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ENVIRONMENTAL MANAGEMENT PROGRAMME

FORZANDO SOUTH AND KALABASFONTEIN PROJECT

DOCUMENT DETAILS

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COMPANY:	Forzando South Coal (Pty) Ltd

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1 INTRODUCTION

1.1 REPORT STRUCTURE

This report reflects an amendment and update to the existing approved Environmental Management Programme (EMPr) and as such is compliant with the requirements of the National Environmental Management Act (Act 107 of 1998) (NEMA) Regulations. On approval, this EMPr will supersede the existing EMPr for MR MP 30/5/1/2/2/380 MR & MP 30/5/1/2/2/381 MR and will be implemented for Forzando South and Kalabasfontein. Table 1 below provides a summary of the NEMA requirements in terms of Appendix 4 of the Environmental Impact Assessment (EIA) Regulations (GNR 982 as amended), and an indication in which section 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;	Sections 1.6 and 1.7 and Appendix 1
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 4 and Figure 5
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 5
Appendix 4(1)(1)(f):	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – i. Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; ii. Comply with any prescribed environmental management standards or practices; iii. Comply with any applicable provisions of the ac regarding closure, where applicable; and iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	Section 6
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 4.1

Environmental Regulation	Description	Section in Report
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 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

Forzando Coal Mines (Pty) Ltd. (Forzando Coal Mines) applied to the (DMR) for the conversion of Old Order Mining Rights to New Order Mining Rights for its mining operations at the Forzando North Shaft and Forzando South Shaft. These conversions were granted in November 2011 and executed on 28 June 2013.

This application is for the extension of the current mining area for the Forzando South Mining Right (MP 30/5/1/2/2/380) (under Section 102 of MPRDA (Act No. 28 of 2002) by inclusion of contiguous areas, which are held under Prospecting Rights 1035PR & 1170PR (Kalabasfontein Project). Through an intensive drilling exercise on these areas, economically viable blocks of coal have been defined. The plan is to access these newly defined blocks of coal from the existing Forzando South incline. Underground mining has been selected as the appropriate mining method for the Kalabasfontein project.

Annexation of these Prospecting Rights into the existing Forzando South Mining Right is motivated by subsequent reduction of reserves at Forzando North Shaft. This diminution is as a result of unexpected poor ground conditions as well as burnt coal.

The Kalabasfontein project area is situated in Mpumalanga, 20 kilometres north of Bethal. It is located to the east and south of the existing Forzando South 380MR and Forzando North 381MR respectively which fall within the Msukaligwa Local Municipality. The project area comprises two prospecting rights, 1035 PR and 1170 PR, which covers a total of ~1 547.8296ha over portions 7, 8, RE, 11 and 13 of the farm Kalabasfontein 232 IS. A new ventilation shaft will be located on Portion 22 of the farm Uitgedacht 229 IS as part of the Kalabasfontein project. Initial granting of both Prospecting Rights was in 2006 to Forzando Coal Mines (Pty) Ltd. Subsequent to this, in respect of 1035PR before the right could lapse on the 2nd of November 2009, a Prospecting Rights renewal was applied for in October 2009. In respect of PR 1170 the renewal was applied for on 12 January 2011 before the right expired on 9 April 2011. Both renewals were granted on the 31st July 2015 with execution finalised on the 27th October 2015, extending the validity of both Prospecting Rights to the 30th of July 2018. The proposed extension of the current mining area will require minimal new surface infrastructure as the mining method to be employed is underground mining and existing surface infrastructure from the Forzando South mine will be used.

Forzando Coal Mines (Pty) Ltd. has appointed EIMS to act as the independent EAP to undertake the EIA for the proposed Kalabasfontein project. An application for the amendment to the existing MWP and EMPr, through an MPRDA Section 102 Application, and a full Environmental Impact Assessment (EIA) for the proposed new mining area is, therefore, required to support an application for environmental authorisation (EA). A water use licence application (WULA) for the relevant water use triggers associated with the proposed project, is also being undertaken. Mined coal is transported from the mining area by means of a 5km overland conveyor belt to the existing Forzando plant for processing (situated at the Forzando North mining area). The existing discard handling facilities, coal loading and rail system, all located at Forzando North, are also used for the processing of this coal.

1.3 MINE INFRASTRUCTURE

1.3.1 DESCRIPTION OF THE MINING OPERATION

Forzando South is an underground mining operation. Access to the mining area is via a decline shaft system from one box-cut. Coal is transported from the mining area by means of an overland conveyor belt to the existing Forzando plant for processing (situated at the Forzando North mining area). The existing discard handling facilities, coal loading and rail system, all located at Forzando North, are also used for the processing of this coal.

Although Kalabasfontein annexation is intended to extend the Life of Mine (LOM) of Forzando South Coal Mine, it will come into production a year after the annexation is granted by the DMR. The Kalabasfontein project has an estimated LOM of 17 years with the project schedule and timeframe being based on the Forzando South equipment availabilities, efficiencies and both skilled and unskilled labour force. Mining in the Kalabasfontein project area is based on two Continuous Miner (CM) sections.

The access corridor to Kalabasfontein Reserves was identified during exploration drilling. Reserves will be mined through access from one of Forzando South Reserves block. This will eliminate intense preparation work of developing a new incline, as there will be infrastructure available at the face.

Currently, Forzando South mine is scheduled until 2037. However, the Kalabasfontein portion will be mined as soon as permission is granted, in order to ensure sustained production volumes and quantities from the 5 CM sections that are currently being mined. The mine will maintain its production rate of 2.2 Million tonnes (Mt) per annum. Commissioning of Kalabasfontein will not add to the production of Forzando South but will provide relocation areas for existing Forzando South sections. Since the Kalabasfontein project will be mined concurrently with Forzando South, production decline will be due to depletion of Reserves. In the second quarter of year 17 (2037), the first section will pull out and leave the one section to deplete the remaining Reserves.

1.3.2 EXISTING AND OPERATIONAL INFRASTRUCTURE

At present, the existing surface infrastructure related to Forzando South can be summarised as follows:

- Power lines;
- Storm water management infrastructure;
- Access roads;
- Ventilation shafts (one upcast and one downcast);
- RoM Coal stockpile;
- Overland Conveyor from box-cut to Forzando North plant;
- Clean water containment facilities (Erickson Dam);
- Wastewater containment Facilities [Pollution Control Dams (PCDs);
- One small sewage treatment package plant; and
- Administration, workshops, change house and related buildings.

Forzando South's extracted coal is transported to Forzando North's coal beneficiation plant via a conveyor, and hence there are no coal beneficiation plants or coal slurry and discard dumps at Forzando South. The infrastructure layout for the Forzando South Mine can be seen in Figure 1.

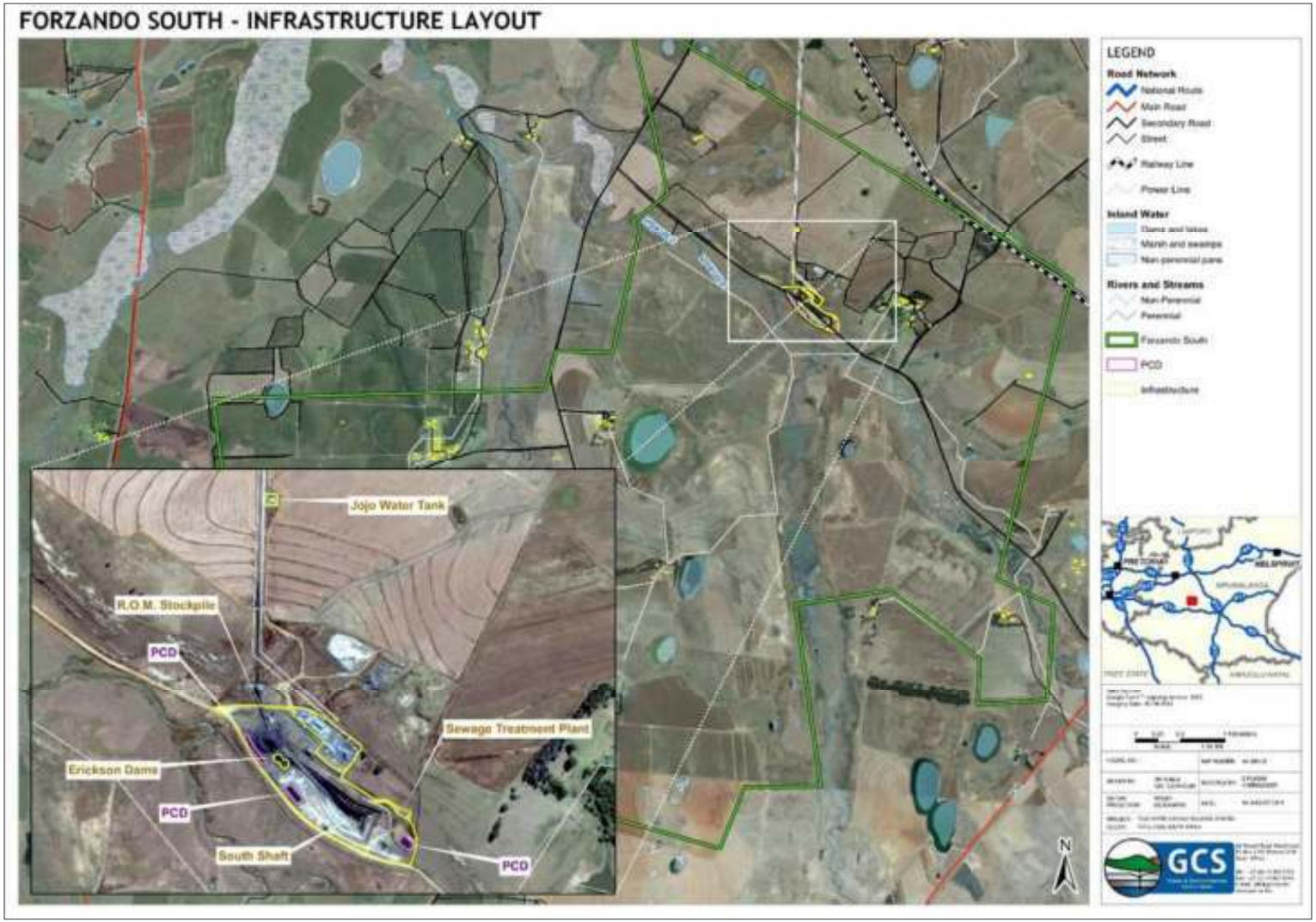

Figure 1: Layout of the Forzando South Infrastructure

1.4 DESCRIPTION OF THE PROPERTY

Table 2 below indicates locality details and the farm portions that fall within the Forzando South as well as the Kalabasfontein project area. Figure 2 indicates the farms that fall within the Mining Right Boundary. A locality map is included in Figure 3 below.

1.5 LOCALITY AND SENSITIVITY MAP

The locality for the Kalabasfontein project in relation to the Forzando South and North Mining Right boundary is indicated in Figure 3 below. The sensitivity map for the underground mining area for the Kalabasfontein Project is provided Figure 4 and Figure 5 provides the sensitivity mapping for the ventilation shaft and powerlines areas. Figure 6 provides an overview of the composite map for the project area and Figure 7 and Figure 8 provide an inset of the overview composite map.

Table 2: Summary of the project including property names

<table>
<tr><td>Summary</td><td colspan="6">Mining Right holder
Forzando Coal Mines (Pty) Ltd is the holder of Mining Rights in respect of the following operations:
• Forzando South (380MR)
• Forzando North (381MR)
The details of the properties where the current Forzando South Coal Mine operations are situated are provided below. The current approved EA and WUL only covers the properties listed on the left side of the table, the proposed future mining operations fall outside of these properties (but within the prospecting right area) and thus require environmental and water use authorisation.</td></tr>
<tr><td>Application Area (Ha)</td><td colspan="6">The properties affected by this application cover an area of ~1 547.8296 (ha).</td></tr>
<tr><td>Magisterial District</td><td colspan="6">The Kalabasfontein Project area is situated in the Msukaligwa Local Municipality within the Gert Sibande District Municipality, Mpumalanga Province.</td></tr>
<tr><td>Distance and direction from nearest town</td><td colspan="6">Kalabasfontein Project area is situated approximately 20 kilometres north of Bethal and 26 kilometres east of Ga-Nala (Kriel)</td></tr>
<tr><td rowspan="9">21-digit Surveyor General Code for each Portion</td><td colspan="3">Properties <u>within Mining Right area-</u> Forzando South (380MR)</td><td colspan="3">Properties <u>affected by this Application</u></td></tr>
<tr><td>Farm Name:</td><td>Portion:</td><td>SG Codes:</td><td>Farm Name:</td><td>Portion:</td><td>SG Codes:</td></tr>
<tr><td rowspan="2">Kalabasfontein 232 IS</td><td>Portion 8</td><td>T0IS00000000023200008</td><td rowspan="5">Kalabasfontein 232 IS</td><td rowspan="2">7</td><td rowspan="2">T0IS00000000023200007</td></tr>
<tr><td>Portion 11</td><td>T0IS00000000023200011</td></tr>
<tr><td rowspan="3">Uitgedacht 229 IS</td><td>Remainder of Portion 1</td><td>T0IS00000000022900001</td><td rowspan="3">8</td><td rowspan="3">T0IS00000000023200008</td></tr>
<tr><td>Remainder of Portion 3</td><td>T0IS00000000022900003</td></tr>
<tr><td>Portion RE4</td><td>T0IS00000000022900004</td></tr>
</table>

		Portion 5	T0IS00000000022900005			
		Portion 12	T0IS00000000022900012			
		Portion 13	T0IS00000000022900013			
		Portion 14	T0IS00000000022900014			
		Portion 15	T0IS00000000022900015			
		Portion 16	T0IS00000000022900016			
		Portion 17	T0IS00000000022900017			
		Portion 18	T0IS00000000022900018			
		Portion 7	T0IS00000000022900007			
		Portion 8	T0IS00000000022900008			
	Bankpan 225 IS	MA 2 on Portion 2	T0IS00000000022500002		Remaining Extent	T0IS00000000023200000
	Schurwekop 227 IS	Portion 3	T0IS00000000022700003		11	T0IS00000000023200011
		Remainder of Portion 4 RES	T0IS00000000022700004			
		Portion 12	T0IS00000000022700003			
					13	T0IS00000000023200013
		Portion 13	T0IS00000000022700013	Uitgedacht 229 IS	7	T0IS00000000022900007

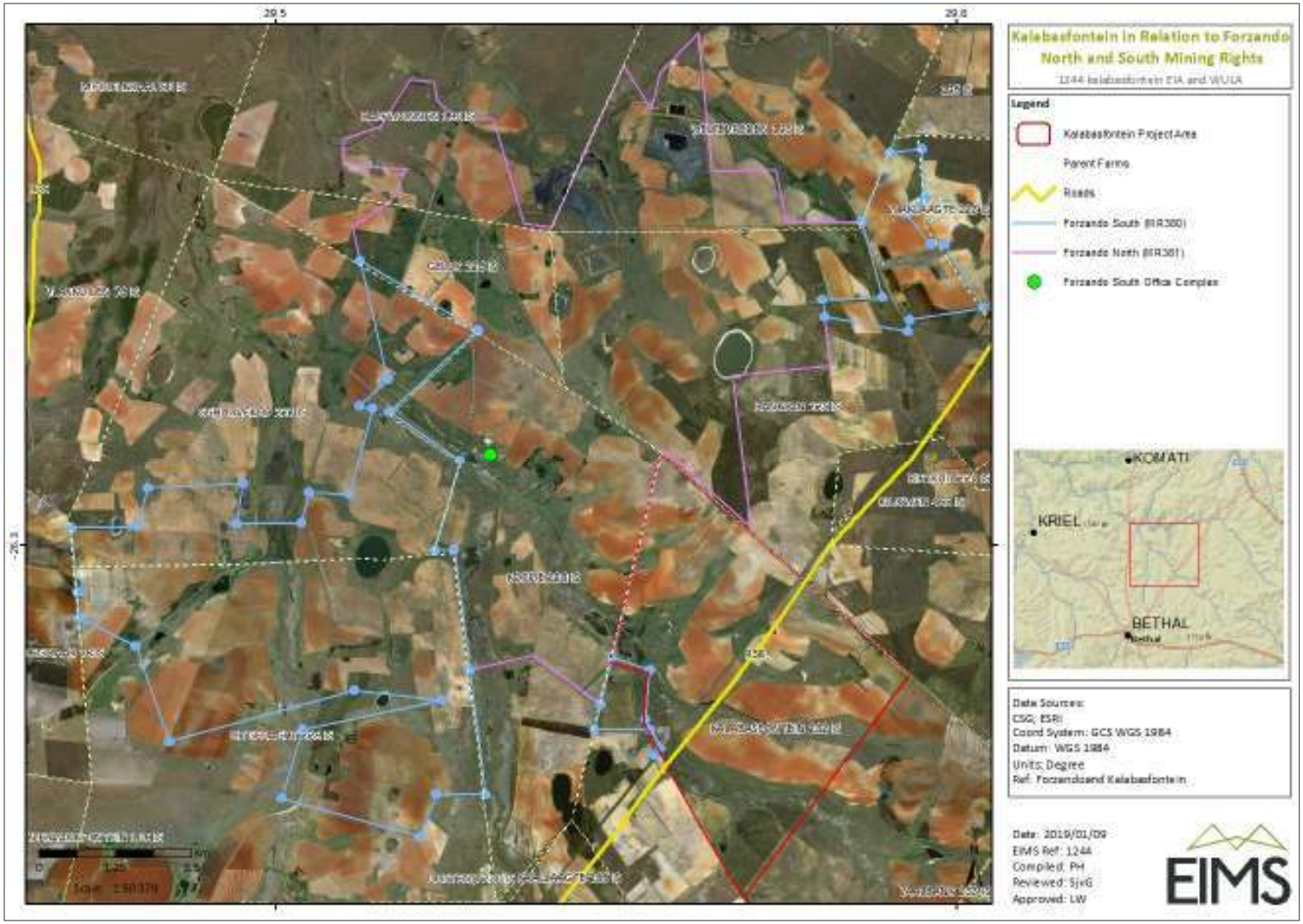

Figure 2: Properties within the Forzando South and North Mining Right and the Kalabasfontein project area

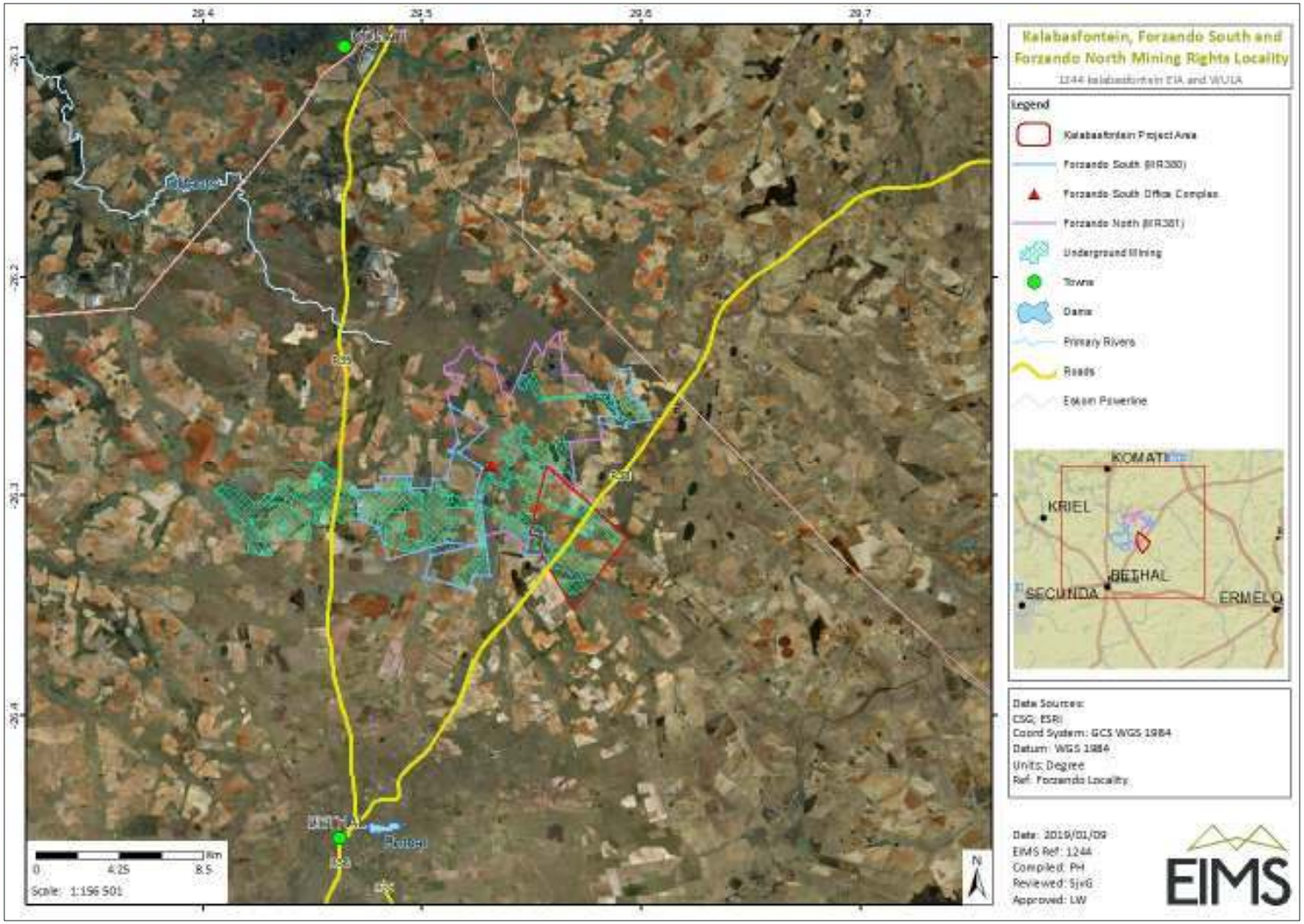

Figure 3: Locality of the Kalabasfontein project in relation to the Forzando North and South Mining Right areas

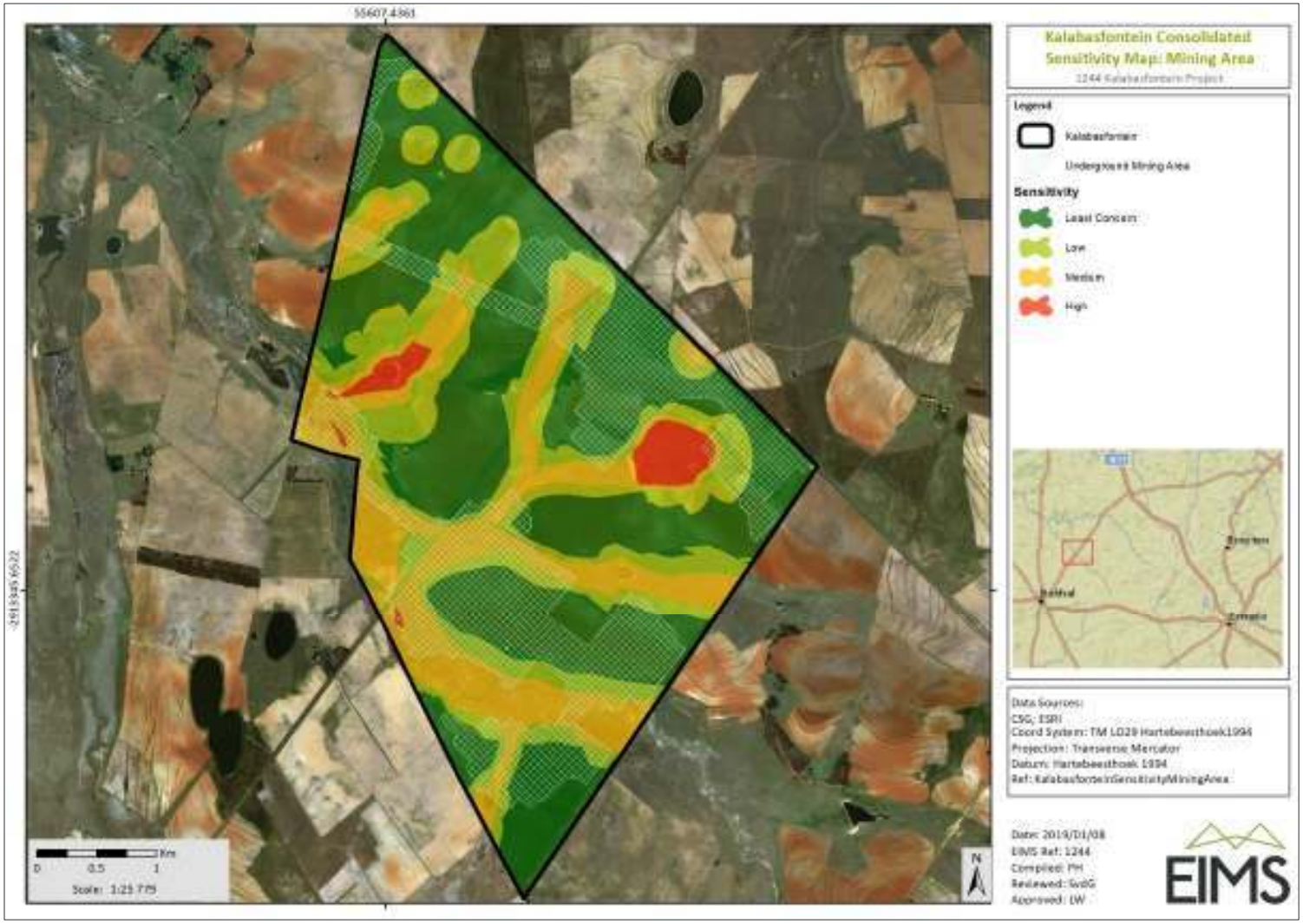

Figure 4: Sensitivity mapping for the Kalabasfontein project underground mining area

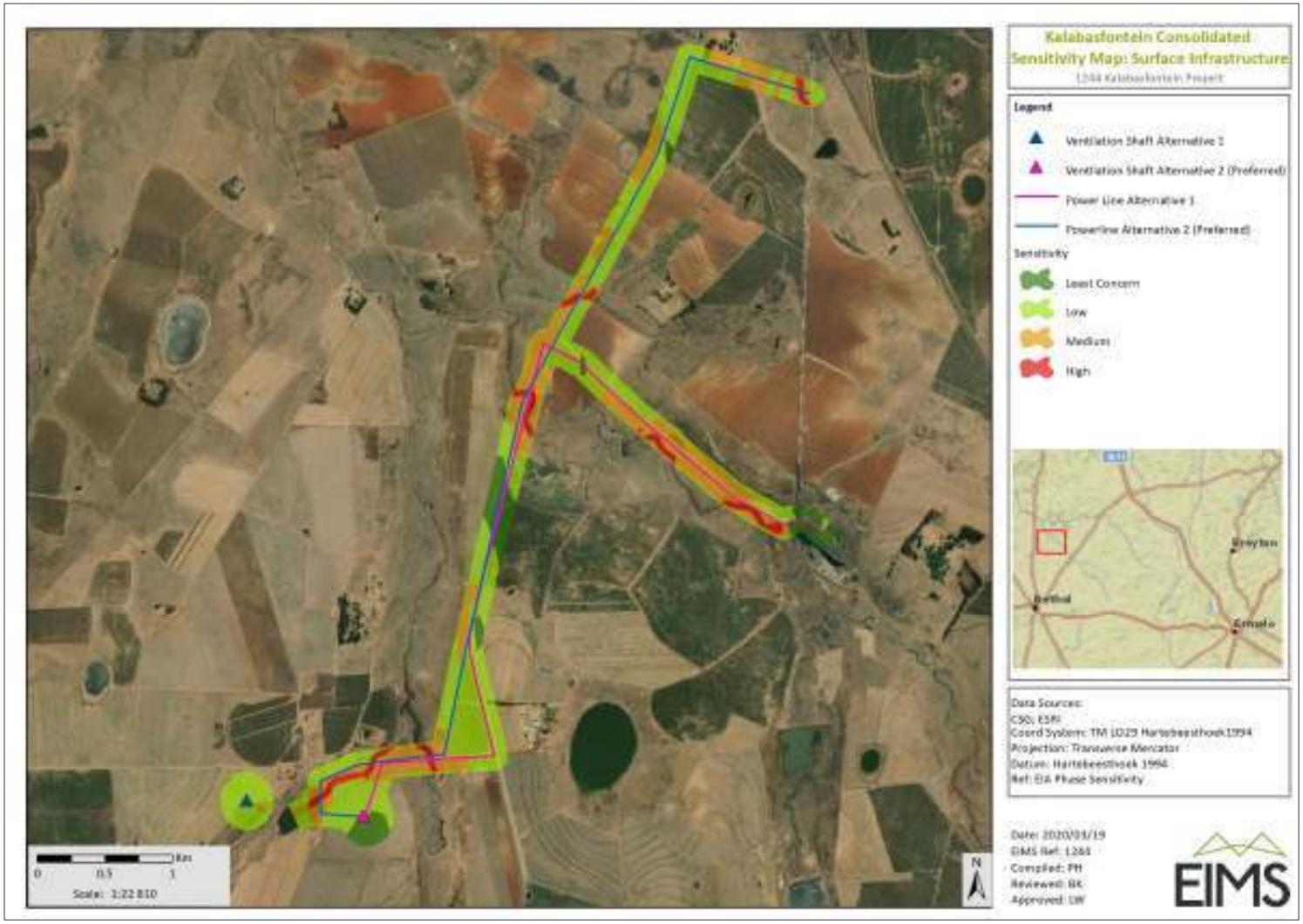

Figure 5: Sensitivity mapping for the proposed ventilation shaft and powerline

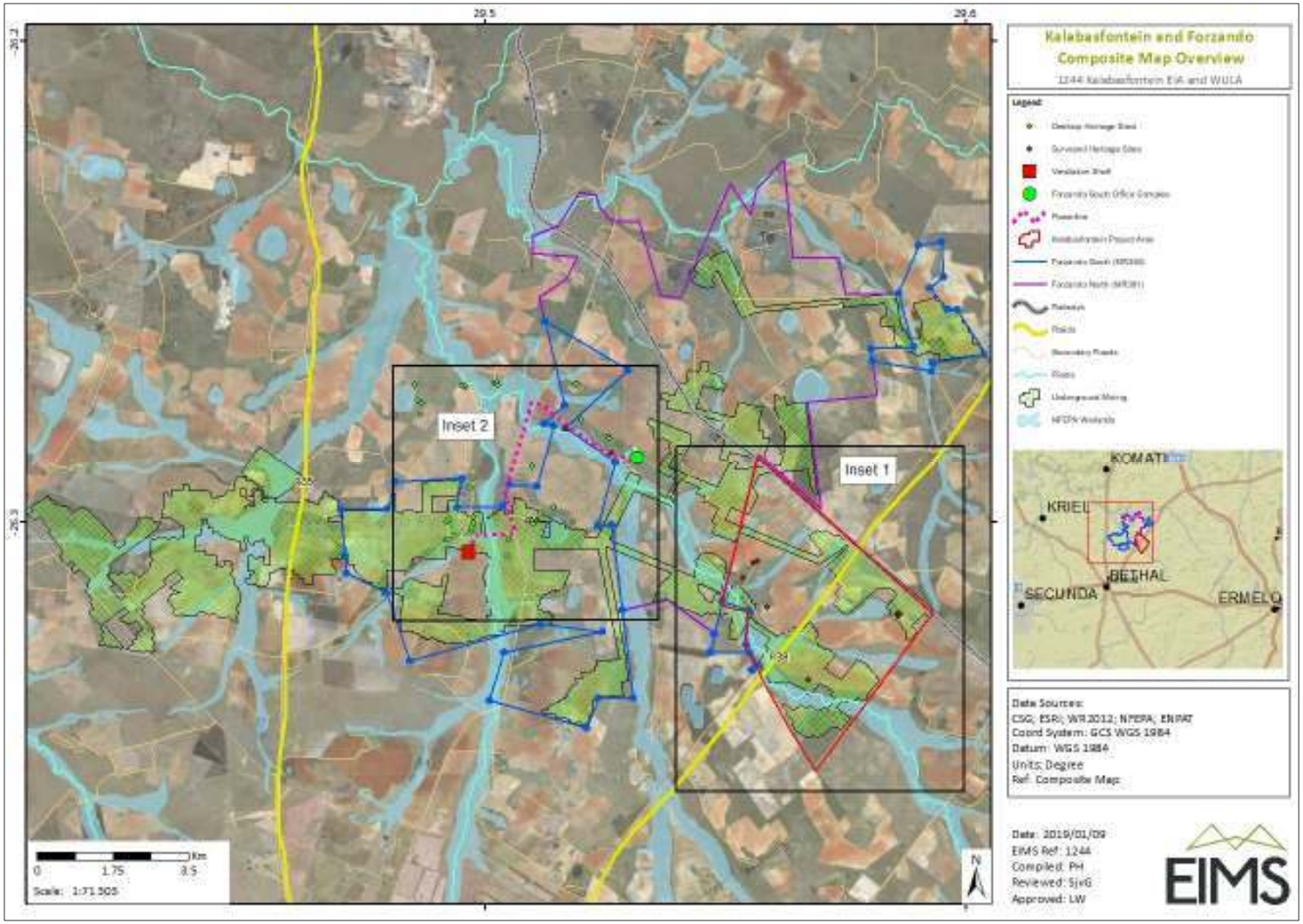

Figure 6: Composite map overview of the Kalabasfontein project

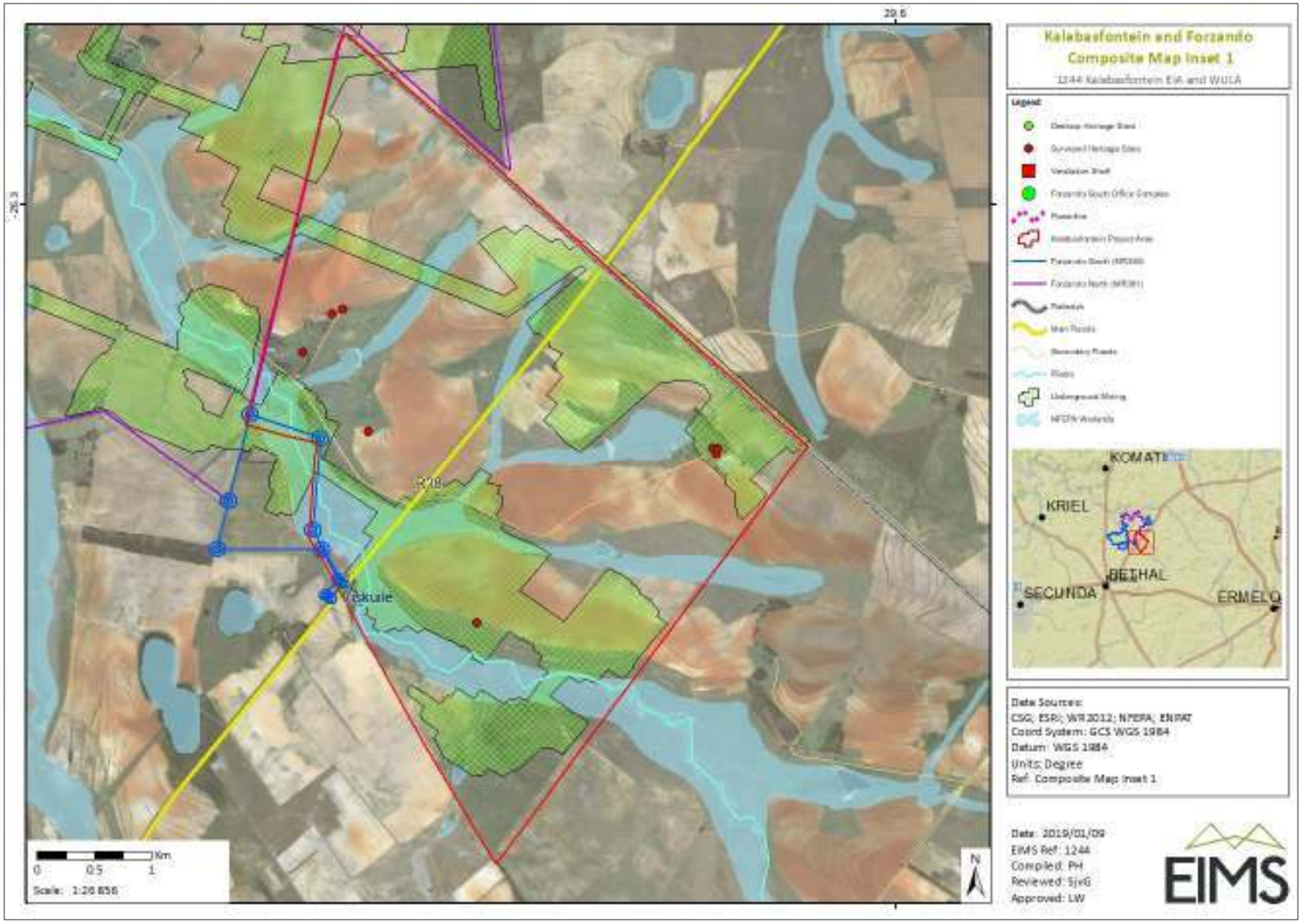

Figure 7: Composite map of the Kalabasfontein project Inset 1

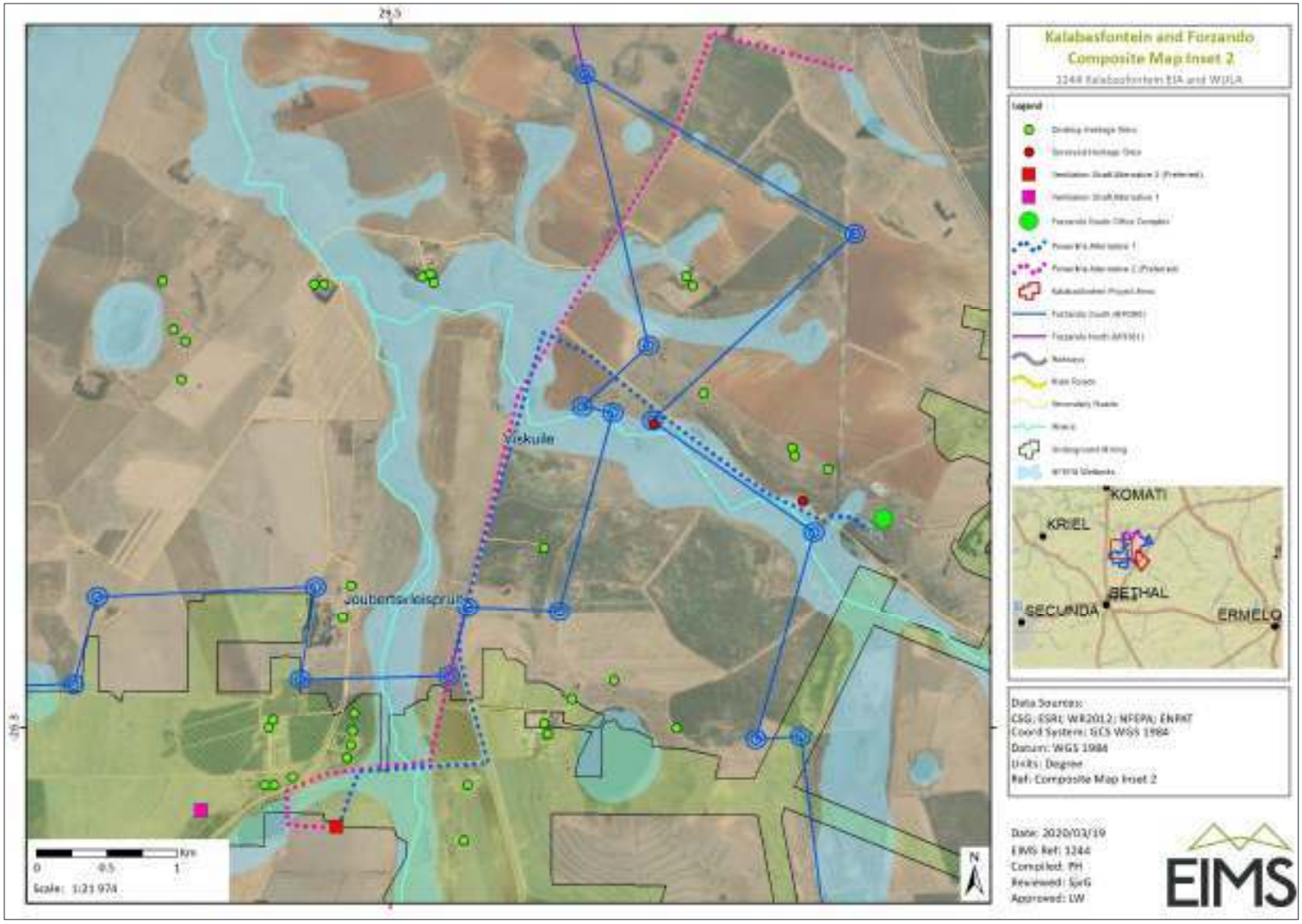

Figure 8: Composite map for the ventilation shaft and powerline Inset 2

1.6 DETAILS OF THE EAP

Forzando Coal Mines currently has an approved EMPr for its Forzando North and Forzando South Operations that was prepared by GCS (Pty) Ltd. EIMS was appointed by Forzando Coal Mines as the Environmental Assessment Practitioner (EAP) to amend the approved EMPr only for the management of the Forzando South and Kalabasfontein mining areas. It is assumed that the current approved EMPr was complete, comprehensive and adequate to deal with the Forzando North and Forzando South Operations. Where relevant the approved EMPr has been supplemented to account for the Kalabasfontein project impacts.

The contact details of the EAP are as follows:

EAP Name: Bongani Darryl Khupe

SACNASP Registration Number: 400375/11

Contact no: +27 11 789 7170

Email address: bongani@eims.co.za

1.7 EXPERTISE OF THE EAP

1.7.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the 2014 EIA Regulations (Government Notice R. (GNR) 982), an independent EAP, must be appointed by the applicant to manage the application. EIMS has been appointed by Forzando Coal Mines as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

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

Furthermore, EIMS has appointed a team of specialists to undertake additional studies required for the project. EIMS is responsible for project management and the compilation of the EIA and EMPr with the guidance and input from the independent specialists.

1.7.2 SUMMARY OF EAP'S PAST EXPERIENCE

Mr Khupe is an environmental project manager and environmental auditor. He is a registered Professional Natural Scientist who holds a Bachelor of Science Honours degree in Applied Environmental Science from the University of Zimbabwe and is a trained Environmental Auditor (Crystal Clear, 2012). His training included all aspects of Environmental Auditing as well as EMS auditing in terms of ISO14001. In addition, he is a trained on the ISO14001:2015 environmental standard and has completed the EMS lead auditor training in terms of ISO14001:2015. Mr Khupe is registered with the Institute of Environmental Management and Assessment (IEMA) as an Environmental Auditor and with the South African Auditor and Training Certification Authority (SAATCA) as a Provisional Auditor. He has more than 12 years' experience in the environmental field. His key focus is on environmental compliance advice and monitoring, environmental impact assessments, environmental permitting, public participation, environmental management plans and programmes, strategic environmental advice, rehabilitation advice and monitoring as well as providing technical input for projects in the environmental management field. He is conversant with the South African environmental legislation as well as sustainability auditing, including Equator Principles, IFC Performance Standards and World Bank EHS guidelines.

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

1.7.3 SPECIALIST CONSULTANTS

The specialist studies involved the gathering of data relevant to identifying and assessing environmental impacts that may occur as a result of the proposed Kalabasfontein project. These impacts were then assessed according to pre-defined rating scales. Specialists also recommended appropriate mitigation / control or optimisation measures /actions to minimise potential negative impacts or enhance potential benefits, respectively. The specialist consultants that provided inputs into this report are summarised in Table 3 below.

Table 3: List of specialists appointed to the Kalabasfontein project

Specialist List	
Hydrogeological Impact Assessment	GCS Water and Environmental Consulting (Pty) Ltd.
Hydrological Impact Assessment	Hydrologic Consulting (Pty) Ltd.
Wetland Impact Assessment Study	The Biodiversity Company (Pty) Ltd.
Aquatic Ecology Impact Assessment	The Biodiversity Company (Pty) Ltd.
Terrestrial Biodiversity Impact Assessment	The Biodiversity Company (Pty) Ltd.
Soils Assessment/ Agricultural Impact Assessment	The Biodiversity Company (Pty) Ltd.
Noise Impact Assessment	Enviro Acoustic Research
Blasting and Vibration Impact Assessment	Blast Management and Consulting CC
Heritage and Cultural Resources Impact Assessment	PGS Heritage (Pty) Ltd.
Palaeontology Assessment	PGS Heritage (Pty) Ltd.
Air Quality Impact Assessment	WSP Environmental (Pty) Ltd.
Greenhouse Gas Emission Study	WSP Environmental (Pty) Ltd.
Closure Costing	Environmental Impact Management Services (Pty) Ltd.
Traffic Impact Assessment	Beal Consulting Engineering and Project Management
Geotechnical Impact Assessment	Exxaro

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 mine's 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.

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 South Africa, the DWA (then DWAF, now DWS) adopted a BPEO guideline in 1991 for water quality management and in 1994 in the Minimum Requirements document for waste management.

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 National Environmental Management Act (Act 107 of 1998) (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 formal, effective 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 Forzando Coal Mines shall be required to appoint a suitably qualified specialist to develop the ESMS to be implemented 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 ESMS will be based on:

- Forzando Coal Mines's corporate vision;
- South African legal requirements; and
- Mining best practice.

The ESMS that has been developed for the Mine incorporates and provides for:

- A project specific Environmental Policy;
- Organisational capacity and competency;
- Identify roles and responsibilities of key role players;
- Incorporation for a mechanism for ongoing identification of risks and impacts.
- Appropriate management plans and procedures to ensure effective operational control;
- Emergency response and 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 together with the EIA report for the Kalabasfontein project and its associated infrastructure. Stakeholder engagement is, however, required on an ongoing basis throughout the operation of the facility. As such, the mine has developed and implemented a detailed Stakeholder Engagement, Philosophy, Policy, Process and Communication Plan (Pol007), designed to work as a living document for implementation over the entire LoM.

The Forzando Coal Mines philosophy and policy with regards to the stakeholder plan is to build long-term, stable and mutually beneficial relationships with Forzando Coal Mines stakeholder as it allows the Forzando Coal Mines operations to operate successfully and create value for stakeholders. Stakeholder engagement is a pillar of Forzando Coal Mine's corporate governance approach and support their commitment to sustainable development programmes.

Forzando Coal Mines aims to achieve specific goals for building mutually beneficial relationships with their stakeholders through:

- Obtaining support for operational and strategic plans, and the performance of the business;
- Proactively managing the risk, opportunities and reputation of the company;
- Understanding stakeholder expectations, and creating and delivering relevant beneficial value;
- Building mutual trust and respect; and
- Promoting the well-being of society.

Stakeholder relationship management and communication are viewed as strategic activities in achieving Forzando Coal Mine's development and growth objectives and play a critical role in risk management and identifying opportunities. The purpose of engagement ensures that effective and mutually beneficial relationships are built to enable Forzando Coal Mines to succeed while meeting the needs and expectations of the stakeholders.

The principles of engagement include:

- Transparency: open agenda and information exchange;
- Accountability: emphasis on governance;
- Legitimacy: recognise that stakeholders have valid needs and expectations; and
- Mutual respect: engage with dignity.

The Stakeholder Engagement, Philosophy, Policy, Process and Communication Plan (Pol007), clearly defines various stakeholders and provides the procedure for engagement, including:

- Plan:
    - Profile and map stakeholders'
    - Scope out the purpose of engagement;
    - Establish authority matrix; and
    - Determine appropriate engagement levels and methods.

- Prepare:
    - Identify who is to be engaged /mode and format/date;
    - Identify issues to be discussed;
    - Invite stakeholder to proposed engagement session;
    - Establish clear objectives and projected outcomes for the engagement session;
    - Develop an agenda; and
    - Present the proposed engagement objectives and tactics to the person taking responsibility for any/ all stakeholder engagement to obtain approval to conduct the engagement activity;
- Engage:
    - Meet with the identified Stakeholders at the planned location, date or issue appropriate communique;
    - Ensure that all matters are discussed and identified as “future matters;”
    - Identify and confirm any/all commitments made by either the engagement champion managing the engagement activity, or one of the engaged Stakeholders;
    - Ensure that timeline and expected outcomes are duly agreed upon by all parties;
- Document:
    - During any/all engagement with Stakeholders, comprehensive attendance registers ought to be recorded by the engaged facilitator; and
    - During any/all engagements with Stakeholders, comprehensive meeting notes ought to be recorded either by the engagement facilitator or colleague tasked with taking notes/minutes.

3.1.2 GRIEVANCE MECHANISM

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

The grievance mechanism is 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.

3.1.2.1 INTERNAL GRIEVANCE PROCEDURE

Forzando Coal Mines has developed 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). Forzando Coal Mines also has a health, safety and environmental reporting system in which grievances are reported internally (see FM 210).

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.

3.1.2.2 EXTERNAL GRIEVANCE PROCEDURE

For external grievances, Forzando Coal Mines makes use of a complaints register at the security gate. Standard Operating Procedure No. 6 on Communication, revision 08, dated 25 July 2019 details the procedure for complaints. This includes, a Complaints Register (QR21), which is maintained to log all correspondence received from external sources regarding concerns or complaints. It is the policy of Forzando Coal Mines to respond to such correspondence without unnecessary delays. The Environmental Management Representative must ensure that this is maintained. Only the Business Unit Manager has the authority to formally communicate externally. Any complaints of an environmental nature must be logged in the complaints register. The concern or the complaint is then processed through the Non-Conformance/Incident Management Process (SOP10, discussed below). All complaints logged will be presented to Management during the bi-annual Management Review of the ESMS.

3.2 DOCUMENT CONTROL

A formal document control system has been established by Forzando Coal Mines, namely the Standard Operating Procedure (SOP) 01 titled, “Control of documented information,” dated 05 July 2019. This SOP is applicable to all procedures, forms, standards and electronic data of Forzando Coal Mines Environmental Management System documents. The document control system provides for the following:

- Only the environmental department is authorised to generate and revise documented information;
- Draft documents are distributed to relevant parties for comments;
- Electronic access to the documents is limited to the environmental department;
- Once comments are received, the documents are finalised and distributed to the relevant managers for approval;
- Newly generated documented information will receive a document name and number, revision number and date of generation;
- The revised documented information’s revision number and date of revision will be updated;
- Only approved documents are issued for use by personnel at Forzando Coal Mines;
- The approving authority for all manuals and policy is the Business Unit Manager;

- The Business Unit Manager has the authority to authorise to authorise relevant procedures and instructions arising from the development and maintenance of the ESMS upon advice from the Sustainability Manager, who will ensure that when changes are required to the system; the affected documents are updated and approved prior to issue thereof;
- All obsolete versions will be removed from point of use by the Environmental Practitioner;
- Master copies of all current procedures and instructions are retained by the Environmental Management Representative and controlled copies are issued by means of a Document Issue Register (QR 03);
- All procedures are subject to review within two years from the latest revision date;
- If no changes are required to be made this will be recorded accordingly and the last version will remain valid;
- Should any changes be made in the content of the procedures, this will be indicated in the revision section summarising any changes or inclusion made.
- All external documents reflecting critical data will be retained and registered on (QR 02) reflecting the latest version. These will be filed centrally by the Environmental Management Representative for use by personnel. Old versions will be identified as obsolete to prevent inadvertent use thereof;
- All forms in use at Forzando Coal Mines will be controlled by means of a number and revision. This will be reflected on a form's matrix (QR 04) for users to ensure that they are using the latest version. It is the responsibility of the users of the forms to ensure that only the latest versions are used. The Environmental Management Representative will be responsible to ensure that the latest forms are available for users;
- One copy of old forms will be retained for knowledge purposes and this will be identified as obsolete and kept by the Environmental Management Representative;
- All electronic data is stored onto the Main Server of which an automatic backup is conducted daily. This data is kept off site for protection purposes; and
- The records of all documented information derived from the implementation of this procedure is controlled in accordance with the requirements as defined in Procedure SOP 02.

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. Forzando Coal Mines has, therefore, developed and maintains a procedure (SOP02, titled "Control of Records" dated 04 July 2019,for the identification, storage, protection, retrieval, retention and disposal of records as part of the ESMS. Records must be legible, identifiable and traceable.

According to the SOP, all department heads are responsible to ensure that Environmental records are kept legible and readily identifiable and retrievable. A Records Matrix (QR 11) will be established and retained by the Environmental Management Representative, which reflects the identification, storage location, responsibility and retention period and disposal requirements for all records.

After the retention period of a record has elapsed, it will be disposed of in the correct manner. The disposal method will take into consideration the confidential nature of the contents of the record in question.

3.4 AUDITING AND REPORTING PROCEDURES

Forzando Coal Mines has developed an auditing procedure (SOP11) titled "Internal Audit Procedure" dated 29 August 2019to define the requirements for scheduling and conducting internal audits to verify the correct

implementation of the management system at Forzando Coal Mines. The SOP includes reporting of results, auditor competencies, corrective action and responsibilities of the audit process.

All monitoring and auditing must be accompanied by applicable records and evidence (e.g. delivery slips, photographic records, etc.) as per SOP02. All reports must be retained and made available for inspection by the Forzando Coal Mines 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;

An environmental non-conformance and incident corrective action plan must be prepared and maintained by the Mine Environmental practitioner throughout the lifespan of the mine in order to monitor environmental concerns, incidents, and non-conformances. The action plan must include details of date, description of the NC or Incident, root cause analysis , corrective action , date rectified, etc.

Non-compliance with the EMPr or any other environmental legislation, specifications or standards shall be recorded by the Mine Environmental Practitioner/ECO in the corrective action plan. This action plan shall be maintained by the Mine Environmental Practitioner and will be sent to Forzando Coal Mines/EM on a regular basis (at least quarterly), and Forzando Coal Mines/EM shall ensure that the responsible party takes the necessary corrective actions. Non-conformances may only be closed out in the action plan by the Mine Environmental Practitioner/Mine Environmental Specialist upon confirmation that adequate corrective action has been taken.

3.6 ENVIRONMENTAL INCIDENTS

Forzando Coal Mines has developed a procedure (SOP10) titled “Incidents, Non-conformance, Corrective and Preventative Action” dated 05 July 2019. The aim of the procedure is to define the requirements for dealing with all environmental incidents to ensure that these are quickly reported and dealt with to mitigate/reduce the effects if such incidents. This includes the recording of incidents for the future analysis of trends and for documenting of responsibilities for dealing with such incidents, which includes investigating the causes and taking corrective action to prevent the recurrence thereof.

The procedure is applicable to all Forzando Coal Mines operations as per the ISO system scope. The procedure provides for incident reporting, including:

- Internal incidents;
- Inspections;
- External complaints/concerns;
- Internal audits and non-conformance; and
- Follow-up and closure.

SOP10 also provides for other platforms that employees may use to report environmental non-conformance/incidents including HSE improvement reports, over inspections, environmental housekeeping reports and housekeeping audits. These reporting platforms are used by ground level employees up to top management.

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, Forzando Coal Mines 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 Forzando Coal Mines shall engage the Mine Environmental Specialist 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. The overall aim of the training will be to ensure that all site staff are informed of their relevant requirements and obligations pertaining to the relevant authorisations, licences, permits and the approved EMPr and protection of the environment.

The applicant must ensure that all relevant employees are trained and capable of carrying out their duties in an environmentally responsible and compliant manner and 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 applicant shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. All training must be formally recorded, and attendance registers retained. The environmental training should, as a minimum, include the following:

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

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

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 prepared by the Mine Environmental Practitioner. 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 Mine Environmental Specialist;

- Regular Environmental Toolbox Talks: Environmental toolbox talks will be prepared by the Mine Environmental Practitioner 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; and

- 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 Environmental Practitioner.

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

Forzando South Mine has developed an ESMS which is in line with the ISO 14001:2015 standard and 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

Forzando South Mine has identified potential emergencies and developed 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 Emergency Preparedness and Response Plan is based on a baseline Hazard and Risk Assessment and provides 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.

Forzando Coal Mines 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.

Forzando Coal Mines 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. Forzando Coal Mines 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. Forzando Coal Mines 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. Forzando Coal Mines 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 Forzando Coal Mines coordinate fire prevention efforts with local Fire Protection Agency (FPA).

3.7.3.2 HEALTH AND SAFETY

Forzando Coal Mines 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.

Forzando Coal Mines 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.

Forzando Coal Mines 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.

Forzando Coal Mines must ensure that all environmental accidents and incidents are recorded and reported to the Mine Environmental Practitioner/Mine Environmental Practitioner. Forzando Coal Mines 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. Forzando Coal Mines 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 Mine Environmental Practitioner (this requirement must be included in induction training);
- Take immediate action to contain or stop the spill where it is safe to do so;
- Contain the spill and prevent its further spread (e.g. earth berm or oil absorbent materials for spill to land or by deploying booms and/or absorbent material for a spill to water);
- Dispose of any contaminated soil or materials according to appropriate waste disposal procedure (waste from spills of hazardous materials shall be disposed of as hazardous waste at a suitably licensed waste disposal facility);
- The Mine Environmental Practitioner 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 Environmental Practitioner shall immediately inform the Environmental Specialist/EM. The Mine Environmental Specialist/Mine Environmental Practitioner shall record the incident in the non-conformance and corrective action plan and advise on the appropriate measures and timeframes for corrective action. Environmental incident reports shall be completed and submitted to the Mine Manger and Mine Environmental Practitioner/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 Forzando Coal Mines in consultation with the Environmental Specialist /EM.

Forzando Coal Mines 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.

Forzando Coal Mines 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 PCDs 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/or overburden dumps with adequate storm water runoff measures;
- Establish and maintain dirty and clean water systems in line with the regulatory requirements;
- 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 where practically possible;
- 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

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

Forzando Coal Mines has a SOP (No. 13) that describes the procedure for defining and documenting the roles and responsibilities of those involved in the ESMS, including the level of authority that may be associated with the role or responsibility. Table 4 provides the roles and responsibilities for environmental resources as identified in SOP 13.

Table 4: Roles and responsibilities for environmental resources on site

Environmental Resource	Key Responsibility	Tasks	Reporting
Business Unit Manager	Provide adequate resources for the implementation and maintenance of the ESMS.	• Assigning authority to achieve legal responsibility and environmental objectives. • Ensure that Forzando Coal Mines delivers necessary product and service of specified quantity and quality on time. • Delegating authority for the formulation and authorisation of environmental objectives and Policy to personnel responsible for achieving defined goals. • Monitoring of environmental regulatory compliance, environmental performance, aspects and strategic issues. • Understand and promotes environmental management within the commodity business. • Overall environmental performance of all Forzando Coal Mines operations, persons and visitors. • Ensuring sufficient resources are provided for the effective operations of the ESMS. • Authorisation of Environmental Policy. • Determine all managing structures with regards to ESMS. • Delegate responsibility and authority to key persons to ensure the co-operation of all activities relating to the successful operation of the ESMS of Forzando Coal Mines operations. • Will designate, appoint and/or assign tasks to persons who will be responsible for managing the ESMS. These persons shall accept the necessary authority to carry out their responsibility by way of standard appointment as formatted by the BU Manager and by the acceptance of their duties on the Key Performance Indicators.	Forzando Coal Mines Management Representatives

Environmental Resource	Key Responsibility	Tasks	Reporting
		• Ensuring that Management Review Meetings are carried out as documented. • Formulating the Environmental Policy and objectives. • Ensuring that all Stakeholders (I&APs) complaints receive the required attention in liaison with Forzando Coal Mines operations management team. • Authorising environmental management documentation i.e. procedures, instructions, etc. • Making all appointments (including Management Representatives).	
Department Managers/Head of Department	Overall responsibility for administering the activities relating to the environment of their departments.	• Ensuring the Forzando Coal Mines operations environmental objectives are met. • Review all incident reports relating to their department and ensure that corrective action recommendations from all incidents are implemented and their effectiveness evaluated. • Review all reports for site progress in relation to environmental performance i.e., audit findings, investigations, corrective and preventative action requests, meeting minutes, statistics, etc. • Be visible on site to inspect the workplace informally and formally; • Review operational procedures, determine aspects and impacts, objectives and Planning Actions. • Develop appropriate standards/procedures as part of a preventative program. • Review status of aspects and impacts and identification and the monitoring thereof. • Ensuring that all persons are suitably trained and possess the necessary skills to undertake their environmental responsibilities. • Implement all remedial action. • Participate in environmental meetings/programs. • Review the ESMS procedures in their respective areas of responsibility. • Review areas of concern identified by Sustainability Manager and Environmental Specialist. • Shall demonstrate visible and proactive leadership and commitment to achieve environmental excellence.	Business Unit Manager

Environmental Resource	Key Responsibility	Tasks	Reporting

		• Shall be accountable for:
		  o Environmental performance of their area of responsibility
		  o Develop, implement and continuous improvement of the ESMS
		  o Meeting the performance requirements of these standards and requirements
		• Shall monitor:
		  o Environmental performance
		  o Ethical business practices
		  o Socio-economic development of communities in which they operate
		  o Adherence to fundamental human right
		• Communicating and consulting with persons in their area of responsibility, changes made in the ESMS.	

Sustainability Manager	Overall responsibility for the ESMS and compliance with the requirements of ISO 14001:2015	• Ensuring that all commitment as specified in approved environmental authorisation are adhered to. • Reporting to management regarding any improvements that may be realised to ensure that sufficient resources are available to deal with environmental emergencies. • Actively promoting awareness of environmental issues at the mines and communicate the potential consequence of departure from established or adopted standards. • Reporting to BU regarding the performance of the ESMS. • Implementation of the ESMS and its review, modification and continual improvement. • Provides direction and support for the overall environmental performance of all personnel and contractor. • Liaise with Government officials when required. • Communicating relevant environmental matters with External Stakeholders. • Mine environmental objectives are met. • Manage the ESMS and report on the progress and performance. • Motivate personnel to pursue their individual roles within the ESMS.	Reports to Business unit Manager

Environmental Resource	Key Responsibility	Tasks	Reporting
		• Conduct site visits and audits to monitor the compliance with ESMS requirements. • The authority to investigate any problem relating to the ESMS. • Ensuring ESMS requirements are established, implemented and maintained in conjunction with IZO 14001:2015 standard with current compliance obligations. • Reporting on performance of ESMS to ensure continual review and improvement of the system. • Report on the implementation of corrective actions for significant environmental deficiencies. • Ensuring the promotion of awareness throughout the organisation. • Liaising with external parties on matters related to the ESMS. • Ensuring the effective handling of environmental complaints. • Investigating any problems related to, or any aspect of the MES. • Apply for relevant licence/ permits at environmental forums. • Chair Management review meetings and internal audit meetings.	
Environmental Specialist	Overall responsibility for environmental management at the mine and implementation of the ESMS.	• Setting department environmental objectives. • Developing appropriate SOPS and Risk /Aspect Assessments as part of a preventative program. • Ensuring the aspects are identified and persons are trained to handle these aspects effectively. • Implementing the ESMS. • Ensuring all personnel are suitably trained and possess the necessary skills to undertake their designated environmental responsibility. • Identifying training needs. • Implementing all agreed remedial actions. • Participating in incident investigations, audits, aspect identification and root-cause analysis. • Participating in environmental meetings and programs. • Reviewing the environmental performance and their respective departments.	Reports to Sustainability Manager

Environmental Resource	Key Responsibility	Tasks	Reporting
		• Inspecting the workplace informally and formally and implementing corrective actions where conditions which could cause an incident are identified.	
Environmental Practitioner	Responsible for actively supporting activities to meet the Forzando Coal Mines operations environmental objectives within their department.	• Undertaking duties specified by their letter of appointments. • Referring all environmental matters that cannot be resolved in the workplace or could result in an incident to either the Environmental Specialist or the Sustainability Manager. • Participating and co-ordinating environmental meetings and campaigns. • Stimulating a high level of environmental awareness at all times by providing information to persons on the management of environmental issues in the workplace. • Conduct inspections and actively participate in environmental meetings. • Ensure that ISO14001:2015 standard is implemented maintained and entrenched in their departments.	Reports to Environmental Specialist
Site Environmental Management Representatives /Site Contract Managers	Responsible for each area at the operations.	• Ensuring that the environmental policy is communicated to all employees. • Participate in the establishment of environmental objectives in their area. • Ensuring that all non-conformance and incidents in the area of their responsibility are reported and corrected. • Stimulate a high level of environmental awareness at all times by providing information to persons on the management of environmental issues in the workplace. • Participating in environmental audits when requested. • Ensuring that employees are trained in environmental procedures pertaining to their jobs. • Ensuring compliance to mine-wide specific environmental procedures. • Ensure that environmental objective is set an evaluated. • Actively support activities to meet Forzando Coal Mines operations ESMS objectives • Ensuring communication on the importance of effective environmental management and conforming to the ESMS requirements.	Reports to Environmental Specialist

Environmental Resource	Key Responsibility	Tasks	Reporting
		• Directing and supporting employees to contribute to the effectiveness of the ESMS. • Identification of activities that have or potentially may have a negative impact on the environment and ensuring that corrective or preventative measures are implemented. • Assist the Environmental Department in the implementation, coordination and maintenance of the ISO 14001:2015 standard and environmental standards.	
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

Forzando Coal Mines has an internal audit SOP (SOP11). 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. The aim of the procedure is to define the requirements for scheduling and conducting internal audits in order to verify the correct implementation of the ESMS. This includes reporting or results, auditor competencies, corrective action and responsibilities for the correct implementation of the audit process.

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 Mine Environmental Practitioner, the Forzando Coal Mines and /or the relevant Competent Authorities. All reports shall be signed by the relevant parties to ensure accountability. Forzando South Mine 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
Sustainability Manager	ESMS Procedures	Yes	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	EMP/EMPr's	Yes	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	IWULA	Yes	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	NEMA EA	Yes	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
	Other Licences, Permits or Approvals	Yes	As Required	Yes	Report Review	As Required	Mine Management	Board Report	As Required
Mine Environmental Practitioner	ESMS Procedures	Yes	Weekly	Yes	Site Inspection	Weekly	Environmental Specialist	Report	Monthly
	EMP/EMPr's	Yes	Weekly	Yes	Site Inspection	Weekly	Environmental Specialist	Report	Monthly
	IWULA	Yes	Weekly	Yes	Site Inspection	Weekly	Environmental Specialist	Report	Monthly
	NEMA EA	Yes	Weekly	Yes	Site Inspection	Weekly	Environmental Specialist	Report	Monthly
	Other Licences, Permits or Approvals	Yes	Weekly	Yes	Site Inspection	Weekly	Environmental Specialist	Report	Monthly

Resource	Document	Implementation		Checking/Monitoring/Audit			Reporting		
		Responsible Party	Frequency	Responsible Party	Type	Frequency	To	Type	Frequency
Mine Environmental Specialist	ESMS Procedures	No	-	Yes	Sample Audit	As Required	Sustainability Manager	Audit Report	As Required
	EMP/EMPr's	No	-	Yes	Sample Audit	As Required	Sustainability Manager	Audit Report	As Required
	IWULA	No	-	Yes	Sample Audit	As Required	Sustainability Manager	Audit Report	As Required
	NEMA EA	No	-	Yes	Sample Audit	As Required	Sustainability Manager	Audit Report t	As Required
	Other Licences, Permits or Approvals	No	-	Yes	Sample Audit	As Required	Sustainability Manager	Audit Report	As Required
Independent Environmental Auditor	ESMS Procedures	No	-	No					
	EMP/EMPr's	No	-	Yes	Performance Assessment	Annual	Environmental Specialist		Annual
	IWULA	No	-	Yes	Audit	Annual	Environmental Specialist		Annual
	NEMA EA	No	-	Yes	Audit	Annual	Environmental Specialist		Annual
	Other Licences, Permits or Approvals	No	-	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 Environmental Practitioner and must aim to monitor and report on-site environmental performance;
- Monthly Environmental Compliance Reports: These reports must be undertaken by the mine Environmental Practitioner and must aim to monitor and report on compliance with the requirements of the relevant authorisations. licences and permits, the approved EMPr; and
- Annual Environmental Management Review Reports : The Mine Environmental Practitioner must compile annual reports presented to management for review and correction of non-compliance issues. It is the responsibility of the Mine Environmental Practitioner 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	Weekly inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Environmental Specialist	As Required
		Site Inspections and Audits	Environmental Practitioner	Weekly inspections
				Monthly Reports
			Independent Environmental Auditor	Annual Performance Assessment
Underground Mining	All Impacts Identified during the EIA	Site Inspections and checklists	Environmental Practitioner	Regular inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Environmental Specialist	As Required
		Site Inspections and Audits	Environmental Practitioner	Weekly inspections
				Monthly Reports
			Independent Environmental Auditor	Annual Performance Assessment
Decommissioning Activities		Site Inspections and checklists	Environmental Practitioner	Regular inspections and checklists

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

4.5 THE EMPR PERFORMANCE ASSESSMENT

According to Regulation 55 of the MPDRA regulations compliance with the EMPr must be monitored on a continuous basis. This requirement shall be accomplished through the continuous monitoring of compliance undertaken by the Mine Environmental Practitioner and independent auditor (when relevant). The performance assessment will focus on the following Key Aspects:

- Compliance with the Approved EMPr;
- Compliance with the approved SLP; and
- Appropriateness and validity (technical content) of the EMPr.

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

1) *"The holder of an environmental authorisation must, for the period during which the environmental authorisation and EMPr, and where applicable the closure plan, remain valid-*
   (a) Ensure that the compliance with the conditions of the environmental authorisation and the EMPr, and where applicable the closure plan, is audited; and
   (b) Submit an environmental audit report to the relevant competent authority.
2) *The environmental audit report contemplated in sub-regulation (1) must-*
   (a) be prepared by an independent person with the relevant environmental auditing expertise;
   (b) provide verifiable findings, in a structured and systematic manner, on
      i) The level of performance against and compliance of an organisation or project with the provisions of the requisite environmental authorisation or EMPr and, where applicable, the closure plan; and
      ii) The ability of the measures contained in the EMPr, and where applicable the closure plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
   (c) Contain the information set out in Appendix 7; and
   (d) Be conducted and submitted to the competent authority at intervals as indicated in the environmental authorisation".

An EMPr performance assessment audit report shall be submitted to the Department of Mineral Resources (DMR) on an annual basis (each year of mining and before applying for closure). The holder of the mining right must appoint an independent qualified person for the monitoring and to compile a report, 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. monitoring 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 (adequacy of the EMPr) and how it can be rectified.

Annual EMPr performance assessment reports are currently being conducted for the Forzando South mine.

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. Since this is a mining project, the overarching legislation is the MPRDA, and it is important to note that in accordance with Section 102 of the MPRDA, no EMPr may be amended or varied without the written consent of the minister. It should also be noted that in terms of the 2014 NEMA EIA Regulations (as amended)., no EMPr may be amended or varied without the written consent of the minister. It is, however, also important to consider that the EMPr is a dynamic document which may require such alteration and /or amendment as the project evolves. Conditions under which the EMPr would require revision include:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater intensity, extent and significance than predicted;
- Inadequate mitigation measures (i.e. where environmental performance does not meet the required level despite the implementation of the mitigation measure); and
- Secondary impacts occur as a result of the mitigation measures.

Forzando Coal Mines in consultation with the Mine Environmental Practitioner 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 Forzando Coal Mines/Mine Manager to ensure that all personnel are performing according to the requirements of the relevant procedures and to initiate the revision of controlled documents, when required by changes in process or operations and shall notify the Mine Environmental Practitioner of such changes.

It is recommended that a risk assessment protocol must be developed and implemented by the Mine Environmental Practitioner 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 Forzando South and the proposed Kalabasfontein 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
1.	• **General Surface Rehabilitation** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	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
2.	• **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Storm water management** • **Ventilation shaft**	Altered drainage patterns	Topography and Landform	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Control through proper soil management procedures	• Rehabilitation and closure plan • DWS best practice Guidelines

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Water management Infrastructure construction**					
3.	• **Underground mining** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Water management Infrastructure construction**	Soil surface change through subsidence	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.
4.	• **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Powerline**	Erosion and sedimentation	Soils	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Avoid and control through preventative measures (Soil placement, storm water infrastructure, erosion control structures)	Principles of the Conservations of Agricultural Resources Act (CARA)

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Permanent site office Infrastructure** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**					
5.	• **Infrastructure removal** • **Mine area site preparation** • **Powerline** • **Post Closure Monitoring and Maintenance** • **Permanent site office Infrastructure** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**	Soil compaction	Soils	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through implementation of EMPr mitigation measures • Remedy through application of treatment measures (e.g. ripping)	• Principles of CARA • Rehabilitation and Closure Plan • Ripping to 30cm where soil depth permits
6.	• **General decommissioning activities** • **General Surface Rehabilitation**	Soil Pollution/Contamination	Soils	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through preventative measures (e.g. bunding, spill kits) • Remedy through clean-up and waste disposal	• Hazardous Substances Act • NWA • NEMA Duty of Care • NEMWA

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Re-vegetation** • **Permanent site office Infrastructure** • **Storm water management** • **Ventilation Shaft** • **Water management Infrastructure construction**				• Modify through soil treatment if required	• Incident reporting procedures • DWS minimum standards for waste disposal
7.	• **General Surface Rehabilitation** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure**	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
	• **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**					
8.	• **General Surface Rehabilitation** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**	Loss of soil resource and its utilisation potential	Land Capability	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through preventative measures (e.g. limit area of disturbance) • Remedy through soil remediation if required (e.g. fertilizer and Organic Matter applications)	• CARA • Rehabilitation and Closure Plan

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
9.	• **Infrastructure removal** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	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 • Control through implementation of ESMS	• Stakeholder Engagement Plan • Rehabilitation and Closure Plan • Grievance Mechanism
10.	• **General Surface Rehabilitation** • **Infrastructure removal** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Powerline** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**	Interference with existing land uses	Land Use	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through implementation of EMPr mitigation measures (e.g. communication with landowners) • Control through implementation of ESMS	• Stakeholder Engagement Plan • Rehabilitation and Closure Plan • Grievance Mechanism
11.	• **General Surface Rehabilitation** • **Maintenance and operation of site**	Direct and indirect mortality of flora and fauna	Fauna and Flora	• Planning and Design • Construction	• Control through implementation of EMPr mitigation measures (e.g.	• NEMBA • TOPS

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	infrastructure and facilities • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Permanent site office Infrastructure** • **Site visits** • **Storm water management** • **Water management Infrastructure construction**			• Operation • Decommissioning • Rehabilitation and Closure	limit area of disturbance, training) • Avoid/Stop through relocation of threatened or protected species • Control through implementation of ESMS	
12.	• **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Storm water management** • **Water management Infrastructure construction**	Habitat fragmentation and blockage of seasonal and dispersal movements	Fauna and Flora	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. shape of disturbed areas, maintaining corridors)	NEMBA

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
13.	• **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Permanent site office Infrastructure** • **Powerline** • **Site visits** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**	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
14.	• **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation**	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)	• NWA • GN704 • NEMA Duty of Care • NEMA Polluter Pays Principle

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Post Closure Monitoring and Maintenance** • **Re-vegetation** • **Permanent site office Infrastructure** • **Ventilation shaft** • **Water management Infrastructure construction**				• Control through implementation of mitigation measures (water treatment when required)	• DWS best practice guidelines
15.	• **Maintenance and operation of site infrastructure and facilities** • **Water management Infrastructure construction**	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.
16.	• **General Surface Rehabilitation** • **Storm water management**	Dewatering of groundwater aquifers and decrease in groundwater quantity/ availability.	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
17.	• **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,	• NWA • GN704 • NEMA Duty of Care

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

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
20.	• **Maintenance and operation of site infrastructure and facilities** • **Permanent site office Infrastructure** • **Powerline** • **Ventilation shaft** • **Water management Infrastructure construction**	Loss and disturbance of wetland habitat	Wetlands	• Construction • Operation • Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. wetland delineation and mine planning, limitation area of wetland disturbance – i.e.: avoid wetlands and wetland buffer areas) Remedy/modify through wetland rehabilitation	• NWA • GN704 • NEMA Duty of Care • NEMA Polluter Pays Principle • DWS best practice guidelines • Rehabilitation and closure plan
21.	• **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
22.	• **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

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
						• MHSA • NEMA Duty of Care • NEMA Polluter Pays Principle • NEMWA • Incident reporting procedures • WS minimum standards for waste disposal
23.	• **General decommissioning activities** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Re-vegetation** • **Permanent site office Infrastructure**	Hydrocarbon spills/ contamination	Environmental Pollution	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through preventative measures (e.g. bunding, spill kits) • Remedy through clean-up and waste disposal • Modify through soil treatment if required	• Hazardous Substances Act • NWA • MSDS • OHSA • MHSA • NEMA Duty of Care • NEMWA • Incident reporting procedures • DWS minimum standards for waste disposal

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**					
24.	• **General decommissioning activities** • **Maintenance and operation of site infrastructure and facilities** • **Underground mining** • **Permanent site office Infrastructure**	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
25.	• **Underground 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
26.	• **Mine area site preparation** • **Permanent site office Infrastructure** • **Ventilation shaft**	Destruction/ damage of palaeontological resources	Heritage	• Construction • Operation • Rehabilitation and Closure	• Avoid and control through implementation of preventative measures (e.g. Palaeontological site visit and training, watching brief) • Modify through removal and curation of fossils	• NEMA • MPRDA • NHRA • SAHRA permitting requirements

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Water management Infrastructure construction** • **Underground mining**					
27.	• **General Surface Rehabilitation** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Powerline** • **Storm water management** • **Water management Infrastructure construction**	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
28.	• **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 • ESMS • MHSA • OHSA • Code of Conduct
29.	• **General Construction Management** • **General Mine Management**	Influx of migrant workers	Social	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoidance and control through mitigation measures (e.g. recruitment procedure, grievance mechanism) • Control through implementation of ESMS	• Labour Act • Basic Conditions of Employment Act • SLP Commitments

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Mine area site preparation** •				and stakeholder engagement plan	
30.	• **General Construction Management** • **General Mine Management** • **Permanent site office Infrastructure**	Loss of sense of place	Social	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Modify through reduction of visual impact	• Rehabilitation and Closure Plan • ESMS
31.	• **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
32.	• **General Construction Management** • **General Mine Management** • **Maintenance and operation of site infrastructure and facilities**	Social vices	Social	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoidance and control through mitigation measures (e.g. recruitment procedure, grievance mechanism, code of conduct) • Control through implementation of ESMS and stakeholder engagement plan	• Labour Act • Basic Conditions of Employment Act • SLP Commitments • Code of Conduct • Livelihood restoration plan
33.	• **General Construction Management** • **General Mine Management**	Economic growth	Socio-Economic	• Construction • Operation • Decommissioning	Maximise through optimisation of economic growth opportunities	SLP Commitments

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
				• Rehabilitation and Closure		
34.	• **General Construction Management** • **General Mine Management**	Education, Skills Development and Training	Socio-Economic	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	Maximise skills development and training through implementation of SLP	SLP Commitments
35.	• **General Construction Management** • **General decommissioning activities** • **General Mine Management** • **Maintenance and operation of site infrastructure and facilities** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	Employment Opportunities	Socio-Economic	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	Maximise employment opportunities through implementation of SLP	SLP Commitments
36.	• **General Construction Management**	Loss of jobs and economic opportunities	Socio-Economic	• Construction • Operation • Decommissioning	• Minimise impacts of job loss through skills development and livelihood restoration	SLP Commitments

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **General Mine Management**			• Rehabilitation and Closure		
37.	• **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
38.	• **Underground mining**	Coal supply for energy security	Socio-Economic	Operation	Maximise security of coal supply through sound and responsible mine management	• Legal register • SLP Commitments • ESMS
39.	• **General Construction Management** • **General decommissioning activities** • **General Mine Management** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Re-vegetation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	Community health and safety	Health and Safety	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoidance and control through preventative measures (e.g. HIV/AIDS awareness) • Remedy through application of mitigation measures in EMP	• OHSA • MHSA • SLP Commitments • Grievance Mechanism

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
40.	• **General Construction Management** • **General decommissioning activities** • **General Mine Management** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Re-vegetation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	Health impacts	Health and Safety	• Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoidance and control through preventative measures (e.g. HIV/AIDS awareness) • Remedy through application of mitigation measures in EMP	• OHSA • MHSA • SLP Commitments • Grievance Mechanism
41.	• **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure**	Fire and explosion hazard	Health and Safety	• Construction • Operation • Rehabilitation and Closure	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
42.	• **Mine area site preparation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	Damage to road infrastructure	Transportation, Infrastructure and Traffic	• Construction • Operation • Decommissioning	Avoid and control through implementation of EMPr mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	• National Road Traffic Act • OHSA • MHSA
43.	• **Mine area site preparation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction**	Increased traffic	Transportation, Infrastructure and Traffic	• Construction • Operation	Avoid and control through implementation of EMPr mitigation measures (e.g. speed limit enforcement, vehicle maintenance)	• National Road Traffic Act • OHSA • MHSA
44.	• **Mine area site preparation**	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
45.	• **General Surface Rehabilitation** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Powerline** • **Storm water management** • **Ventilation shaft**	Visual impact of mine infrastructure, stockpiles and dust	Visual	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. dust suppression, mine planning and progressive rehabilitation)	• Rehabilitation and Closure Plan • Final land use objectives

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Water management Infrastructure construction**					
46.	• **General decommissioning activities** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Re-vegetation** • **Permanent site office Infrastructure** • **Water management Infrastructure construction** • **General Surface Rehabilitation** • **Storm water management**	Greenhouse gas emissions	Air Quality	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. vehicle maintenance, progressive rehabilitation)	NEMAQA
47.	• **Drilling monitoring boreholes** • **General decommissioning activities** • **General Surface Rehabilitation**	Fugitive emissions (Dust)	Air Quality	• Planning and Design • Construction • Operation • Decommissioning	• 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

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Infrastructure removal** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Re-vegetation** • **Permanent site office Infrastructure** • **Storm water management** • **Water management Infrastructure construction**			• Rehabilitation and Closure		
48.	• **Drilling monitoring boreholes** • **General decommissioning activities** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Re-vegetation**	Disturbing and/or nuisance noise	Noise	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	• Avoid through preventative measures (e.g. communication with landowners, timing of activities) • Control through implementation of EMPr mitigation measures (e.g. Noise abatement measures)	• ECA noise regulations • SANS 10103 • OHSA • MHSA

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
	• **Permanent site office Infrastructure** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**					
49.	• **Underground mining**	Ground Vibration and human perception	Blasting and Vibration	Operation	Avoid and control through implementation of preventative measures (e.g. blast procedures, monitoring, communication with landowners, emergency response procedures)	• Explosives Act • MHSA • OHSA • MPRDA • United States Bureau of Mines (USBM) criteria for safe blasting for ground vibration and recommendations on air blast • Blast Procedures • Emergency response procedure
50.	• **Underground 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

#	Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
						recommendations on air blast • Blast Procedures • Emergency response procedure
51.	• **Underground 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

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 maintain the ESMS. The ESMS should include and provide for the following as a minimum: • HSE 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
	• 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
	• Planning and Design • Construction	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 Environmental Representative 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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	• Operation Decommissioning Rehabilitation and Closure				
	• 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
	• Planning and Design • Construction • Operation • Decommissioning Rehabilitation and Closure	No direct physical disturbance	The mine shall ensure that all sub-contractors (if utilised) abide by the requirements of the EMPr.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
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 maintain 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)	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
			• Periodic training/ awareness to ensure effective response; and • Periodic review and revision, as necessary, to reflect changing conditions.		
	• 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					
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
	• 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	Speed limits on the road to the mine must be enforced.	OHS and MHSA	Throughout LoM
	• Construction • Operation	Health and safety risks are classified as high significance	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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	• Decommissioning • Rehabilitation and Closure	due to the value of human life			
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life	The mine shall undertake safety audits to ensure compliance with the; • Occupational Health and Safety Act (Act No. 85 of 1993) and associated regulations; and • Mine Health and Safety Act (Act 29 of 1996) as amended and associated regulations.	OHS and MHSA	Throughout LoM
	• 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 continue implementing the safety reporting procedure to ensure that all accidents and incidents (safety and environmental) are recorded and reported to the Mine manager and Mine Environmental Practitioner.	OHS and MHSA	Throughout LoM
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Health risks are classified as high significance due to the value of human life	The mine shall maintain 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
	• 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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Site Access and Security					
General Mine Management	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Security risks can have a highly significant impact although localized	On-site vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site 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
	• Construction • Operation	The creation of roads can have a significant and relatively widespread impact, especially as roads create corridors	Any new access (if required and withing the confines of relevant environmental legislation) shall first be approved by the Business Unit Manager and Mine Environmental Practitioner (method statement may be required) and should be provided with erosion and silt pollution prevention measures where required.	OHS and MHSA	Throughout LoM
	• 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.	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 site induction which shall include basic environmental awareness and site-specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures).	NEMA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Social and Socio-Economic					
General Mine Management	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	The mine shall implement a recruitment policy that allows equal opportunity to all people (woman, disabled) and give preference to local labour from the local community where possible.	Adherence to corporate policies (e.g.: SLP) and compliance with legislation including Labour Act and Employment Act	Throughout LoM
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	The stakeholder engagement plan will assist Forzando Coal Mines to outline their approach towards communicating in the most efficient way possible with stakeholders throughout the life of the project. The plan 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
	• 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
	• Planning • Construction • Operation • Decommissioning	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	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	• Rehabilitation and Closure			SLP Commitments	
	• 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
	• 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
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	The mine shall maintain and continue implementing the Stakeholder Engagement Plan in consultation with a suitably qualified specialist.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
	• Planning • Construction • Operation	No direct physical disturbance	The community liaison practitioner/specialist shall communicate frequently with the affected stakeholders to ensure that they understand the processes and do not develop more unrealistic expectations.	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
	• Decommissioning • Rehabilitation and Closure				
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	The mine shall continue implementing the detailed grievance mechanism for communities to lodge concerns, suggestions and grievances which can be dealt with by the Project in a timely manner. The grievance mechanism aims to accomplish the following objectives; • Receive and register external communications from the public; • Screen and assess the issues raised and determine how to address them; • Identify roles and responsibilities relating to the reporting, recording and addressing of grievances; • Maintenance of a grievance register to record and track, and document responses and actions taken to address grievances; • Reporting of grievances to DMR; and • Adjust the management program, as appropriate. The community must be informed that they can complain about unsafe behaviour through the grievance mechanism	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	A complaints 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), • Agreed corrective action, • Responsible party for corrective action,	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
			• Status of grievance (open, closed-out, awaiting feedback etc.). The grievance mechanism must be communicated to all stakeholders and communities.		
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	Employees should be sourced from the local area where possible.	Adherence to corporate policies and compliance with legislation including Labour Act and Employment Act SLP Commitments	Throughout LoM
	• 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.	SLP	Throughout LoM
	• 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
	• Planning • Construction • Operation • Decommissioning • Rehabilitation and Closure	No direct physical disturbance	The mine should establish relationships with the surrounding commercial farmers as per the Stakeholder Policy (POL 07) and sharing of environmental data when requested to keep the farmers informed . All meetings should be recorded, and records must be included in the communication register.	Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
	• Planning • Construction	No direct physical disturbance	Stakeholder Engagement should continue throughout the life of the mine to ensure local communities are kept informed and allowed to	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		raise issues. These issues will then be addressed through the grievance mechanism.	compliance with the regulatory framework	
	Operation	No direct physical disturbance	Where retrenchments are unavoidable, they should be managed humanely according to legislative requirements.		When retrenchments are required
Site Establishment					
• **Construction camp sewage management** • **Dust suppression** • **Earthworks** • **Fencing** • **Fuel Storage and refuelling** • **Hazardous substances management** • **Site security** • **Soil Management** • **Truck and heavy machinery operation**	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.	• Shall adhere to the ESMS developed to ensure compliance with the regulatory framework • OHSA • MHSA • NEMA • MPRDA	Throughout construction
			All construction and/or site camps shall be enclosed with a fence. The mesh size should be small enough for the fence to act as a catch net for blown debris and as a demarcation of the site. The fence shall be maintained as required to ensure access control remains effective. All temporary fences erected by the Mine shall be removed and the site restored on completion of construction, unless otherwise agreed in writing with Forzando Coal Mines.		
			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.		
			The waste storage area must continue to provide for appropriate and adequate waste storage and waste separation for recycling. All		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Utilization of portable toilets and generation of sewage** • **Vegetation clearance**			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 or roofed lined areas to prevent the possibility of spillages.		
			All fuel storage areas shall be bunded to contain at least 110 % of the volume stored and will comply with the relevant safety regulations. Fuel storage areas may not be located within 100m of 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 may smoke or take part in any activity that may result 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 Mine Environmental Practitioner and Mine Environmental Specialist and		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			within a designated structure designed for that purpose. In such cases firefighting equipment must be readily available near the fireplace and an appropriate safety representative should be present at all times during burning of the fire. All fires shall be fully extinguished after use.		
Flora					
• **Drilling monitoring boreholes** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Permanent site office Infrastructure** • **Powerline** • **Site visits**	• Planning and Design • Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	• Weeds and invader plants will be controlled in the manner prescribed in the Alien Management Plan, • 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
		Impacts on red data species has a very high significance	All Red Data Plants within the proposed powerline, roads and all other infrastructure areas should be transplanted and relocated within either a nursery or any neighbouring piece of land where it can be conserved until rehabilitation can take place. These species can either be replanted during the rehabilitation process or left in their new location if this is not to be disturbed in future.	• NEMBA • Threatened or Protected Species (TOPS) regulations • National Forests Act • DAFF permitting requirements	Prior to commencement of activities or disturbance
		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	• NEMBA • TOPS regulations	Prior to commencement

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Storm water management** • **Ventilation Shaft** • **Water management** • **Infrastructure construction**			maintain a seed bank. Limit activity to area of disturbance and revegetate impacted areas as soon as possible.	• National Forests Act • DAFF permitting requirements	of activities or disturbance
		Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	• Limit the vegetation disturbance to the designated areas only and the legal minimum requirement width for road and powerline servitudes is strictly adhered to. Where possible locate activities on the boundaries of existing disturbance. Use existing access roads as much as possible and rehabilitate disturbed areas as soon as possible • No unnecessary clearing of vegetation will take place, to enable seeds from undisturbed areas to move into disturbed area through natural processes of succession.	NEMA	Throughout LoM
			• Bush clearing of all bushes and trees taller than one meter that may be obstacles to the operational efforts should take place. The remaining vegetation must then be stripped with the topsoil to retain a more effective seedbank as well as giving the stockpiles soil better organic matter content and chance to re-vegetate itself. • Place the cleared vegetation were the topsoil stockpiles are to be placed. Cleared trees could be placed in separate stockpiles and allowed to decompose, these could then be used later as a type of compost to assist in the rehabilitation effort. Using the vegetation as cover on the stockpiles is also an acceptable option only if there is no alien vegetation present. However, if the grass is stripped with the topsoil layer there will be an increase organic matter content and seed bank reserve within the topsoil layer, which will dramatically improve rehabilitation efforts and possible save on re-seeding and lengthy monitoring programs.	• NEMA • CARA	
			The harvesting of plants by construction and mine workers is prohibited on site. This includes the harvesting of plants for	NEMA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			firewood, construction material, the making of crafts and medicinal purposes.		
			It should be made an offence for any staff to bring any plant species into any portion of the project site, including offices. No plant species whether indigenous or exotic should be brought into the project area, to prevent the spread of exotic or invasive species.		
			Damage or harm to threatened plant species is illegal in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004). Threatened species are defined in terms of the most recent Red Data list of Southern African Plants. Employees and workers shall be educated with regards to any potential threatened species that may be encountered on site and shall take the necessary actions to prevent of harm to any such species found on site.	• NEMBA • TOPS regulations • National Forests Act • DAFF permitting requirements	
			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	
			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	
			Alien species removal must take place in an appropriate manner, which includes: • Avoid disturbance to the soil.	• NEMA • NEMBA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Use an appropriate control for each species. Some species may require manual and herbicide control. Areas of indigenous vegetation should be delineated, and rehabilitation measures implemented in areas where the indigenous community is still present but degraded;	• CARA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
Fauna					
• **Drilling monitoring boreholes** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Permanent site office Infrastructure** • **Powerline** • **Site visits**	• 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
		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 management procedures in place to ensure decreased contact with humans. A waste management procedure 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
		Impacts on sensitive landscapes have the potential to be a relatively high significance with widespread effects.	The destruction of sensitive landscape features shall be avoided where possible and otherwise minimised through effective planning. In areas where the destruction cannot be avoided, these features should be re-introduced in the post mining landscape.	In accordance with Rehabilitation and closure plan	During construction and operation
		Impacts on fauna has the potential to	No construction workers or mine employees may disturb, hunt, set traps/snares, utilise dead or alive fauna/livestock/wildlife/fish. This	• NEMA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Storm water management** • **Ventilation shaft** • **Water management** • **Infrastructure construction** • **Power line**		be a relatively high significance especially where threatened or protected species are impacted upon.	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.	• NEMBA • CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Ensure that heavy vehicle traffic is limited to daylight hours only. Ensure that speed limits are enforced	• NEMA • NEMBA • CARA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Any animals found within excavations should be carefully returned without harm to an adjacent area away from potential harm, but preferably not further than 200m away from where it was found unless otherwise agreed to by the Mine Environmental Specialist.	• NEMA • NEMBA • CARA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	The Mine shall ensure that any snakes discovered in excavated areas, on or near the construction site are not killed or otherwise harassed. The Mine Environmental Practitioner must be notified should a snake be found on or near the site. The Mine Environmental Practitioner will be responsible to ensure that an appropriately skilled person is summoned to remove the snake from the site for relocation to a suitable nearby location.	• NEMA • NEMBA • CARA • 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
		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.	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	Any red data species recorded within the areas that will be cleared for the ventilation shaft and powerline pole areas should be relocated within re- vegetated areas where a good vegetation cover has been established. The mine must ensure relevant permits are in place if any threatened or protected species are relocated. Conduct a protected fauna species survey prior to commencement and relocate species where possible or required.	• NEMA • NEMBA • CARA Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon	No person should wilfully disturb the movement of any mammals, birds, amphibians, insects or reptiles on the mine site.	• NEMA • NEMBA • CARA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or	Where the proposed powerline crosses wetland areas (if it is unavoidable to do so otherwise), appropriate bird mitigation measures should be put in place to avoid bird collisions and direct impacts to the infrastructure. This includes the use of 'bird-flappers' and bird-friendly powerline structures	• NEMA • NEMBA • CARA • Shall adhere to the ESMS developed to ensure	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		protected species are impacted upon		compliance with the regulatory framework	
		Impacts on fauna has the potential to be a relatively high significance especially where threatened or protected species are impacted upon.	No domestic animals are to be allowed into the project area under any circumstances, especially any dogs and cats.	• NEMA • NEMBA • CARA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework.	
Soils and Agriculture					
• **Decommissioning Mine Infrastructure** • **Drilling monitoring boreholes** • **General decommissioning activities** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site**	• 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 use and land capability.	Soils must be stripped from the area of activity. Topsoil and subsoil 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
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	• To the greatest extent possible topsoil shall only be handled twice, only-once during the initial stripping of topsoil and a second time to replace it. • Areas that are stripped should be optimised to limit unnecessary stripping. Storm water from upslope of the stripped areas should be diverted around these areas to limit the amount of storm water flowing over these areas. The timing of the topsoil stripping should be optimised to limit the time between stripping and construction/mining/deposition.	• CARA • NEMA • 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 and facilities • **Mine area site preparation** • **Underground mining** • **Powerline** • **Post Closure Monitoring and Maintenance** • **Re-vegetation** • **Permanent site office Infrastructure** • **Storm water management** • **Ventilation Shaft** • **Water management Infrastructure construction**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	• Place the above cleared vegetation where the topsoil stockpiles are to be placed. Strip the topsoil and the remaining vegetation as per the rehabilitation guideline and place in the allocated locations for the various soil types, on top of the previously cleared bushes and trees.	• CARA • NEMA • In accordance with Rehabilitation and closure plan	Throughout LoM
	• Construction • Operation	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	• Areas for stripping need to be delineated and stripping will only occur where soils are to be disturbed by activities that are described in the design report, and where a clearly defined end rehabilitation use for the stripped soil has been identified.	• CARA • NEMA • In accordance with Rehabilitation and closure plan	Throughout LoM
	• Construction • Operation	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	• Topsoil and sub-soil stockpiles must be located such that the potential for erosion is minimised. Areas with existing erosion and stability issues must be avoided. If erosion occurs, corrective actions (erosion berms etc.) must be taken to minimize any further erosion from taking place. • If erosion has occurred, topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion. Only the designated access routes are to be used to reduce any unnecessary compaction. Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated. Implement land rehabilitation measures as defined in rehabilitation report.	• CARA • NEMA • GN704 • In accordance with Rehabilitation and closure plan	Throughout LoM
	• Construction • Operation • Decommissioning	Impacts on soils can have significant impact both in terms of severity and scale. Impacts	• There must be no contamination of topsoil. Prevent any spills from occurring. Machines must be parked within concreted/hard park 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
	• Rehabilitation and Closure	on soil can in turn affect land use and land capability.			
		Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	Topsoil stockpiles are to be kept to a maximum height of 4m.	• MPRDA • CARA	Throughout LoM
		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 Mine Environmental Specialist.	• NEMBA • NEMA	Throughout LoM
		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 as per the hydrocarbon management procedure. 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
		Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn	• Accidental hydrocarbon spillages should be reported immediately, and then the affected soil should be removed, and rehabilitated or if this is not possible, disposed of at a waste site designated to accept such waste.	• NEMWA • DWS minimum requirement for waste disposal	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		affect land use and land capability.			
		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					
• **General Mine activities**	• 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					
• **General Mine activities**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Small scale and localised	Any equipment that may leak, and does not have to be transported regularly, shall be placed on 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.	• NEMA Polluter Pays Principle • NEMA Duty of Care • NEMA • NWA • OHSA • MHSA Shall adhere to the ESMS developed to ensure	Throughout operations
	• Construction		Servicing and maintenance of vehicles may only take place in the workshop area (subject to suitable spill prevention and containment measures). The workshop area should be lined with		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	• Operation • Decommissioning		concrete or alternatively plastic under gravel. If emergency repairs are required elsewhere on site, this shall be undertaken with the necessary spill prevention measures in place.	compliance with the regulatory framework	
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		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,		
	• Construction • Operation		• 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 spillages will then be removed and recycled or disposed of responsibly.		
		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	• NEMA Polluter Pays Principle • NEMA Duty of Care • NEMA	Throughout operations Throughout operations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			results in sparks in the vicinity of fuels and other flammable substances to prevent ignition.	• NWA • OHSA • MHSA • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework • NEMWA • DWS minimum requirement for waste disposal	
		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.		
		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.		
		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
		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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		Small scale and localised	The Mine Environmental Practitioner shall maintain a list of all hazardous materials that would be present on site and where they are kept. 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 infrastructure and facilities** • **Permanent site office Infrastructure** • **Powerline** • **Ventilation shaft** • **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, waste separation, 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
			The mine shall implement a waste management procedure for the Mine which complies with the principles of the NEMWA and provides a mechanism for the effective management of waste throughout the LoM.	• NEMWA • NEMA cradle to grave • DWS minimum requirement for waste disposal • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout operations
			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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Underground mining** • **Maintenance and operation of site infrastructure and facilities** • **General decommissioning activities** • **Infrastructure removal** • **Decommissioning**			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
			Littering shall be strictly prohibited. The site shall remain in a neat and tidy condition at all times.	• NEMWA • NEMA cradle to grave	Throughout operations
			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
			The mine will implement the 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
			The mine will implement the 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					
• **Permanent site office Infrastructure** • **Powerline** • **Ventilation shaft** • **Water management Infrastructure construction**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Sewage has the potential to result in localized impacts of low to medium significance	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.	• NEMWA • NWA • NEMA cradle to grave	Throughout operations
			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		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **General Construction** • **Mine area site preparation** • **General Mine Management** • **Underground mining** • **Maintenance and operation of site infrastructure and facilities** • **General decommissioning activities** • **Infrastructure removal**			systems be allowed. Septic tanks are permitted on condition that they are closed units and are serviced regularly to prevent overflows. 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. 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** • **Infrastructure removal** • **Maintenance and operation**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Noise has the potential to result in significant impacts to sensitive receptors at a small to medium scale	The mine shall take reasonable measures to limit exceedingly noisy activities. Where noise is generated which may impact on sensitive receptors, the mine shall apply measures to control the noise that cannot be avoided, mitigation measures to be applied shall include but is not limited to; • Ensuring that equipment is well-maintained and fitted with the correct and appropriate noise abatement measures; • All machines should be equipped with appropriate noise reduction equipment; • All machines should be roadworthy (including meeting maximum noise specifications);	• SANS10103 • ECA Noise Regulations • World Bank EHS guidelines • OHSA • MHSA	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
of site infrastructure and facilities • **Mine area site preparation** • **Underground mining** • **Ventilation shaft** • **Permanent site office Infrastructure** • **Storm water management** • **Mine Infrastructure** • **Mining** • **Water management and treatment**			• The vehicles exhaust and baffle systems must be maintained regularly to ensure that the noise from these vehicles is within the required noise specification; • All plant and equipment must be operated in accordance with the specifications provided by the manufacturer; and Safety measures that generate noise, including reverse gear alarms, should be adjusted to minimise noise where possible		
			Community involvement needs to continue throughout the project. Good public relations are essential. At all stages surrounding receptors should be educated with respect to the potential increase of noise from the mine (i.e.: when the potential increase is considered of concern to surrounding receptors). The information presented to stakeholders should be factual and should not set unrealistic expectations.		
			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.		
			A channel of communication should be established and promoted between the mine and surrounding stakeholders as well as the community. The developer must investigate any reasonable and valid noise complaint if registered by a receptor staying within 1,000 m from any mining activities.		
			As a general rule, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).		
			As a general rule, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			As a general rule, operations should meet the noise standard requirements of the Occupational Health and Safety Act (Act No 85 of 1993).		
Air Quality					
• **General decommissioning activities** • **General Surface Rehabilitation** • **Infrastructure removal** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Underground mining** • **Post Closure Monitoring and Maintenance** • **Re-vegetation**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Localised and low significance	The Mine Environmental Specialist/Mine Environmental Practitioner shall evaluate the condition of the roads and in the event that coal dust is being tracked off site to an unacceptable degree, Forzando Coal Mines shall implement measures as necessary to avoid and reduce this impact.	• NEMAQA • Dust regulations	
			It is important to note that dust could be a major disturbance, especially during the dry winter periods to people residing around the site. All reasonable measures must be utilised to minimise the generation of dust as a result of activities on site. Such measures shall include, but shall not be limited to; • Traffic control measures aimed at reducing the entrainment of material by restricting traffic volumes and reducing vehicle speeds; • Regular and effective measures aimed at binding the surface material or enhancing moisture retention, such as wet suppression and chemical stabilisation; • Appropriate scheduling of dust-generating activities (e.g. the clearing of parking areas should be postponed until the construction programme requires the clearing of that specific area). • Avoid excavation and stockpiling activities during periods of strong winds in the direction of sensitive receptors. • Increase dust suppression efforts during conditions conducive to excessive dust creation (e.g. dry and windy conditions). • Limit the height of soil stockpiles where possible; and		Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Permanent site office Infrastructure** • **Powerline** • **Storm water management** • **Mine Infrastructure** • **Ventilation shaft** • **Water management Infrastructure construction**			Areas where excessive or difficult to manage fallout dust and erosion occur may be treated with chemical dust suppressant or paved as opposed to using water.		
		Wide scale of disturbance and low to medium significance. Some localized high significant impacts.	The mine shall comply with the National Dust Control Regulations, Promulgated under the National Environmental Management: Air Quality Act (Act 39 of 2004). If dust levels exceed the specified thresholds in terms of the dust control regulations, Forzando Coal Mines 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
		Wide scale of disturbance and low to medium significance. Some localized high significant impacts.	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 regulations	Throughout LoM
		Localised and low significance	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
		No direct Impacts	Employees will receive training on the use of personal dust respirators, whenever high dust levels are experienced.	• NEMAQA • Dust regulation	Throughout LoM
		Health impacts have a localized but high significance	Speed limits will be established and enforced on the mine to minimise dust generation.	• NEMAQA • Dust regulation	Throughout LoM
		Wide scale of disturbance and low to medium significance. Some	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

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		localized high significant impacts.			
		Localised and low significance	Coal will not be left lying around as this increases the risk of spontaneous combustion.	• NEMAQA • Dust regulation	Throughout LoM
		Localised and low significance	Information regarding construction activities should be provided to all local communities. Such information includes: • Contact details of a responsible person on site should complaints arise to reduce emissions in a timely manner. Complaints register must be kept to record all events.	• NEMAQA • Dust regulation	Construction phase
All activities	• Construction	Localised and low significance	• Avoid dust generating works during the windiest conditions	• NEMAQA • Dust regulation	Construction phase
Excavations during construction	• Construction	Localised and low significance	As the largest source of emissions from the Kalabasfontein project is crushing. It is recommended that dust emissions from crushing be minimised by water sprays.	• NEMAQA • Dust regulation	Throughout LoM
Crushing	• Operation	Localised and low significance	Dust emissions from stockpiles can occur during the loading of the stockpiles piles, when wind disturbs the stockpile surface, and during reclamation (USEPA, 2006a). Smaller stockpiles can be covered using hessian sheets or alternatively protected by a shade cloth windbreak (porous wall). Both of these techniques aim to reduce wind speed at the surface of the stockpile, in turn reducing the potential for dust scour and entrainment. An important characteristic about wind erosion is that each time a surface is disturbed, its erosion potential is restored. In order to decrease the erosion potential of stockpiles, the following mitigation techniques are suggested: • The height of existing berms at stockpiles be increased, reducing the impact of winds on the stockpile;	• NEMAQA • Dust regulation	Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Temporary stockpiles be enclosed by porous (containing pores) walls; and • Small, temporary stockpiles can be covered with a porous sheet (preferably hessian).		
Stockpiles	• Operation	Localised and low significance	Wind erosion of material on conveyor belts can cause large quantities of dust to become airborne, particularly if they are open. It is suggested, in order to decrease dust emissions from such a source, that conveyors be enclosed or semi-enclosed (fitted with side wind guards). • Carry-back, the material that sticks to the belt instead of falling off at the head pulley, may also become airborne as the belt dries and passes over the return idlers. If a conveyor belt is not clean, dust can also be bumped from the belt as it passes over the idlers and pulleys, creating more potential for dust to become airborne and entrained in prevailing winds (Kissell, 2003). To prevent unnecessary airborne dust from the conveyors, it is suggested that the conveyor belts are cleaned on a regular basis using belt scrapers or washers. Wetting of conveyor belts has also been found to greatly improve airborne dust concentrations around conveyors. Where it is not economically viable to wet material along transfer points another option is to use non-liquid suppressants	• NEMAQA • Dust regulation	Throughout LoM
Heritage and Paleontological					
• **General decommissioning activities** • **General Surface Rehabilitation**	• Construction • Operation • Decommissioning	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.	Demarcate burial sites with a 50-meter buffer and avoid them. Stakeholder engagement will need to be implemented If this is not possible a detailed grave relocation process must be implemented as required under the NHRA and National Health Act regulations	• NHRA • Development Facilitation Act	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** • **Underground mining** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Re-vegetation** • **Permanent site office Infrastructure** • **Storm water management** • **Mine Infrastructure** • **Ventilation shaft** • **Water management Infrastructure 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.	Historical sites should be avoided with at least a 20 m buffer if activities should occur near them. If the sites will be affected directly, they will need to be documented before a destruction permit can be applied for at the provincial heritage resource authority (Mpumalanga).		
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	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.	Heritage structure **KAL009** (S 26.28548°, E 29.52640°) may be affected as it occurs near the road where the proposed powerline will be erected, however it should be noted and demarcated. If it would be impacted negatively by the proposed development, consultation with the local community is recommended.		
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	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.	If any other heritage resources are uncovered SAHRA should be contacted and a qualified archaeologist appointed to evaluate the finds and make appropriate recommendation on.		
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	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.	If construction activities expose any fossil deposits, a professional palaeontologist should be contacted to assess whether mitigation actions are necessary.		As soon as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
	• Construction • Operation • Decommissioning • Rehabilitation and Closure	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.	If construction activities expose any fossil deposits, a professional palaeontologist should be contacted to assess whether mitigation actions are necessary.		As soon as possible and implemented throughout LoM
Land Capability					
• **General Surface Rehabilitation** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Permanent site office Infrastructure** • **Powerline** • **Storm water management** • **Ventilation shaft** • **Water management Infrastructure construction**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on land capability have long term effects and can be of a high significance.	Topsoil and subsoil stockpiles should be vegetated with prescribed seed mixtures to prevent soil erosion.	In accordance with Rehabilitation and closure plan	Throughout LoM
			During rehabilitation care must be taken to return the correct soil types and depths to specific sections of rehabilitated land to ensure land capability potential is restored to as close as possible the original land capability rating for the area.		
			Re-vegetate rehabilitated areas as soon as possible to prevent soil erosion.	In accordance with Rehabilitation and closure plan	During Rehabilitation
			Re-vegetate rehabilitated areas as soon as possible to prevent soil erosion.	In accordance with Rehabilitation and closure plan	Throughout LoM
			Re-vegetate rehabilitated areas as soon as possible to prevent soil erosion.	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
Surface Water					
• **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Post Closure Monitoring and Maintenance** • **Powerline** • **Re-vegetation** • **Site establishment – Permanent site office Infrastructure** • **Underground mining** • **Ventilation shaft** • **Water management Infrastructure construction**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on surface water can have a high significance and extent Impacts on surface water can have a high significance and extent	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. Where clean water is diverted away from construction and/or mining areas, its point of re-entry into the natural watercourse should be well protected against erosion. In addition, sediments should be effectively trapped before re-entry. 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. Forzando Coal Mines shall ensure compliance with the requirements of the National Water Act and GN704 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 Mine Environmental Specialist. 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	• NWA • GN704 • DWS best Practice Guidelines • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	As soon as possible and implemented throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			rehabilitation of eroded areas, shall be undertaken under direction from the Mine Environmental Specialist.		
			Materials capable of resulting in poor quality leachate will not be used for the construction of haul roads. This will entail testing for acid generation potential.		
			Where possible, the disturbance of land during the construction phase will be confined to areas which are planned to be disturbed during the operation of the mine.		
			Topsoil and subsoil stockpiles should must be stabilised with vegetation to reduce erosion and siltation into streams and dams.		
			Hydrocarbon spills will require immediate attention and should be disposed of at a licensed facility. All used hydrocarbons will be collected and recycled.		
			Storm water drainage and pollution control facilities will be constructed to manage the flow of water and separate clean and dirty water on site.		
			All licenses and permits required as per the National Water Act will be applied for as per the relevant water uses.		
			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.		
			Erosion control measures should be implemented on rehabilitated areas and vegetation established as soon as possible.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			Excess water will only be discharged if it meets statutory requirements.		
			• 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. • 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. • Dirty water dams will be lined by a suitable liner to limit the potential for leakage. Liner systems will be regularly inspected and repaired/replaced as required ensuring continued functionality.		
			• Mining will adhere to regulations stipulated in the water license.		
	• Construction • Operation		• Mining will adhere to regulations / requirements stipulated in the water license.		
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		Uncontrolled stockpiling of coal will be avoided and cleaned up immediately when detected. The coal stockpiles should be kept as small as possible. This will reduce the volume of potentially poor-quality leachate infiltrating the aquifers. Effective surface water drainage methods will be used to ensure the containment of dirty runoff and subsequent seepage into the underlying strata. Berms, should they be necessary, will be constructed upstream and downstream of the dumps and stockpiles to ensure that clean water is kept separate from dirty water. Water contained in the berms		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			downstream will evaporate. All berms will be sized so as to prevent spilling for up to a 1:50 year storm event. Any storm water runoff from the outer slopes will contain some eroded residue solids. In order to prevent this from discharging into the surrounding environment, catchment paddocks and/or catchment dams and / or berms will be provided along the perimeter of the dumps. The catchment paddocks will require periodic cleaning of sediment. This should form part of normal operation and maintenance		
RoM and Product Stockpiles	• Construction • Operation	Impacts on surface water can have a high significance and extent	Uncontrolled stockpiling of coal will be avoided and cleaned up immediately when detected. The coal stockpiles should be kept as small as possible. This will reduce the volume of potentially poor-quality leachate infiltrating the aquifers. Effective surface water drainage methods will be used to ensure the containment of dirty runoff and subsequent seepage into the underlying strata. Berms, should they be necessary, will be constructed upstream and downstream of the dumps and stockpiles to ensure that clean water is kept separate from dirty water. Water contained in the berms downstream will evaporate. All berms will be sized so as to prevent spilling for up to a 1:50 year storm event. Any storm water runoff from the outer slopes will contain some eroded residue solids. In order to prevent this from discharging into the surrounding environment, catchment paddocks and/or catchment dams and / or berms will be provided along the perimeter of the dumps. The catchment paddocks will require periodic cleaning of sediment. This should form part of normal operation and maintenance.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Wetlands and Aquatics					
• **Maintenance and operation of site infrastructure and facilities** • **Underground mining** • **Permanent site office Infrastructure** • **Powerline** • **Mine Infrastructure** • **Ventilation shaft** • **Water management Infrastructure construction**	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 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 implement an aquatic biomonitoring and water quality monitoring programme. Where target endpoints are not met, recommendations should translate directly into follow-up action that is recorded and auditable.	• NWA • GN704 • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework •	Throughout LoM
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		No dirty water may be discharged into any wetland or water resource on site unless treated to the required standards. It is recommended that an Erosion Risk Assessment and Management Plan is completed and implemented to derive the areas at highest risk for erosion. These high-risk areas should then be key points for erosion management throughout the entirety of the project lifecycle.		Throughout LoM
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		Areas where high subsidence risk has been determined should be completely avoided to reduce the risk for surface hydrology alterations. Should unavoidable subsidence occur, rehabilitation actions must be implemented to avoid further effects to downstream river reaches. This may include the implementation of a river diversion around impacted areas. This would require additional environmental approvals and additional specialist studies should this be required		Throughout LoM
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		The construction of linear infrastructure such as the powerline, ventilation shafts, roadways and conveyor systems should consider the following mitigation actions when encountering wetland systems and watercourses: • No crossings over riffle/rapid habitats. These should be avoided as these are the most sensitive; slow deep/shallow habitats should be favoured for crossings;		Construction phase

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• The crossing points should be stabilised to reduce the resulting erosion and downstream sedimentation; • The amended powerline should be suspended over the river crossings rather then buried underneath rivers. It can be attached to existing river crossing structures (bridges and culverts) such as those as sites J1 and V3; • Structures must not be damaged by floods exceeding the magnitude of those which may occur on average once in every 50 years; • The indiscriminate use of heavy vehicles and machinery within the instream and riparian habitat will result in the compaction of soils and vegetation and must be controlled; • Erosion prevention mechanisms such as gabions must be employed to ensure the sustainability of all structures to prevent instream sedimentation; • The crossing points should be unobtrusive (outside riparian and instream habitat) to prevent the obstruction and subsequent habitat modification of downstream portions; • Soils adjacent to the river that have been compacted must be loosened to allow for germination of vegetation; and Stockpiling of removed soil and sand must be done outside the 1:100 flood line or riverine buffer (whichever is greater). This will prevent solids from washing into the river during high flow events.		
	• Construction • Operation		• Minimise the removal of vegetation in the infrastructure footprint area; • Re-vegetation of the construction footprint as soon as possible; • Where storm water enters river systems, sediment/silt and debris trapping, as well as energy dissipation control measures must be put in place;		Throughout LoM

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Storm water must be diverted from construction activities and managed in such a manner to disperse runoff and prevent the concentration of storm water flow; • Sequential removal of the vegetation (not all vegetation immediately); and • The vegetation of unpaved roadsides/margins.		
• **Vegetation clearing** • **Construction of roads**	• Construction • Operation • Rehabilitation	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.	• Belt transfers should take place outside wetland areas, preferably within the pollution control area of the mine. • Regular inspection of the conveyor route to check for spillages and the removal of spillages should be undertaken. • The conveyor must be covered where watercourses are crossed.	• NWA • GN704 Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
Topography and Landform					
• **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 topography tend to be large in extent and can have a significant effect on the environment	• In accordance with Rehabilitation and closure plan • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework 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.	• In accordance with Rehabilitation and closure plan • 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
• **Underground mining** • **Post Closure Monitoring and Maintenance** • **Permanent site office Infrastructure** • **Storm water management** • **Mine Infrastructure** • **Underground mining** • **Water management Infrastructure construction**			Monitor, especially after first heavy rain falls to ensure adequate surface water drainage, surface water flow and erosion.		
			There will be survey checks included as part of the rehabilitation planning to ensure that the planned post mining topography is being followed.		
			All 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.		
			Topsoil and subsoil should be stockpiled separately.		
			Soil horizons should be replaced in the same order as they occur in nature to prevent mixing of soil horizons.		
			Topsoil depth should be related to the proposed post-mining land capability plans.		
			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.		
			Rehabilitated areas should be landscaped to prevent water logging and vegetated to prevent soil erosion.		
			Erosion control measures such as contour banks and cut off berms should be constructed, and soil vegetated in rehabilitated areas.		
			Accidental hydrocarbon spillages should have a suitable absorbent 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.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			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' 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.		
			Regular surveys will be undertaken to ensure the rehabilitation conforms to the final topographical plan and that no final void will be left.		
			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** • **Underground mining** • **Permanent site office Infrastructure** • **Powerline**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance	On-site vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site so as to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic.	• Road Traffic Act • OHSA • MHSA	Throughout LoM
			In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of Forzando Coal Mines. Road conditions must be assessed regularly for signs of damage.		
			All intersections with main tarred roads will be clearly signposted.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Underground mining** • **Ventilation shaft** • **Water management Infrastructure construction**			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.		
			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.		
			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** • **Mine area site preparation** • **Underground mining** • **Permanent site office Infrastructure** • **Storm water management**	• Rehabilitation and Closure	Visual impacts have an impact on the perception and sense of place in the area and although hard to quantify can have a significant impact over a large extent of the area.	Directional lighting and soft lighting will be utilised to ensure that only areas required to be lit are lit. Screens will be considered if I&AP complaints are received.	• In accordance with Rehabilitation and closure plan • Closure and final land use objectives	Throughout LoM
			It is proposed that as little existing vegetation as possible be removed during mining.		
	• Construction • Operation • Decommissioning		Where possible, and in consideration of the rehabilitation plan and objectives, the mine shall create screening using soil stockpiles, berms and natural vegetation to reduce the visual impact of the mining operations and infrastructure.		
	• Construction		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
• **Powerline** • **Ventilation Shaft** • **Water management Infrastructure construction**	• Operation • Decommissioning				
	• Construction • Operation • Decommissioning • Rehabilitation and Closure		Dust suppression methods must be applied when necessary to restrict the visual impact of dust emissions.		
Groundwater					
• **General decommissioning activities** • **General Surface Rehabilitation** • **Maintenance and operation of site infrastructure and facilities** • **Mine area site preparation** • **Underground mining** • **Post Closure Monitoring and Maintenance**	• Construction • Operation • Decommissioning • Rehabilitation and Closure	The mining impact on groundwater potentially affected a very large area and has a potentially high significance impact	Rainfall runoff should be separated into clean and dirty water (rainfall falling on the site should be allowed to drain quickly/freely, and contaminated water should then be captured in the mine dirty water system and re-used where possible	• NEMA Duty of care • NWA • GN704 • DWS best practice guidelines • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	Throughout LoM
			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.		
			The mine shall ensure that the groundwater monitoring program is implemented. All boreholes identified in the monitoring plan 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.		
			The mine shall utilize water on site responsibly. Ensure all pipelines and water containment facilities are adequately sealed to prevent leaks. Record water usage by attaching meters to relevant pumps.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• **Re-vegetation** • **Permanent site office Infrastructure** • **Storm water management** • **Mine Infrastructure** • **Water management Infrastructure construction**			Should the groundwater monitoring reveal that the quality of groundwater available to surrounding users are affected, an alternative water resource will be provided to replace the loss. Confirm decant areas and start planning for closure during the operational phase. Decant can also take place from the monitoring borehole (FNGW03) drilled into the underground workings, depending on the hydraulic pressure exerted on the borehole. An unplugged borehole acts as a conduit for flow and a preferential pathway for decant if no other pathways exist. Unless this borehole will be used for monitoring (see comment below), it should be sealed at closure to limit the possibility of decanting. It is also critical that any future monitoring boreholes that will be installed to measure rebound in the underground workings be placed outside the sensitive area (potential decant areas as identified in the Geohydrological report, GCS, 2018) The following general management strategies must be considered to manage any long term AMD: • Plan for closure with regard to understanding where water enters the mine and would normally accumulate, how it flows, how it should preferably flow in order to minimize water quality deterioration; • Adits can be major sources of surface and groundwater ingress if not properly sealed. It is therefore recommended that all potential mine entry points like boreholes, old ventilation shafts, old rescue bays and mine portals/adits be sealed off as per the DMR regulations; and Sufficient pillars must be left underground, as part of sound mine planning, to avoid subsidence of the roof to surface along the shallower areas (where underground mining is less than 40m from surface). This will ensure that the rate of recharge to the		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			underground workings remain at natural rates and will minimise decant from the workings post-closure. The following general management strategies must be considered to manage any long term AMD: • Plan for closure with regard to understanding where water enters the mine and would normally accumulate, how it flows, how it should preferably flow in order to minimize water quality deterioration; • Adits can be major sources of surface and groundwater ingress if not properly sealed. It is therefore recommended that all potential mine entry points like boreholes, old ventilation shafts, old rescue bays and mine portals/adits be sealed off as per the DMR regulations; and • Sufficient pillars must be left underground, as part of sound mine planning, to avoid subsidence of the roof to surface along the shallower areas (where underground mining is less than 40m from surface). This will ensure that the rate of recharge to the underground workings remain at natural rates and will minimise decant from the workings post-closure.		
Underground Mining and conveyors					
Underground mining	• Construction • Operation • Decommissioning • Rehabilitation and Closure	N/A	Mining operations will be limited to the mining plan within the approved mining rights area of the mine. Coal pillars (bord-and-pillar mining method) will be designed in accordance with accepted practice adopted by the South African coal mining industry to limit possible surface subsidence. No high extraction mining methods will be employed, unless the necessary authorisation has been received from the DMR.	• NEMA Duty of care • NWA • GN704 • DWS best practice guidelines • 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
			Management and mitigation to assist in reducing the likely long-term subsidence risk include: • Comply with the mine design recommendations presented in the Geotechnical Risk Assessment (Exxaro Coal Central, 2018). • Ensure that suitably conservative safety factors are incorporated into the mine design, specifically in area underlying sensitive environmental features, sensitive social and cultural features (including heritage features), and surface structure and infrastructure. • Carry out periodic monitoring and assessment of the structural integrity of the pillars during the mining operations to assist in informing and calibrating future rock stability models and subsidence risk assessments. • Surface elevation monitoring points should be installed at positions surrounding the sensitive structures such as building and tarred road at convenient points. During mining, surveys should be conducted monthly and continued monthly for three months after mining has ceased for a period of three months. Thereafter the periods can be relaxed to quarterly for a further year and after that annual surveys should be conducted. Survey beacons should consist of 20 mm rebar and be anchored in concrete with the anchor at least a metre deep. The protruding end of the beacon should not protrude more than 10 cm, to avoid accidental damage. Similar beacons should be installed in an area with similar ground conditions, more than 200 m away from any undermining to serve as control measurements. • Carry out a detailed stability /geotechnical assessment and associated risk assessment prior to final closure to identify the likelihood of future subsidence and to identify suitable management and mitigation measures to be implemented prior to closure.	compliance with the regulatory framework • OHSA • MHSA	

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			• Utilise the updated risk assessment to refine and adjust the post closure liability assessment and ensure adequate financial provisions for residual and latent risks		
			Regular inspection of the conveyor route to check for spillages and the removal of spillages should be undertaken.		
			Measures to contain spills from conveyors over or close to watercourses will be implemented.		

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 landowners with regards to the reinstatement of preferred land uses post mining. This should be utilized for final rehabilitation objectives and landform design.

The 2010 EIA and EMPr report (GCS (Pty) Ltd, 2010) lists the following main environmental closure objectives:"

- With regard to every activity the mitigation of all environmental impacts and addressing all environmental aspects on the basis of the EMP;
- To ensure an effective surface runoff control system in order to deal with the separation of clean and dirty water environment;
- Rehabilitate areas as soon as possible;
- The sustainable and safe rehabilitation of all activities, in order to address all environmental impacts as far as practical according to the EMP;
- The sustainable rehabilitation of all activities and the mining area as a whole in order to ensure a sustainable end use for the majority of the activity sites/areas;
- Return of land to its pre-mining state where possible (i.e. agriculture/grazing for the majority of the mine's lease area);
- Make all areas safe for both humans and animals;
- Ensure that all areas remaining upon closure are stable, which will prevent dust and water erosion;
- Minimise the impact on the local community;
- Minimise the impact on the surrounding economic environmental and other mining activities;
- Maintenance requirements for rehabilitated activity areas/sites need to be established and documented within the capability of the subsequent land user;
- Financial provision for post closure maintenance cost of rehabilitation activity area/sites will at all times be appropriate to provide for premature closure in terms of the MPRDA;
- No rehabilitation work, demolition of buildings shall take place without the approval of the General Manager in consultation with the Manger (Group Environmental Manager); and
- Final rehabilitation of all infrastructures shall be completed within a period as specified in the appropriate closure document and rehabilitation activities will comply with the specifications as per the appropriate closure document. Should the mine, due to unforeseen circumstances, need to deviate from the closure plan, approval from the DME (now DMR) and relevant State Departments will be obtained.
- The aim of the maintenance measures is to ensure that the area affected by the mining operations is rehabilitated according to the closure plan and to apply for closure. The objective is for the area to be rehabilitated sustainably (ensuring self-succession of plants and the associated return of natural wildlife; as well as the improvement of the natural watercourses and groundwater

systems)." The closure objectives presented above remain unchanged for the mine moving forward. It should be noted that in the next annual assessment and determination of financial provisions, and/or the compilation of the NEMA Financial Provisioning Reports, these closure objectives should be reviewed and, where applicable, amended

Closure objectives include physical, biological and chemical stability of the post-mining landform, as well as regulatory approval and stakeholder support for the actions associated with this objective and outcome. These objectives counter the principle post-mining risks of:

- Post-closure site safety for casual access;
- Restoration of native vegetation covers and ecology;
- Protection of water resources, including wetlands; and
- Post-mining environment in line with stakeholder needs.

The overall rehabilitation and closure objectives for the Forzando South Mine are:

- Public health and safety must be protected;
- Prevention of erosion and sedimentation to ensure long-term structural integrity of the site;
- Socio-economic benefits post-closure must be maximised;
- Visual impacts of disturbed areas should be minimised by creating a natural landform that is visually suited to the surrounding landscape;
- Soil integrity should be restored, as it forms the base from which rehabilitation proceeds. Soils in rehabilitated areas should be correctly prepared and suitably conditioned and maintained for re-vegetation;
- Management of invasive alien vegetation;
- Short and long-term impacts on surface and groundwater quality must be minimised and contained at acceptable levels;
- Restoration of pre-mining drainage patterns; and
- The need for long term monitoring and maintenance must be reduced or removed.

7.2 CONSULTATION WITH LANDOWNERS AND I&AP'S

Forzando South is an existing mine and several authorisation processes have been undertaken for the mine to date. The EIA process undertaken for the Kalabasfontein project has 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.

7.3 MINE CLOSURE PROCESS

7.3.1 DECOMMISIONING PHASE

The decommissioning phase will commence once the mining operation has reached the end of life, and will typically involve:

- Demolishment of all infrastructure (plants, ancillary, etc.):
    - All infrastructures will be removed and rehabilitated, should no alternative use be found for the structures.

- An alternative use for the brick structures will first be sought i.e. they can either be sold/donated to the post-mining landowner on sale of the land. If an alternative use cannot be found, the buildings will be demolished.
- All material recovered from the demolition of buildings and/or structures will either be transported to a permitted disposal site, sold as scrap or made available to the local community as building materials (provided they are in a satisfactory condition following demolition).

- Removal of linear infrastructure (conveyors, railway, roads and pipelines):
  - Linear infrastructure constructed by the mine (i.e. roads, conveyors, railways and power lines) will be removed if it proves to inhibit land use at decommissioning. Where possible infrastructure will remain for social investment opportunities, this will be decided in conjunction with Integrated Development Plan (IDP) of the area and the local authorities (i.e. municipality). The soils and land capability will be rehabilitated to near pre-mining conditions.
  - All haul roads, and access roads not being handed over to the landowner, will be rehabilitated.
  - All fences erected around the mine will be dismantled and either disposed of at a permitted disposal site or sold as scrap (provided these structures will no longer be required by the post-mining landowner). Fences erected to cordon-off dangerous excavations will remain in place and will be maintained as and when required.
  - The overland conveyors and railway line, if not used as a community initiative, will be disassembled and the components removed from the site. The material can either be sold (as a unit) or the components sold as scrap.
- Decommissioning of dams:
  - All containment dams will be maintained to ensure that no leakages occur.
  - Overflow pipes and /or spillways will be kept clean.
  - Sumps will be kept clean and all pumps will be maintained.
  - The containment dams will only be demolished should the area proof to be free draining with no pollution potential after rehabilitation.
- Underground closing: All shaft adits will be made safe by sealing this infrastructure.
- Decanting into underground: The extent of decant to be defined and informed by an updated groundwater model.

Following cessation from mining activities and processing, it is planned that all infrastructure will be decommissioned and removed from site in a systematic and regulated matter.

The decommissioning phase for the Kalabasfontein project would align with the general activities listed above. The following specific actions should also be considered at the time of developing a final closure plan:

- All material and machinery (including mine machinery, pipelines, electrical infrastructure, water facilities, ablutions, etc) which can be recycled, reused, or salvaged should be removed from the underground workings. Any remnant equipment should be rendered safe for disposal and abandonment.
- Any potentially contaminated areas (including refuelling areas, hazardous material stores, etc) should be tested for contamination and where applicable remediated, and/or contaminated materials removed and disposed of at a licenced facility. It should be noted that the current plans do not include dedicated refuelling facilities for the Kalabasfontein Project and the existing facilities in place for Forzando South will be used.

- All “conduits” like exploration boreholes, emergency boreholes and ventilation shafts be sealed off after closure.
- An updated numerical groundwater model should be prepared and where applicable the closure of the underground workings should consider the need to isolate and separate certain mining areas to allow for more effective post closure water management. The model should also identify the need to install water monitoring infrastructure to monitor and inform the long-term water management.
- A survey should be conducted on the pillar conditions in the applicable mining area to inform the long-term post closure pillar collapse and subsidence predictions.
- The vent shaft must be closed in accordance with the recommendations of an updated groundwater model and a suitable plug and cap must be designed by a qualified engineer. In principle the vertical hydraulic connectivity between various intercepted aquifers must be prevented.
- An updated risk assessment on the potential for methane gas or other hazardous substances migrating through the ventilation shaft must be carried out and applicable management and mitigation measures implemented.

7.3.2 REHABILITATION

The concept of progressive rehabilitation and decommissioning should be implemented throughout the life of mine. Progressive rehabilitation and decommissioning will assist in reducing the final closure cost as well as informing the mine of suitable closure strategies for final closure. The mine must consider all options for progressive rehabilitation and decommissioning at each interval for the development and submission of both the annual rehabilitation plan and the final rehabilitation, decommissioning, and closure plan to be submitted in accordance with the NEMA financial provisioning regulations.

In accordance with the EMPr for Forzando (GCS (Pty) Ltd, 2010) the following active rehabilitation of the area will be undertaken:

- Recovery of all saleable infrastructure, including the conveyor system.
- Demolition and removal of all buildings and structures.
- Ripping of all compacted areas, which will be followed with soil amelioration and vegetation.
- Ensure that all remaining piles and slopes are sufficiently shaped to blend in with the surrounding environment.
- Soil amelioration and vegetation of all disturbed areas.
- Maintenance of all re-vegetated areas up until such areas initiate succession and create a sustainable cover.
- Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas.
- Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.

The opportunities for progressive rehabilitation of the aspects associated with the Kalabasfontein project are limited. The progressive decommissioning of the underground working areas should be implemented as and when the mining is complete.

7.4 CLOSURE OBJECTIVES AND COSTING

7.4.1 CLOSURE OBJECTIVES

The 2010 EIA and EMPR report (GCS (Pty) Ltd, 2010) lists the main environmental closure objectives. These are also detailed in Section 7.1. The aim of the maintenance measures is to ensure that the area affected by the mining operations is rehabilitated according to the closure plan and to apply for closure. The objective is for the area to be rehabilitated sustainably (ensuring self-succession of plants and the associated return of natural wildlife; as well as the improvement of the natural watercourses and groundwater systems)." The closure objectives presented above remain unchanged for the mine moving forward. It should be noted that in the next annual assessment and determination of financial provisions, and/or the compilation of the NEMA Financial Provisioning Reports, these closure objectives should be reviewed and, where applicable, amended.

7.4.2 CLOSURE COSTING

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

The planned or scheduled closure costs and associated financial provision has not been calculated separately. It is anticipated that most of the closure actions will apply equally for planned closure as for un-scheduled closure. The opportunity for progressive rehabilitation on the Kalabasfontein project is limited.

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

Table 9: Decommissioning, Rehabilitation and Closure Actions

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
Decommissioning					
• General decommissioning activities • General Mine Management • Decommissioning Mine Infrastructure • Infrastructure removal	Decommissioning	Decommissioning of infrastructure can result in negative impacts. The extent is localized to the extent of the infrastructure and mining footprint.	All infrastructure, equipment, plant, temporary housing and other items used during the mining period will be removed from the site (Section 44 of the MPRDA). Infrastructure should be removed down to foundations to prevent loss of soil productivity. All vehicles, equipment and other assets belonging to Forzando Coal Mines must be removed from the property upon completion of the mining operation, including any excess aggregate, gravel, stone, concrete, temporary fencing and the like. No discard materials of whatsoever nature shall be buried on the site, or on any vacant or open land in the area. Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a recognised and licensed landfill facility. It will not be permitted to be buried or burned on the site.	• MPRDA • In accordance with Rehabilitation and closure plan • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	During decommissioning activities
Rehabilitation					
• General Surface/ Rehabilitation • Re-vegetation	Rehabilitation and Closure	Rehabilitation has limited negative impacts. The scale of the impact is limited to the	The current RSIP shall be updated to make it applicable to the new extension area. The Plan must be viewed as a dynamic document and shall be subjected to independent review on an annual basis (together with the quantum for financial provision).	• MPRDA • In accordance with Rehabilitation and closure plan	• As soon as possible in operational phase and

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
• Storm water management		disturbance footprint.	As a minimum, the Integrated Rehabilitation and Closure Plan shall include the following; • Desired end land use objectives, • Methodology and proposed schedule for progressive rehabilitation to be undertaken concurrently with mining operations, • Details of soil preparation procedures including proposed measures to improve soil fertility (if so required) and the sustainability thereof, • A list of the plant species that will be used in the rehabilitation process. Only indigenous species may be utilised, and these species should be representative of the relevant vegetation unit/landscape type of the area, • Procedures for ensuring vegetation growth and survival (watering, fertilisation etc.), • Details of proposed storm water and erosion control measures to ensure re-vegetation is successful and not hampered by scouring and erosion, • Monitoring procedures that will be implemented to assess re-vegetation efforts (duration and frequency of monitoring, criteria for determining success of rehabilitation), • Procedures for preventing the establishment of alien invasive vegetation in rehabilitated areas.	• Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	implemented throughout LoM • Annually Updated
			Upon completion of the mining operation and closure of the facility, Forzando Coal Mines shall ensure that all cleared and/or disturbed areas (as a result of the activity) shall be rehabilitated in accordance with the Integrated Rehabilitation and Closure Plan.		
			Rehabilitation will include returning the slope to the minimum possible gradient the topsoil will be replaced for vegetation re-		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			establishment and contour drains will be built to prevent erosion if necessary.		
			The area must be rehabilitated using indigenous vegetation from the area in such a way that it will return as close as possible to the original production potential. Rehabilitation shall be overseen by a suitably qualified specialist who shall approve the indigenous seed mix to be used. The rehabilitated area must be returned to a self-sustaining ecosystem that is consistent with the original natural vegetation type.		
			Any access road or portions thereof, constructed by the mine which will no longer be required by the landowner/tenant, shall be removed and/or rehabilitated to the satisfaction of the Mine Environmental Specialist and Regional Manager (DMR).		
			Erosion control measures shall be implemented where necessary (such as berms, brush packing, silt fences etc.). Erosion control and silt prevention measures shall be inspected regularly and shall be maintained whenever required to ensure they remain effective.		
			No alien or invader plant species should be introduced on site during rehabilitation. The weed management plan shall be implemented throughout the rehabilitation and closure phase. Regular monitoring of the rehabilitated area shall be undertaken, and all alien vegetation shall be eradicated and/or controlled prior to it setting seed. Weed management shall be to the satisfaction of the Mine Environmental Specialist and Regional Manager (DMR). Where required, the necessary adjustments should be made to ensure the complete re-establishment of the natural vegetation.		

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
General Surface/ Rehabilitation	Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	If erosion occurs, corrective actions must be taken to minimize any further erosion from taking place and topsoil should be sourced and replaced and shaped to reduce the recurrence of erosion.	In accordance with Rehabilitation and closure plan	During rehabilitation
			Only the designated access routes are to be used to reduce any unnecessary compaction. Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated. Implement land rehabilitation measures as defined in rehabilitation report. Follow rehabilitation guidelines.		
			The topsoil should be moved by means of an excavator bucket and loaded onto dump trucks. Topsoil is to be moved when the soil is dry, as to reduce compaction. After the completion of the project the area is to be cleared of all infrastructure and topsoil to be replaced for rehabilitation purposes. The handling of the stripped topsoil will be minimized to ensure the soil's structure does not deteriorate and stockpiles should only be used for their designated final purposes.		
			Compacted areas are to be ripped to loosen the soil structure and vegetation cover re-instated. Stockpiles should be reduced to smaller piles to ensure the ease of continues rehabilitation as well as to decrease the sheer weight thereof.		
General Surface/ Rehabilitation	Rehabilitation and Closure	Impacts on soils can have significant impact both in terms of severity and scale. Impacts on soil can in turn affect land use and land capability.	The mine shall reinstate the soil over the open access shafts areas to the following standards • the soils should be replaced to their original soil depth prior to stripping; • in the correct soil profile order; • add mulching; • and soil stabilisation measures; and • the stockpiles will be vegetated (details contained in rehabilitation plan) in order to reduce the risk of erosion,	In accordance with Rehabilitation and closure plan	During rehabilitation

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			prevent weed growth and to reinstitute the ecological processes within the soil. The rehabilitated area must be assessed once a year for post mining land capability compaction, fertility, and erosion. The soils fertility must be assessed by a soil specialist yearly (during the dry season so that recommendations can be implemented before the start of the wet season) as to correct any nutrient deficiencies.		
General Surface/ Rehabilitation	Rehabilitation and Closure	Impacts on flora may occur over a large area (active mine areas) and has the potential to be a relatively high significance	Disturbed surfaces will be re-vegetated as soon as they become available, by seeding with an appropriate seed mix as per direction by a vegetation specialist. The ongoing rehabilitation should occur soon after the area has been mined out so that alternative land use can commence.	Adherence to Rehabilitation and Closure Plan	During rehabilitation
	Rehabilitation and Closure	Impacts on alternative land uses are considered highly significant and can occur over a large area.	Rehabilitation should follow procedures with regard to seed bed preparation and fertilising, and advice on seed mixtures to seed with.	In accordance with Rehabilitation and closure plan	During rehabilitation
Mine Closure					
Closure	Rehabilitation and Closure	Very limited potential for impacts during closure. The Mine remains responsible for the mining right area until such time as a closure certificate is obtained.	Should the activity ever cease or become redundant the applicant shall undertake the required closure process in accordance with Section 43 of the MPRDA.	MPRDA and regulations	In accordance with legislated timeframes in force at the time of closure.
Closure	Rehabilitation and Closure	Impacts on alternative land uses are considered	Leasing options should be evaluated so that unmined land can be used for other uses such as grazing or cropping. Adequate	MHSA	Closure

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
		highly significant and can occur over a large area.	fencing will be required to separate the land from miming areas for safety reasons.		
Acid Mine Drainage					
Underground Mining	• Construction • Operation • Decommissioning • Rehabilitation and Closure	Acid Mine drainage is a highly significant impact in terms of its severity as well as potential extent.	The mine shall appoint specialists to develop detailed, site specific AMD management plan.	• NWA • NEMA duty of care • GN704 • DWS best practice guidelines • Shall adhere to the ESMS developed to ensure compliance with the regulatory framework	As soon as possible during operation. AMD mitigation plan to be implemented as soon as possible.
	• Operation • Decommissioning • Rehabilitation and Closure		Where acid mine drainage is anticipated or detected, an Acid-Base Accounting Technique and Evaluation (ABATE) should be initiated. Where the expected water quality is acidic or highly alkaline, mitigation measures will need to be investigated and implemented (such as impermeable linings for the coal stockpiles and treatment of mine water.)		As required and ongoing until closure certificate s received
	• Operation • Decommissioning • Rehabilitation and Closure		Acid drainage control and treatment techniques can be broadly classified into physical, chemical and biological, and those using combinations of these. The mine must investigate further the best options for site specific treatment of AMD. Treatment techniques are usually reactive rather than pro-active, and are generally designed to: 1. raise pH, 2. lower toxic metal concentrations (e.g. precipitation, adsorption) 3. lower aqueous sulphate concentrations,		As soon as possible during operation. AMD mitigation plan to be implemented as soon as possible.

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures	Compliance with Standards	Time Period for Implementation
			4. lower the toxicity / bioavailability of metals in solution (e.g. oxidation, reduction) 5. oxidise the solution (e.g. Fe (II)-Fe (III), Mn (II)-Mn (IV), As (III)-As(V)), 6. reduce the solution (e.g. SO_4^{2-}, H_2S) 7. collect / dispose / isolate the metallic sludge generated.		
	Rehabilitation and Closure		After closure, mine water and/or decant needs to be treated to the required level before discharge into natural watercourses. The extent of treatment required, as well as the duration of treatment needs to be determined by water quality assessments. All remaining material of the coal processing plant area should be removed and placed into the bottom of a mining area below the final post-mining groundwater level.		As required and ongoing until closure certificate s received
Post-Closure Monitoring					
• Post Closure Monitoring and Maintenance • Water Treatment	Rehabilitation and Closure	Very limited potential for impacts during closure. The Mine remains responsible for the mining right area until such time as a closure certificate is obtained.	The post-closure monitoring and management period following cessation of mining activities will be implemented by a suitable qualified independent party for a minimum of ten (10) years unless otherwise specified by the competent authority. The monitoring activities during this period will include but not be limited to: • Ground and surface water; • Air quality monitoring; • Biomonitoring; and • Re-vegetation of disturbed areas where required; Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed mining activities and incorporated into post closure monitoring and management.	MPRDA and regulations	Minimum of ten (10) years post closure or as agreed upon with DMR

8 ENVIRONMENTAL MONITORING

Ongoing monitoring of the bio-physical and socio-economic environments will continue throughout the life of the project as per the approved EMPr's and the accepted monitoring programmes. Furthermore, Forzando South will monitor and assess the performance of the EMP on an ongoing basis.

Monitoring of different environmental aspects/impacts shall take place by means of quantitative and qualitative evaluation techniques in order to determine whether the requirements of the environmental management programme are being complied with. Monitoring is a continuous data-gathering and control procedure. It may range from routine visual inspections to in-depth investigative 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/Dust Monitoring;
- Aquatic biomonitoring;
- Alien plant monitoring;
- Surface water;
- Groundwater;
- Environmental Performance Assessment monitoring; and
- Rehabilitation.

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

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 Environmental Management Programme are being complied with. The importance and value of detailed environmental monitoring networks cannot be overstated.

Environmental monitoring serves as a tool to track compliance, assist with potential liability identification, and mitigation throughout the life of the proposed project. This is achieved through the provision of actual evidence-based monitoring and reporting thereof. 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. These monitoring plans need to be drawn into standalone plans that can be updated and amended as per authority requirements and additional data requirements identified during the mining activities. These plans need to include the site-specific roles and responsibilities for actions. Forzando Coal Mines does have procedures in place for environmental monitoring.

8.3.1 AIR QUALITY/DUST MONITORING

Forzando Coal Mines has a “Dust Management Procedure (SOP 27” in place, which defines the management of dust emissions. The main objective is to ensure that the dust emission generated during mining confirm with residential and light commercial limit of <600 mg/m²/day and the permissible limit for industrial and heavy commercial purposes of 600 to 1200 mg/m²/day as required by SANS 1929:2005 standard. This enables the minimisation of nuisance dust emanating from the operating area and minimises the impacts to the surrounding environment.

Forzando Coal Mines is monitoring the dust particulate using a dust bucket method to collect settleable dust fallout. Each 5-litre bucket container is mounted on a 2m pole and placed at various places and the samples are taken to a laboratory for analysis on a monthly basis. The dust bucket positions for the Forzando South mine are indicated in Figure 9 below.

Figure 9: Dust bucket positions for the Forzando South mine

Forzando Coal Mines may need to extend the monitoring points to include the new ventilation shaft area.

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

8.3.1.2 RECEPTOR BASED PERFORMANCE INDICATORS

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

Monitoring Strategy Criteria	Dust fall monitoring
Monitoring objectives	• Assessment of compliance with dust fall 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.
Monitoring location(s)	Forzando South operates a network of four dust fallout samplers (T1, T2, T3 and T4) with all locations classified as non-residential.
Sampling techniques	Weatherproof containers of a standard size and shape are prepared and sealed in a laboratory. In the field the container is marked with the locality name and the date. These are then opened and set up at the chosen sites so that particulate matter can settle into them for a period of about 30 days. Upon collection, container area closed (and replaced) and returned to the laboratory. The masses of the water-soluble and insoluble components of the material collected for each locality are determined. The results are reported as grams per square meter per 30 days.
Accuracy of sampling technique	Margin of accuracy given as ~200 mg/m2/day.
Sampling frequency and duration	On-going, continuous 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 dust fall (calculated from total monthly dust fall) of not greater than 600 mg/m2/day for residential areas. Maximum total daily dust fall to be less than 1 200 mg/m2/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

The purpose of establishing a surface water monitoring program is to provide timely and accurate water quality data to the Department of Water and Sanitation and to manage impacts caused by the activity. The data is used to determine the status and trends in surface water quality. Specific objectives of the water quality monitoring programme as follows:

- Determine whether water quality at sampling sites exceeds water quality standards;
- Assess the status of the water quality in the surrounding areas;
- Provide analytical water quality information that describes present conditions and changes (trends); and
- Provide timely data for other surface water users.

Surface water monitoring of the Forzando South operation is currently occurring on a monthly basis with 13 surface water monitoring points. Monitoring points 'FSSW01' to 'FSSW08' are located on the rivers and pans while the remaining points are associated with the containment facilities at the colliery.

The expansion of the Forzando South operation into Kalabasfontein Project necessitates additional surface water monitoring points that will allow for change detection in water quality resulting from contamination originating from the mining operation (whether due to surface or underground works). To this end, four additional monitoring points are proposed, three of which extend the current monitoring upstream on the Viskuile River so as to enable change detection along the primary river reach both before the Kalabasfontein project boundary, at the Kalabasfontein project boundary and within the proposed Kalabasfontein project area.

Quarterly monitoring reports should, as a minimum, include comparison of water samples to differentiate seasonal variations and general trends due to the mining activities, comparison of water samples to standards and guidelines set by the Department of Water and Sanitation (DWS) and analysis of parameters over time so that trends can be established.

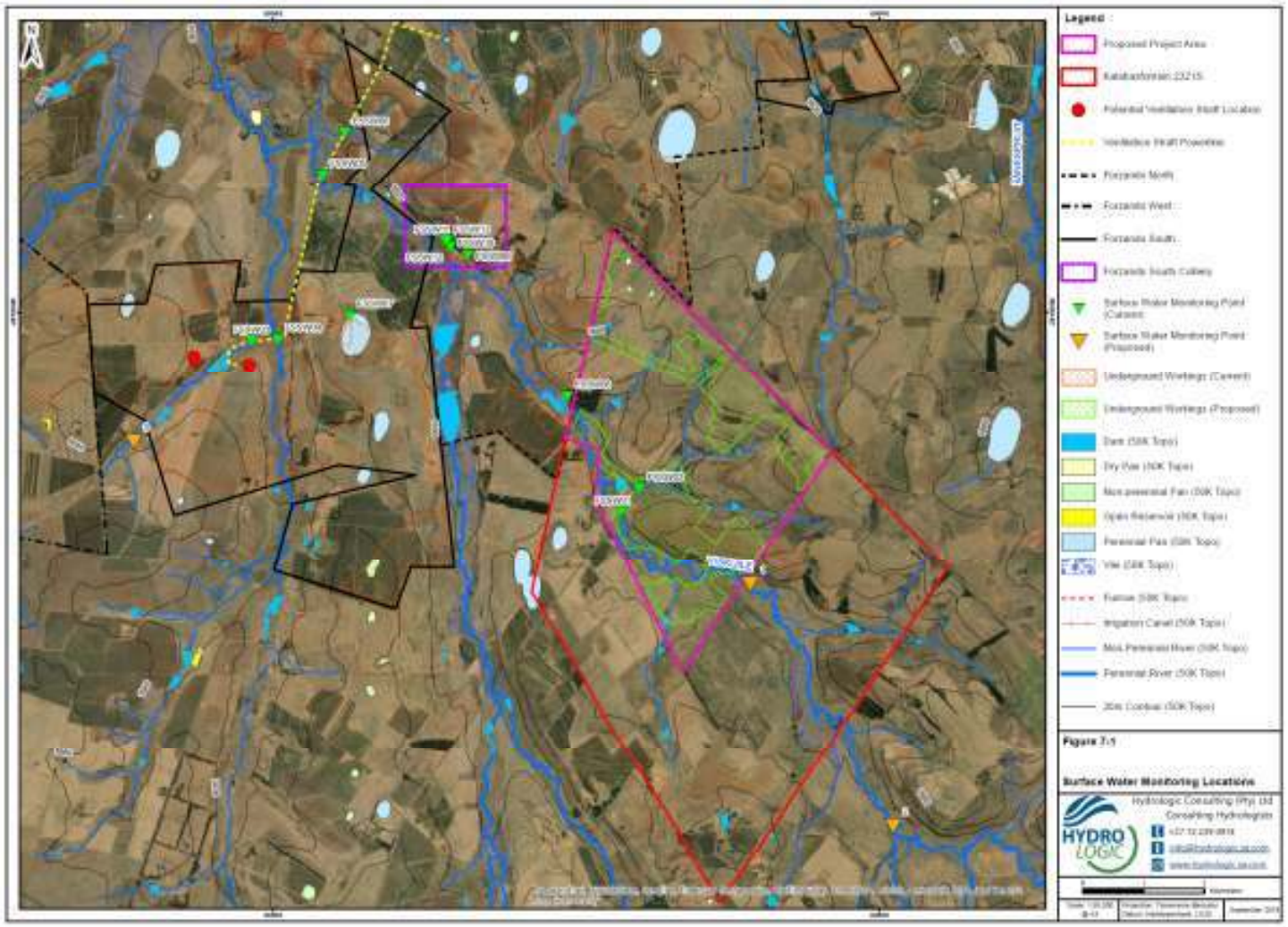

Figure 10: Current monitoring and proposed monitoring points

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 conducted in accordance with the requirements of the IWUL. Biomonitoring for temporal and spatial comparison is undertaken at three locations within the Viskuile Spruit on a bi-annual basis with surveys being conducted in the winter and summer seasons.

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

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

Whilst surface water monitoring is currently undertaken, a detailed stand-alone procedure which is subject to internal review and update is required to align the mine with current best practice standards. This procedure must incorporate a mechanism for dealing with any exceedances identified.

The design and implementation of the surface water monitoring programme must be undertaken in accordance with the Best Practice Guidelines G3: Water Monitoring Systems. The aim of the surface water monitoring network is to assist with overall water management including but not limited to the following:

- Pollution prevention;
- Assess the performance of pollution prevention; and
- Develop a more holistic understanding of current, baseline water quality on site and the changes that result from mining activities.

It is strongly recommended that any water containment facility on site be subject to water quality and quantity monitoring and on a monthly basis. Quantity should be monitored to ensure the facilities are of a sufficient size for the water volumes they are expected to contain. The water quality results should meet applicable standards or ensure that water released into the environment, either intentionally or unintentionally, are of appropriate quality. Surface water samples should be analysed for the parameters listed in the IWUL on a monthly basis. The water quality results should be compared to the limits specified in the Water Use Licence (WUL). An aquatic biomonitoring programme is an essential management tool. The monitoring programme should be designed to enable the detection of potential negative impacts brought about by the proposed project. Table 11 highlights some important aspects to monitor in reference to aquatic biota for the duration of the programme.

Table 11: Aquatic and Wetland Ecology Monitoring Plan

Location	Monitoring objectives	Frequency of monitoring	Parameters to be monitored
1 26°18'9.44"S, 29°30'5.20"E 2 26°21'31.36"S, 29°35'43.53"E 3 26°17'46.54"S, 29°32'17.87"E 4 26°16'41.13"S, 29°30'31.22"E	Overall Aquatic PES	Bi-annual	Standard River Ecosystem Monitoring Programme (Ecostatus) methods
	Determine if water quality deterioration is occurring.	Bi-annual	SASS5 and ASPT scores should not decrease as and be related to mining activities.
	Determine if water quality deterioration is occurring.	Monthly	Standard water quality monitoring

Location	Monitoring objectives	Frequency of monitoring	Parameters to be monitored
	Determine if water/habitat quality deterioration is occurring.	Bi-annual	Monitor for presence of fish.

8.3.4 GROUND WATER MONITORING

Groundwater quality should be assessed against the SANS- 241:2015 Drinking Standards and Background Water Quality Limits. The groundwater-monitoring network has been designed to comply with the risk-based source-pathway-receptor principle. The groundwater-monitoring network is utilised to monitor the impact on water quality and quantity.

Forzando South Coal Mine has an active groundwater monitoring programme in place. The current groundwater monitoring points and their respective geographical information is provided in Table 12 and illustrated in Figure 11.

Table 12: Groundwater monitoring points at Forzando South

Points	Latitude (S)	Longitude (E)	Groundwater Locations
FSGW3	-26.28695	29.52782	North west of PCDs
FSGW4	-26.29106	29.53298	South east of PCDs

It is recommended by the groundwater specialist that the groundwater monitoring network be expanded for the existing and future mining activities at Forzando, including the Kalabasfontein project area. Figure 12 shows the locations of the recommended bore hole locations. These locations should be finalised in consultation with the groundwater specialist.

The main objectives of the groundwater monitoring are:

- To assess, on a quarterly basis, the quality of the groundwater resources in and around the Forzando South study area in accordance with the mine's approved IWUL and its amendments;
- To make use of the data for both human and environmental health and impact assessments;
- To compare results to previous survey results with the aim of detecting environmental trends in the groundwater quality; and
- To identify potential impacts of the mining operations on the receiving water resources and provide suitable mitigation measures for adaptive management.

The following parameters should tested for in the groundwater monitoring (mg/l)

- pH @ 25°C
- Conductivity mS/m @ 25°C
- Total Dissolved Solids
- Calcium, Ca
- Magnesium, Mg (mg/l)
- Sodium, Na
- Potassium, K
- Total Alkalinity as $CaCO_3$
- Bicarbonate, HCO_3
- Chloride, Cl
- Sulphate, SO_4
- Nitrate as NO_3
- Aluminium, Al
- Manganese, Mn
- Iron, Fe

Figure 11: Location of groundwater monitoring points in the Forzando South area

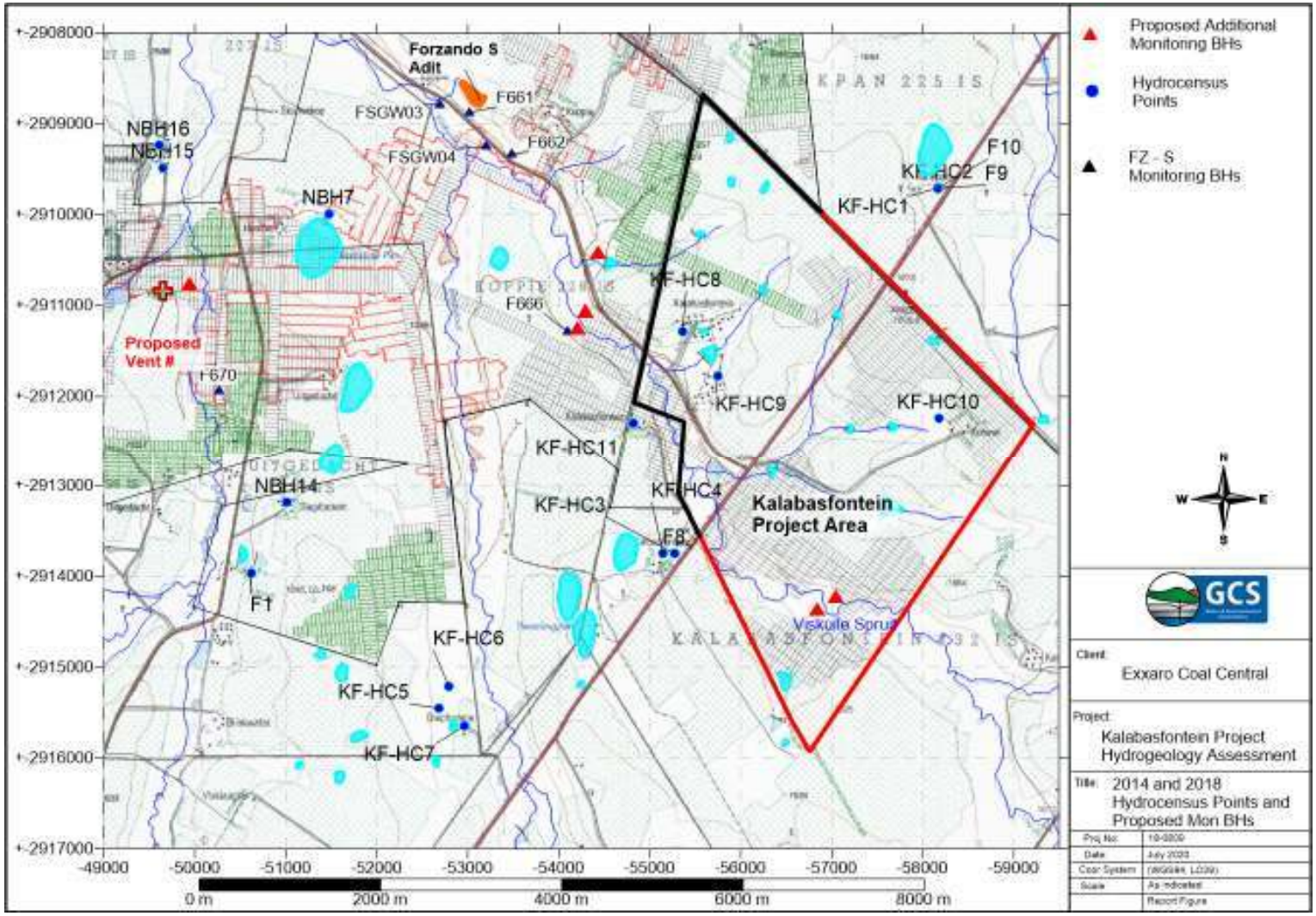

Figure 12: Proposed additional groundwater monitoring points

8.3.5 NOISE MONITORING

The proposed noise monitoring methodology is described in the sections below. Environmental Noise Monitoring can be divided into two distinct categories, namely:

- Passive monitoring: the registering of any complaints (reasonable and valid) regarding noise; and
- Active monitoring: the measurement of noise levels at identified locations.

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 as per the following sections. It is recommended that the noise investigation be done by an independent acoustic consultant.

8.3.5.1 MONITORING LOCALITIES AND PROCEDURES

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 as per the following sections. It is recommended that the noise investigation be done by an independent acoustic consultant.

8.3.5.2 RELEVANT STANDARD FOR NOISE MONITORING

Noise measurements (if and when required) must be conducted as required by the National Noise Control Regulations (GN R154 of 1992) and SANS 10103:2008. Due to the variability that naturally occurs in sound levels at most locations, it is recommended that semi-continuous measurements are conducted over a period of at least 24 hours, covering at least a full day- (06:00 – 22:00) and night-time (22:00 – 06:00) period. Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as $L_{Aeq,I}$ (National Noise Control Regulation requirement), $L_{A90,f}$ (background noise level as used internationally) and $L_{Aeq,f}$ (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.

8.3.5.3 MONITORING FREQUENCIES

No active environmental noise monitoring is recommended due to the low significance for a noise impact to develop.

8.3.5.4 VARIABLES TO BE ANALYSED

Measurements should be collected in 10-minute bins defining the 10-minute descriptors such as LAeq,I (National Noise Control Regulation requirement), L¬A90,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.

Data must be stored unmodified in the electronic file saved from the instrument. This file can be opened to extract the data to a spread sheet system to allow the processing of the data and to illustrate the data graphically. Data and information should be safeguarded from accidental deletion or corruption.

8.3.5.5 FEEDBACK TO RECEPTOR

When a noise complaint is registered, the following information must be obtained:

- Full details 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).

8.3.6 BLAST MONITORING

No active blast monitoring is recommended.

8.3.7 FAUNA AND FLORA MONITORING

A rehabilitation plan must be compiled, and this should include the implementation of the alien plant species management plan.

8.3.8 REHABILITATION MONITORING

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

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

Control of invasive vegetation species.

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 reports have been included as Appendices to this report:

Appendix 1: EAP CV

Appendix 1: EAP CV

CURRICULUM VITAE

Name:	Bongani Darryl Khupe
Profession:	Environmental Scientist
Professional Qualification/ Training:	Bsc. Hons in Applied Environmental Science; University of Zimbabwe, 2004
	Introduction to SAMTRAC, NORSA, 2010.
	Environmental Law Short Course, Rhodes University, 2011
	Environmental Auditing, Aspects International, 2012
	Fundamentals of Project Management, University of the Witwatersrand, 2013
	ISO 14001:2015 Understanding and Implementation of Environmental Management Systems, SABS, 2016
	14001:2015, Lead Auditor, WTH Management and Training, 2017
	Environmental and Social Risk Management (ESRM) Training of Trainers Course, International Finance Corporation (IFC), 2018
	Master Class on E&S Sustainability Management (European Investment Bank), 2018
Professional Membership/ Registrations:	• Professional Natural Scientist (SACNSP- # 400375/11) • Environmental Auditor (IEMA - #0051390) • Provisional Auditor (SAATCA – # E4832):
Current Employer:	Environmental Impact Management Services (Pty) Ltd.

KEY EXPERIENCE

Mr Khupe is a registered Professional Natural Scientist who holds a Bachelor of Science Honours degree in Applied Environmental Science from the University of Zimbabwe and is a trained Environmental Auditor (Crystal Clear, 2012). His training included all aspects of Environmental Auditing as well as EMS auditing in terms of ISO14001. In addition, he is trained on the ISO14001:2015 environmental standard and has completed the EMS lead auditor training in terms of ISO14001:2015. Mr Khupe is registered with the Institute of Environmental Management and Assessment (IEMA) as an Environmental Auditor. He has more than 13 years' experience in the environmental field. His key focus is on environmental compliance advice and monitoring, environmental impact assessments, environmental permitting, public participation and consultation, environmental management plans and programmes, strategic environmental advice, rehabilitation advice and monitoring as well as providing technical input for projects in the environmental management field. . He also has separate training on Environmental and Social Management Systems from the IFC and European Investment Bank.

CAREER SUMMARY

Period: January 2013 to Present	Organisation: EIMS	Position: Senior Environmental Consultant
Key Projects/Assignments	• **Project Manager and Senior Consultant on various projects including the following**: ❖ Eskom Medupi and Matimba coal-fired power stations application for alternative limits in terms of the Minimum Emission Standards. ❖ Vlakfontein Coal Mine Risk assessment, Mpumalanga Province. ❖ Project manager for the Sasol Secunda Plant Air Quality Education and Awareness Project as part of the offset programme required by the plants Air Emissions License ❖ Project manager for the Sasol Secunda Plant AEL bi-annual Public Participation sessions as required by the plants Air Emissions License. ❖ The development of the City of Johannesburg Metropolitan Municipality's waste by-laws compliance monitoring and enforcement strategy and related guidelines ❖ Integrated Environmental Authorisation for a Waste License and WUL for a new ash disposal facility for Eskom's Arnot Power Station, Mpumalanga State Province. ❖ EIA and EMP for the proposed Motouane Henneman Exploration Right, Free State Province ❖ EIA and EMP for the proposed Motouane Ladysmith Exploration Right, Free State Province ❖ Waste License and Air Emissions License for Ecorevert Pyrolysis Plant and Refinery, Waddeville, Johannesburg ❖ EIA and EMP for the proposed AES Wind Energy Facility, Northern Cape Province ❖ Basic Assessment for the proposed construction of Three New Bulk Water Reservoirs near Giyani, Limpopo Province (Mopani District Water and Wastewater Revitalisation Programme) ❖ Basic Assessment for the proposed construction of Giyani Waste Water Treatment works near Giyani, Limpopo Province (Mopani District Water and Wastewater Revitalisation Programme) ❖ EMP for the proposed Bethal station siding coal handling facility, Mpumalanga Province ❖ EMP for the proposed Grootvlei Coal Handling Facility, Mpumalanga Province ❖ EMP for the proposed Belfast Coal Handling Facility, Mpumalanga Province. • **Permit applications and S24 rectification applications for the following** ❖ Construction and upgrade of the bulk water supply and water reticulation infrastructure within the Giyani Local Municipality (Mopani District Water and Wastewater Revitalisation Programme) ❖ Construction of dam and a road within a watercourse on Portion 1 Of Farm Groenfontein 126, Dinokeng, City of Tshwane Metropolitan Municipality ❖ Air Emissions License for Ecorevert Pyrolysis Plant and Refinery, Waddeville, Johannesburg. ❖ Water Use License for the construction of dam and a road within a watercourse on Portion 1 Of Farm Groenfontein 126, Dinokeng, City of Tshwane Metropolitan Municipality ❖ Water Use License for Belfast Coal Handling Facility, Mpumalanga Province • **Environmental Control Officer Manager for the following projects**:	

	❖ Transnet New Multi Product Pipeline (NMPP) Project, responsible for the day to day co-ordination and management of 3 full time ECO's appointed to this project. ❖ Retrofitting of the existing Electrostatic Precipitators (ESPs) with Fabric Filter Plants (FFPs) for Eskom Grootvlei Power Station, responsible for the day to day co-ordination, management and technical support for 2 full time ECO's appointed to this project. ❖ Construction of Eskom Kusile Power Station, responsible for the day to day co-ordination, management and technical support for 2 full time ECO's appointed to this project • **Environmental Control Officer of the following projects** ❖ Construction of Eskom Klevebank-Ithuba-Dalkeith 88kV powerline ❖ Rehabilitation of the Sandspruit River Basin, Killarney Golf Course, Johannesburg • **Environmental Auditor on the following projects**: ❖ ISO14001: 2015 Environmental Management System Internal Audit for De Beers Venetia Mine. ❖ Integrated Water Use License Audit for Sasol Mining Block 3, Secunda. Audit included the following Sasol Mines and operational areas; o Bosjesspruit Mining Operations, o Brandspruit Mining Operations, o Middelbult Mining Operations, o Twistdraai Mining Operations, o Twistdraai Export Plan, o Engineering Support Services, and o Sasol Coal Supply. ❖ Water Use License Audit for Sasol Irenedale Mine Service Water Dam, Secunda ❖ Annual Environmental Compliance Audit report for the operation of Sasol Dyno Nobel (Pty) ltd Ekandustria. ❖ Environmental Legal Review Audit for compliance to ISO14001 for Eskom Tutuka Power Station. ❖ Environmental Legal Review Audit for Eskom Majuba Power Station. ❖ Quarterly Environmental Compliance and IFC Audits (Lenders requirements) for Eskom's Ingula Pumped Storage Scheme (12 Audits). ❖ Annual Environmental Compliance and IFC Audits (lenders requirements) for Cennergi's Amakhala Emoyeni Wind Energy Facility. ❖ Environmental Legal Review Audit for compliance to ISO14001 for Eskom Group Capital Division Office (GCDO). ❖ Environmental Legal Review Audit for compliance to ISO14001 for Eskom Power Delivery Projects (PDP). Audit included the project sites such as the construction of the Kappa-Sterrekus 765Kv powerline (Western Cape), construction of the Aries-Neuwenhoop transmission powerline (Northern Cape), construction of the Kookfontein Substation (Gauteng) and the construction of the Hendrina-Gumeni powerlines. ❖ Environmental Legal Review Audit for compliance to ISO14001 for Eskom Medupi Power Station Construction. ❖ Environmental Legal Review Audit for compliance to ISO14001 for Eskom Real Estate. Audit included the following project sites such as Megawatt Park (MWP), Mkondeni Regional Office in Pietermaritzburg and Koeberg Nature Reserve. o Environmental Legal Review Audit for Eskom Medupi Power Station Operational Phase

Period: October 2010-December 2012	Organisation: Savannah Environmental (Pty) Ltd	Position: Environmental Consultant
Key Projects/Assignments	• **Giving input and assisting in Public Participation projects,** • **Sourcing and managing external specialist,** • **Client and Authority Liaison,** • **Conducting/Attending project meetings** • **New project procurement** • **Conducting Environmental Impact Assessments (EIA) and Basic Assessments (BAR) for the following** ❖ EIA for the proposed Oyster Bay Wind Energy Facility on a site near Oyster Bay, Eastern Cape Province (for Renewable Energy Systems) ❖ EIA and EMP for the proposed Ramphele PV Solar Energy Facility, near Kimberley, Northern Cape Province (Solar Capital) ❖ EIA and EMP for the proposed Ilanga Lethemba PV Solar Energy Facility, near De Aar, Northern Cape Province (for Solar Capital) ❖ Basic Assessment proposed RustMo1 PV solar Energy Facility, Near Buffelspoort, North West Province (for Momentous Energy) ❖ Basic Assessment proposed RustMo2 PV Solar Energy Facility, Near Buffelspoort, North West Province (for Momentous Energy) ❖ EIA and EMP for the proposed Hantam PV Solar Energy Facility, near Loerisfontein, Northern Cape Province (for Solar Capital) ❖ EIA and EMP for the proposed Karoo Renewable Energy Facility on a Site south of Victoria West, Northern and Western Cape Province (for SARGE) ❖ BAR and EMP for the proposed O'kiep 1 PV Solar Energy Facility on a site in O'kiep near Springbok, Northern Cape Province (for SARGE) ❖ BAR and EMP for the Proposed O'kiep 2 PV Solar Energy Facility on a site in O'kiep near Springbok, Northern Cape Province (for SARGE) ❖ BAR and EMP for the proposed Nigramoep PV Solar Energy Facility near Nababeep, Northern Cape Province (for SARGE) ❖ BAR and EMP for the proposed Nigramoep PV Solar Energy Facility near Nababeep, Northern Cape Province (for SARGE) ❖ BAR and EMP for the proposed Carolusberg PV Solar Energy Facility on a site near Carolusberg, Northern Cape Province (for SARGE) ❖ EIA and EMP for the proposed Kabi Vaalkop Solar PV Facility on a site near Orkney, North West Province (for Kabi Solar) ❖ EIA and EMP for the proposed Kabi Witkop Solar PV Facility on a site near Orkney, North West Province (for Kabi Solar) ❖ BAR and EMP for the proposed Kgabalatsane PV 1 Solar Energy facility on a site near Brits, North West province (for Built Environment Africa Energy Services (Pty) Ltd) ❖ BAR and EMP for the proposed Kgabalatsane PV 1 Solar Energy facility on a site near Brits, North West province (for Built Environment Africa Energy Services (Pty) Ltd) ❖ BAR and EMP for the proposed RustMo3 PV Solar Energy Facility, Near Buffelspoort, North West Province (for Momentous Energy) ❖ BAR and EMP for the proposed RustMo4 PV Solar Energy Facility, Near Buffelspoort, North West Province (for Momentous Energy) ❖ EIA and EMP proposed Garob Wind Energy facility near Copperton, Nothern cape Province (for Juwi renewables) ❖ EIA and EMP for the proposed Wind Energy Facility on a site near Molteno, Eastern Cape Province (for Rainmaker Energy Projects) ❖ BAR and EMP for the proposed Kokerboom PV Solar Power Facility on a site south of Springbok, Northern Cape Province (for BQR South Africa)	

	❖ BAR and EMP for the proposed Baobab PV Solar Power Facility on a site north of Kamieskroon, Northern Cape Province (for BQR South Africa) ❖ EIA and EMP for the proposed Elliot Wind Energy Facility, Eastern Cape Province (for Rainmaker Energy Projects) ❖ EMP for the reinstatement of the Standerton Tutuka Railway line, near Standerton, Mpumalanga Province (For Eskom Holdings) ❖ Basic Assessment for the Proposed Raw water pipelines for Medupi Power station, Lephalale, Limpopo Province (for Eskom Holdings) • **Environmental Compliance Monitoring (ECO/Auditor);** ❖ Olifants River Water Resources Development Project (ORWRDP), De Hoop Dam, Compliance monitoring for all project phases including rehabilitation (For Department of Water Affairs) ❖ Cookhouse Wind Energy Facility Pre-Construction EMP Implementation, Eastern Cape Province (For ACED ❖ Neptune-Vuyane power line construction, Eastern Cape Province, responsible for the day to day co-ordination, management and technical support of 1 full time ECO's appointed to this project • **Strategic & regional assessments for energy facilities,** ❖ Site screening assessment for renewable energy facility development for three identified sites in the Northern & Eastern cape provinces (Networx) ❖ Environmental Due Diligence Report for the Vaal River Solar 1 PV Facility (Enertis Solar) ❖ Environmental Screening Report for the proposed Groenfontein Collieries and Lengau Power Station Projects near Vierfontein, Free State Province (Cennergi) • **Permitting and other projects** ❖ Vaal River Solar 1 PV Facility application for Approval from the Department of Mineral Resources (DMR) to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act (for Kabi Solar) ❖ Witkop PV Facility application for Approval from the Department of Mineral Resources (DMR) to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act (for Kabi Solar) ❖ Sol Plaatje Solar Photovoltaic Facility application for Approval from the Department of Mineral Resources (DMR) to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act (for Kabi Solar)	
Period: August 2009-September 2010	**Organisation: EIMS**	**Position: Environmental Control Officer (ECO)**
Key Projects/Assignments	Employed by Environmental Impact Management Services (Pty) Ltd (EIMS) as an Independent Environmental Control Officer (ECO) on the Transnet New Multi Product Pipeline (NMPP) Project. His responsibilities in the NMPP project included the following: • Liaison with the Construction Environmental Manager (contractor's environmental manager), Environmental Officers (appointed by the contractor) and Environmental Manager (Transnet Representative). • Implementing the EMP and Environmental Authorisation compliance monitoring and recommending corrective action for any noncompliance incidents on the construction site.	

	• Monitoring the daily construction operation, recording (in writing and photographically) any non-compliances/ incidents and areas of concern with respect to the Environmental Authorisation and related documentation • Submitting concise environmental compliance daily reports via email to all relevant parties • Providing ad hoc advice, liaison and clarification on compliance issues and environmental issues to the contractor, environmental officers and Authorities • Conducting Pre-Construction surveys along the alignment route of the pipeline to identify and peg sensitive environments (Wetlands, rivers, red data species, etc) and areas of cultural significance (heritage areas). • Keeping photographic record of Pre-Construction Survey so as to aide in rehabilitation of the pipeline after construction • Monitoring reinstatement of the pipeline Right of Way	
Period: February 2007 to August 2009	**Organisation: Enviro-Afrik (Pty) Ltd**	**Position: Environmental Consultant**
Key Projects/Assignments	During his employment he gained experience in a variety of projects as detailed below: • **Environmental Impact Assessments** ❖ Housing Developments ❖ Upgrade of rail infrastructure ❖ Linear developments • **Conducting Basic Assessment** ❖ Numerous housing developments and/or associated infrastructure • **Environmental Monitoring and Auditing:** ❖ Housing developments ❖ Stormwater and road construction ❖ Power line construction • **Other** ❖ Pre-feasibility & site selection ❖ Giving input and assisting in Public Participation	

LANGUAGE CAPABILITY

Language	Speak	Read	Write
English	Excellent	Excellent	Excellent
Zulu	Excellent	Good	Good

DECLARATION

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications and that, at the time of signature.

_____ 17 May 2020

Signature of Staff Member Date