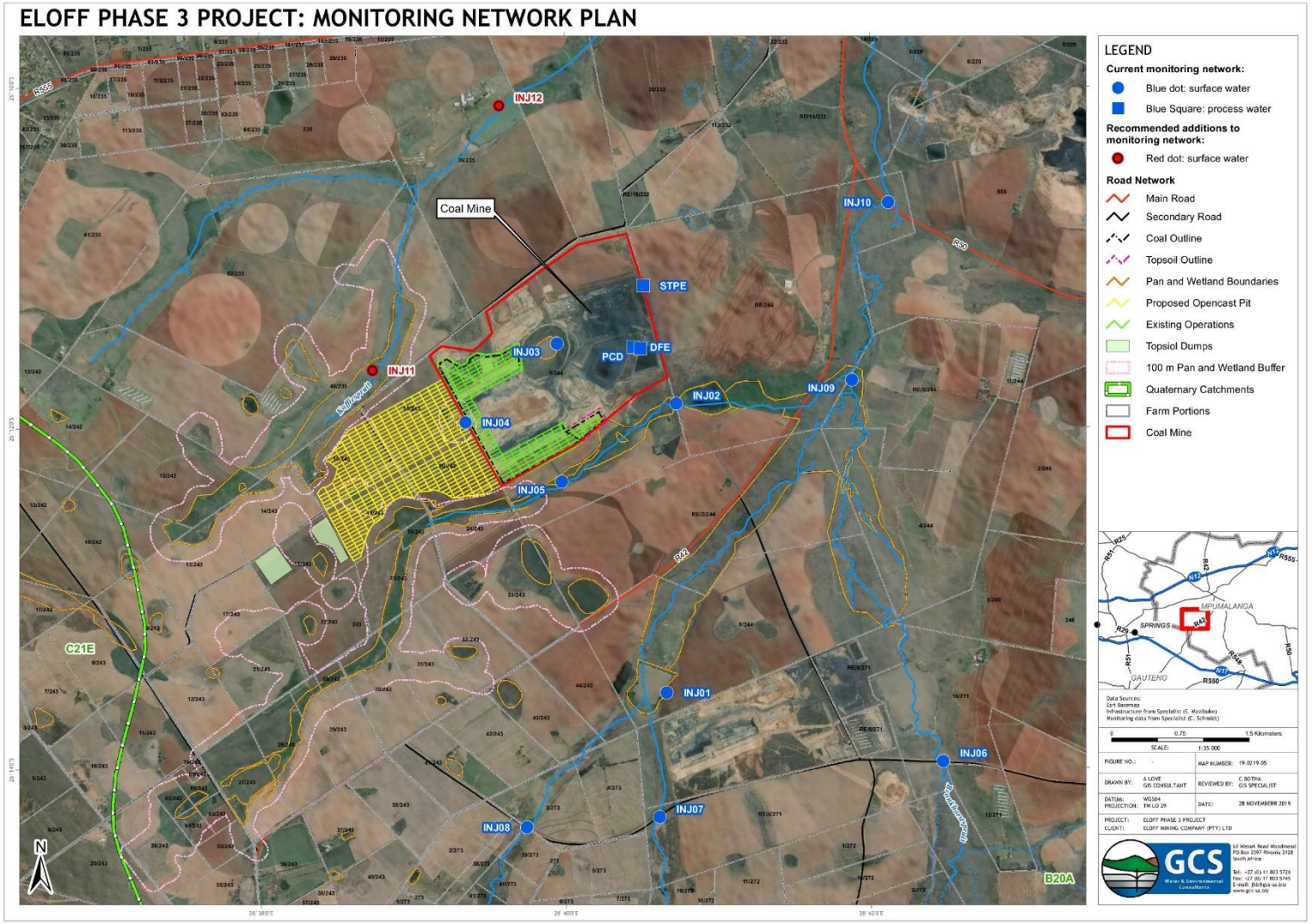

Figure 4: Proposed Surface Water Monitoring Network

Table 11: Recommended surface water monitoring plan.

Localities	Monitoring Frequency	Analysis	
Surface water: **INJ01** **INJ02** **INJ03** **INJ04** **INJ05** **INJ06** **INJ07** **INJ08** **INJ09** **INJ10** **INJ11** **INJ12**	Monthly	pH EC TDS TSS Total Alkalinity Total Hardness Chloride Sulphate Nitrate Nitrite	Fluoride Calcium Magnesium Sodium Potassium Iron Aluminium Manganese Ammonium Orthophosphate
Process water: **DFE** **PCD** **STPE**	Monthly	pH Electrical Conductivity Total dissolved solids Calcium Magnesium	Sodium Potassium Total Alkalinity Chloride Sulphate

8.3.3 AQUATIC BIOMONITORING

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. Aquatic biomonitoring is currently being undertaken for the Kangala Colliery as per conditions of the Water Use Licence (WUL). It is recommended that this biomonitoring programme be expanded to include this proposed Eloff Phase 3 mining area. In addition to this, it is recommended that wetland monitoring be conducted simultaneously with the biomonitoring programme.

A monitoring 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 12 highlights some important aspects to monitor in reference to aquatic biota for the duration of the programme.

Table 12: Aquatic and Wetland Ecology Monitoring Plan

Location	Monitoring objectives	Frequency of monitoring	Parameters to be monitored
Current Kangala monitoring sites	Overall Aquatic PES	Bi-annual	Standard River Ecosystem Monitoring Programme (Ecostatus) methods.
Current Kangala monitoring sites	Determine if water quality deterioration is occurring. SASS5 and ASPT scores should not decrease as and be related to mining activities.	Bi-annual	SASS5 and ASPT scores
Current Kangala monitoring sites	Determine if water/habitat quality deterioration is occurring.	Bi-annual	Monitor for presence of fish.

8.3.4 GROUND WATER MONITORING

The groundwater monitoring network design should comply with the risk-based source-pathway-receptor principle. A groundwater-monitoring network should contain monitoring positions which can assess the

groundwater status at certain areas. The size and location of the current monitoring network used for the existing Kangala coal mine is considered sufficient for the purposes of operational groundwater monitoring at Eloff Phase 3.

Groundwater monitoring during operation should be conducted to assess the following:

- The impact of mine dewatering on the surrounding aquifers. This will be achieved through monitoring of groundwater levels in the monitoring boreholes. If private boreholes are identified within the zone of impact on groundwater levels, these should be included in the monitoring programme;
- Groundwater inflow into the mine working. This will be achieved through monitoring of groundwater levels in the monitoring boreholes as well as measuring water volumes pumped from mining areas;
- Groundwater quality trends. This will be achieved through sampling of the groundwater in the boreholes at the prescribed frequency; and
- The rate of groundwater recovery and the potential for decant after mining ceases. This can be achieved through drilling of additional boreholes into the opencast workings for monitoring purposes. These boreholes should be drilled in the deepest sections of the mine. Stage curves should be drawn to assess the inflow into defunct workings.

Groundwater monitoring should be undertaken to SANS and DWA requirement according to the schedule presented in Table 13. The same monitoring points should be used during all mining phases (e.g. operation, post-closure) to develop a long-term database which will enable trend analysis and recognition of progressive impacts with time.

Table 13: Operational, Decommissioning and Post-Closure Phases Groundwater Monitoring

Monitoring Position	Sampling Interval	Analysis	Water Quality Standard
All monitoring boreholes	Quarterly measuring the depth of groundwater levels	N/A	N/A
All monitoring boreholes	Quarterly sampling for water quality analysis	Full analysis in April and October	South African Water Quality Guidelines: Domestic Use

In addition to the above, all water uses, and discharges should be measured on an ongoing basis and typically include volumes of groundwater seepage into the opencast pits and volumes of contaminated water used for dust suppression.

For the post-closure phase, it is recommended to drill one borehole per opencast to monitor groundwater recovery in the opencasts and to monitor in-pit water quality. The monitoring boreholes should be drilled to the full depth of the backfilled opencasts.

In addition to the above, it is recommended to drill monitoring boreholes down-gradient of the potential decant points to monitor the potential impact of these potential sources.

8.3.5 SOIL MONITORING

The stripping of topsoil and vegetation (and stockpiling) is by far the most important steps to reduce or mitigate some of the impacts associated with the loss of soil as a resource and land capability. Stockpiles should be demarcated and logged, as to make sure the right stockpiles (soil types) are used when rehabilitating, as per the requirements of the Rehabilitation, Decommissioning and Closure Plan and the Topsoil, Stripping, Stockpiling and Placement Plan. It is recommended that a soil specialist be appointed to conduct quarterly audits of the soil stockpiles to ensure this is being undertaken in line with the requirements of the Rehabilitation, Decommissioning and Closure Plan. A topsoil stripping and placement register to be reported together with monthly and annual compliance reporting.

An annual soil survey report to inform and be considered in Annual Independent Environmental Audit and/or annual review of financial provision reports is required. Topsoil stripping and placement register to be reported together with monthly and annual compliance reporting. Refer to FDRCP (Appendix B) for more information regarding soil stripping guidelines.

8.3.6 SINKHOLE FORMATION

Monthly groundwater level monitoring must take place to ensure the groundwater level does not extend below the dolomite rockhead. If the mine does abstract from the dolomitic aquifer it will be localized and under the mining footprint. To mitigate against possible sinkhole formation it is recommended the drawdown should be limited to less than 6m if possible. Ideally the mine must immediately stop pumping from that borehole or surrounding boreholes and consider alternatives like sumps to keep the mining environment dry. The mine should, through their monitoring positions and program demonstrate that the do not impact the dolomite aquifer and in the case that they do change their abstraction or dewatering plan to stop dewatering the dolomite aquifer.

8.3.7 BLAST MONITORING

A monitoring program is currently in place. Monitoring is done at various points around the current mine. These monitors positions are indicated as: Kangala 1 - Chicken Farm, Kangala 2 - Kangala Farm, Kangala 3 - Du Plessis and Kangala 4 – Roos. These monitors are at located at these specific points of concern and at different distances from the operation. The distances range between 92 m and 2820m from the edge of the current pit area. When blasting is done in the different areas of the pit these distances will also differ and results will also differ.

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;
- Meteorological information at time of the blast;
- Video recording of the blast; and
- 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. Eight 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. 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.

Third party consultation and monitoring should be considered for all ground vibration and air blast monitoring work. This will bring about unbiased evaluation of levels and influence from an independent group. Monitoring could be done using permanent installed stations. Audit functions may also be conducted to assist the mine in maintaining a high level of performance with regards to blast results and the effects related to blasting operations.

Video of each blast will also help to define if fly rock occurred and from where. Immediate mitigation measure can then be applied if necessary. The video will also be a record of blast conditions.

Figure 5: Suggested preliminary blast monitoring positions (refer to specialist report for co-ordinates).

8.3.8 FAUNA AND FLORA MONITORING

It is recommended that a project area specific but also species-specific biodiversity monitoring and action plan be compiled once the environmental authorisation is issued. The monitoring and action plan must inform and guide the proposed project and prescribed clear goals and objectives that can be practically implemented and easily monitored using appropriate variables. The key aspects must include the following:

- The collation and generation of data for selected species, ecosystems and/or habitats;
- Assess and determine the conservation status of species within specified ecosystems;
- Prescribe aims, objectives and targets for conservation and restoration; and
- Establish and assign budgets, timelines, reporting structures and partnerships for implementing the action plan.

8.3.9 POST-CLOSURE MONITORING

Post-Closure monitoring requirements and frequencies are indicated in Table 14. For more detail on the objectives and basis of this monitoring programme are presented in the FRDCP (Appendix B)

Table 14: Post closure monitoring requirements.

Aspect	Functional Requirement	Performance indicator/ target	Frequency	Reporting Mechanism	Adaptive management action
Groundwater	Standards: - SANS 5667-1:2008/ISO 5667-1:2006 Water Quality – Sampling Part 1: Guidance on the design of sampling programmes and sampling techniques. - SANS 5667-3:2006/ISO 5667-3:2003 Water Quality – Sampling Part 3: Guidance on the preservation and handling of water samples. - SANS 5667-11:2015/ISO 5667-11:2009 Water Quality – Sampling Part 11: Guidance on sampling of groundwater. - Use of SANAS Accredited analytical laboratory. Parameters: - Groundwater level. - Indicator parameters as identified by the groundwater specialist. Locations: - In pit dedicated monitoring borehole (to full depth of backfilled pit). - Dedicated monitoring boreholes up/down-gradient of the potential decant point.	- Monitoring network must comply with the risk-based source-pathway - receptor principle. - Compliance with WUL water quality thresholds. - No deterioration of water quality upstream to downstream. - Trend analysis in relation to identified latent impact trigger.	Biennial	Biennial water quality report.	Undertake a final groundwater model update as and when the following is achieved: - The in-pit groundwater levels reach 80% of the predicted decant elevation. - Indicator parameters reach trigger values at dedicated plume monitoring boreholes (i.e. prior to reaching the surface water features). The revised groundwater model to be used to refine and revise the long term water management/ treatment actions.

Aspect	Functional Requirement	Performance indicator/ target	Frequency	Reporting Mechanism	Adaptive management action
	- Dedicated plume monitoring boreholes- in the downgradient groundwater flow direction.				

9 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.

10 TECHNICAL SUPPORTING INFORMATION

The following plans / reports have been included as Appendices to this EMPr:

Appendix A: Water Management and Storm Water Management Plan

Appendix B: Final Rehabilitation, Decommissioning and Closure Plan, Incorporating an Annual Rehabilitation Plan and Environmental Risk Assessment