PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT FOR THE DRIEFONTEIN MINE

A Scoping & EIA Process was followed according to GNR 326 Regulation 21-24 of the NEMA EIA Regulations 2014, as amended, in support of the Mining Right and Environmental Authorisation application and the EMPr is thus subject to the requirements of Appendix 4 of the NEMA EIA Regulations of 2014.

The implementation of this EMPr is a requirement in terms of NEMA and will be a condition of the Environmental Authorisation, issued by the Competent Authority. The Applicant and contractors must therefore familiarise themselves with the contents of this document because failure to comply with the commitments made will constitute an offence which can lead to penalties and/or legal action.

The EMPr should form an integral part of the contract documents to ensure that the biophysical, cultural and socio-economic environment is not adversely affected by the potential impacts resulting from the different aspects of the proposed Driefontein Mine. It should further be noted that the EMPr is not static, as allowances have been made for it to evolve in the future. Such a characteristic is seen to be important as key factors and processes may change through the life of mine. It is therefore necessary to alter proposed mitigation and monitoring methodologies in order to determine the best approach to deal with such changes.

Disclaimer

The mitigation and management measures presented in the EMPr are made for the benefit of those responsible for the implementation and monitoring of the mining operation. Canyon Resources (Pty) Ltd is fully responsible for the correct implementation of the EMPr. uKhozi accepts no liability resulting from misinterpretation and/or mismanagement of the operation made in conjunction with this EMPr. The EMPr by nature is a dynamic document and the NEMA provides for continual updating of the EMPr, with approval from the Competent Authority.

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1 Details of EAP

The Applicant appointed uKhozi Environmentalists (Pty) Ltd as an independent environmental consultant, to facilitate the Environmental Authorisation process. This EMPr was compiled by Thomas Olivier and reviewed by Inus de Wit. The contact details, qualifications and proffesional affiliations of the Environmental Assessment Practitioners are presented in the Table below. Refer to Part A: Section 3 for more details regarding the Project Team.

Table 1: Contact details of EAP

Name	Role	Qualifications	Proffesional Affiliations	Years Experience	Contact details
Thomas Olivier	Project Mananger	Bachelor of Science (BSc) Degree in Ecology BSc Honours degree in Environmental Management and Analysis	EAPASA *Registered EAP (Number: 2020 2020/1162)*	11	Email: tommy@ukhozi-enviri.co.za Tel: 082 521 8870
Inus de Wit	Alternate project manager	Bachelor of Science (BSc) Degree in Ecology BSc Honours degree in Environmental Management and Analysis Master of Science (MSc) Degree in Water Management	EAPASA *Registered EAP (Number: 2019/417)*	9	Email: inus@ukhozi-enviro.coza Tel: 082 451 1615

2 Description of the Aspects of the Activity

The project will involve the development of a new Greenfields opencast coal mining operation on Portion 6 of the farm Sterkstroom 400 JS, Portion 5, and a section of Portion 6 of the farm Driefontein 398 JS. The proposed opencast coal mining will be conducted using the conventional truck and shovel rollover method. The mining operation will consist of two opencast pits referred to as the Northern and South-Eastern Pits which will be mined through a phased approach with the aim to allow for farming activities to continue whilst mining takes place. Mining activity at the northern and south-eastern sections of the proposed mine will not take place concurrently.

Topsoil and subsoil will be stripped using an excavator and will be stored in separate stockpile areas on the mining area. Drilling and blasting will be employed for the hard overburden or bedrock to expose the coal seams. Once blasted, the hard overburden will be excavated and stockpiled separately for rehabilitation. Concurrent rehabilitation will occur during the operational phase by means of the roll over method.

No wash plant will be established on site. Run of Mined (ROM) coal will be stockpiled at the designated stockpile areas and transported to the existing Hakhano Colliery washing plant situated approximately 3km south of the application area or other licensed site for processing via the existing gravel road (D1433) or sold raw. No coarse discard, slurry or product will be stored at the proposed open cast mine. The main access road will be constructed from the D1433 gravel road that runs between the R104 and R555.

The project has an indicated resource of 7.286 million tonnes of coal that will be marketed to local markets. Production will start with 10 000 tons after site establishment and will increase with 20 000 tons per month to an average of 90 000 tons per month once in full production with the life of mine expected to be 7 years.

The following sub sections summarise the aspects of the proposed mining operation in terms of the mineral to be mined and the specific activities proposed per phase.

2.1 Type of Application

This is a Mining Right, Environmental Authorisation and Waste License application for an opencast coal mine.

2.2 Aspects of the proposed operation

Refer to Part A: Section 5 for a detailed description of the proposed operation. This EMPr will cover the activities planned during the construction phase, operational phase and decommissioning/rehabilitation and closure phase. The aspects of the proposed operation associated with the different phases are summarised below.

2.2.1 Construction phase

The construction phase will prepare the site for mining which will include opening the box cut and setting up the required infrastructure. The proposed activities are listed below:

- **Site clearance**
- **Soil stripping and stockpiling**
- **Opening of initial box cut through blasting and excavation of overburden material**
- **Construction of infrastructure:**
  - **Upgrading and establishment of access and haul roads**
  - **ROM coal stockpile areas**
  - **Overburden dump areas**
  - **Pollution control dams (PCDs)**
  - **Storm water infrastructure incl. clean and dirty water channels and diversion berms**
  - **Workshop areas and contractor yards.**
  - **Bulk fuel storage facility**
  - **Hard park, offices, and guard houses**
  - **Sewage management system**
- **General and hazardous waste management**
- **Construction vehicle movement and increased human activity in and around MRA**
- **Appointment of employees and contractors**

2.2.2 Operational phase

All related mine operations, including coal removal, stockpiling, transportation as well as concurrent rehabilitation forms part of this phase. The proposed activities are listed below:

- **Opencast mining and earth work activities**
- **Ongoing vegetation clearance, soil stripping and stockpiling**
- **Dewatering of opencast pits**
- **Overburden stockpiling**
- **ROM Coal handling and stockpiling**
- **Storm water management**
- **Operation of bulk fuel storage facility**
- **Operation of workshop areas**
- **Sewage management**
- **Operational vehicle and increased human activity in and around the MRA**
- **General and hazardous waste management**
- **Implementation of the Social and Labour Plan (SLP)**
- **Concurrent rehabilitation**

2.2.3 Decommissioning/rehabilitation and closure phase

This phase will involve the removal of all infrastructure and rehabilitation of the disturbed area according to the closure plan (attached as Appendix 6.12) which will be updated throughout the life of the mine. The proposed activities are listed below:

- **Final backfill of open pit and closing of the final void**
- **Dismantling and removal of mining infrastructure**
- **Rehabilitation of compacted areas**

- **Rehabilitation of the PCDs and associated infrastructure**
- **Cleaning, landscaping, and replacement of soils over the disturbed area**
- **Waste generation and disposal**
- **Retrenchment**
- **Wastewater treatment**

3 Composite map

Refer to Figure 1 below which shows the Final Site Map in relation to the identified sensitive areas including existing infrastructure found inside the application area and its surrounds. The following exclusion zones/buffer areas were defined:

- **Natural Grassland and moist grassland areas.**
- **Identified Wetlands, Channelled valley bottom (CVB) wetland, Unchanneled valley bottom wetlands (UVB), and Pan.**
- **The burial grounds and graves sites identified inside the application area.**

Please refer to Appendix 3 for a clearer version of the plan.

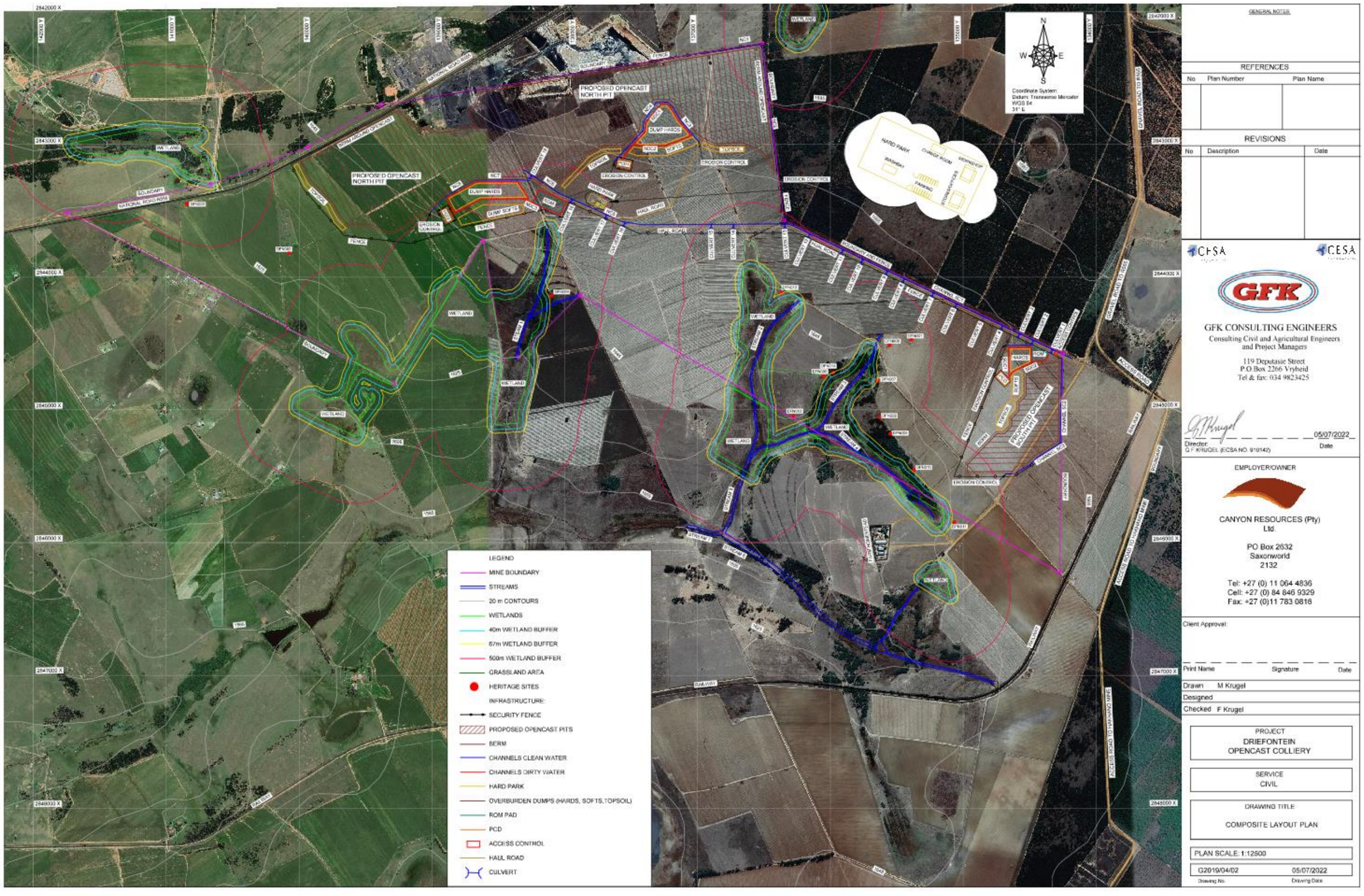

Figure 1: Composite Plan

4 Description of impact management objectives including management statements

The following EMPr has been structured in such a manner as to provide a basis for an Environmental Management Systems (EMS) for the life of mine. The purpose of this Environmental Management Programme Report (EMPr) is to serve as an action plan for implementation of mitigation and management measures to ensure satisfactory environmental (biophysical, cultural and socio economic) management of the proposed Driefontein Mine. More specifically, the objectives of the EMPr are to guide and control the construction, operation and decommissioning/rehabilitation and closure phases of the mining operation. This EMPr should be used from construction through to decommissioning to ensure that appropriate environmental management measures and monitoring requirements are implemented by Canyon.

4.1 Determination of closure objectives

Environmental and social objectives are broad based goals to guide the rehabilitation plan and ensure activities proceed in an environmentally and socially responsible manner. To achieve closure the correct decision needs to be taken during the planning phase of the project.

4.1.1 Closure domains

As described in Section 2 above, the operational context of the proposed mine distinguishes between different operational areas on the mining site, which for the purpose of the closure assessment represents different areas referred to as closure domains.

Domains therefore comprise of site features that have similar closure requirements. The domains are therefore distinguishable based on, initially; differences in the operational processes, secondly; physical location and thirdly; an inherent ability for potential transfer (full or partial) to a third party during final closure planning stages. A closure domain, having similar attributes in effect presents similar closure objectives and can be clustered accordingly.

The other advantage of clustering the proposed mine operation into closure domains is that a domain (area) specific cost (liability) contribution can be presented as a standalone figure, awarding the opportunity to define specific closure objectives and associated costed management plans to each area. It also allows for the drilling down of closure risk into specific domains, whereby a specific domain can be distinguished from others driving accurate risk controls and measures. This in essence also improves the ability to track liability changes (increases and decreases) over time. Therefore, based on the operational overview the proposed Driefontein Mine is divided into the following main closure domains:

- **Domain 1 Offices and Admin buildings**
- **Domain 2 Water, Stormwater management and Pollution control Infrastructure**

- Domain 3 ROM and Overburden stockpiles
- Domain 4 Topsoil, Waste rock and interburden berms
- Domain 5 Fencing, Roads, and other linear Infrastructure
- Domain 6 Northern pit
- Domain 7 South Pit

In addition, the following nonphysical domains descriptions were also applied so as to feed into the closure financial model.

- Domain 8 Post Closure Aspects
- Domain 9 Risk Based and regulatory allowances

Refer to Section 5 of the Closure Plan (Appendix 6.12) for a detailed description of each domain.

4.1.2 Closure vision

The closure vision is an aspirational description of what will be achieved with the proposed Driefontein Mine, mine closure, compatible with regulatory requirements. The vision incorporates an overview of the post closure land, evolving as more information becomes available. The closure vision is to "obtain a sustainable, stable post mining land capability which is not significantly different from that which existed pre-mining, where health and safety is not significantly compromised and where long-term impacts on the environment is minimised."

The Driefontein closure outcome includes the removal all the physical infrastructure and fixed assets off site (unless agreed with third parties that such structure shall remain after closure), rehabilitate all disturbed areas (except for the areas occupied by buildings and infrastructure, which can be commercially employed or converted for any other purpose (determined and agreed to by means of exhaustive public participation), complete backfill and rehabilitation of the opencast pits, long term water treatment initiatives to achieve the instream water quality objectives set out by the CMA as well as to supply suitable water resources to re-establish the agricultural capability of the area.

4.1.3 Closure principles

The closure principles are the common precepts that guide the basis of the proposed Driefontein mine closure plan, more specifically the promotion of physical and chemical stability, meeting regulatory obligations and facilitating social transition and or end user duties where applicable.

The following are key principles that form the basis upon which the rehabilitation, closure and aftercare issues at the proposed mine are evaluated. These principles are used as guidelines toward the annual and final rehabilitation and closure plans required by the Financial Provisioning Regulations, 2019. The Driefontein final closure plan should:

- Enable all stakeholders of Driefontein to have their interests considered during the decommissioning and mine closure phase and overall process (this is achievable

through the NEMA Environmental Impact Assessment (EIA) Public Participation Process (PPP)).

- Ensure the processes of rehabilitation occurs in an orderly, cost-effective and timely manner based on and linked to defined and achievable relinquishment criterion.
- Ensure the cost of ongoing rehabilitation is adequately represented in company accounts as operational allocations.
- Ensure there are clear organisational accountability and adequate resources for the implementation of the annual and final closure and aftercare plans.
- Establish a set of indicators (relinquishment criteria) which will demonstrate the successful completion of the rehabilitation and the closure process; and
- Reach a point where the company has met agreed completion criteria to the satisfaction of the responsible authority.

As such and while the closure vision provides overarching direction for closure, and the principles provide a general framework, the closure objectives provide concrete, site-specific and typically measurable statements of what closure activities or measures aim to achieve.

Individual objectives are therefore specific to mine domains informed by consideration of domain specific risks and opportunities as early identification of closure risks allows possible impacts to be avoided or mitigated in a timely manner, which ultimately reduces the closure liabilities and improves post closure benefits. Refer to Section 8, 9, 10, 11, 12, 13 and 14 of the Closure Plan (attached as Appendix 6.12) which documents, assesses, and prioritises the Internal and external considerations which will give rise to the domain specific closure objectives as portrayed in the figure below.

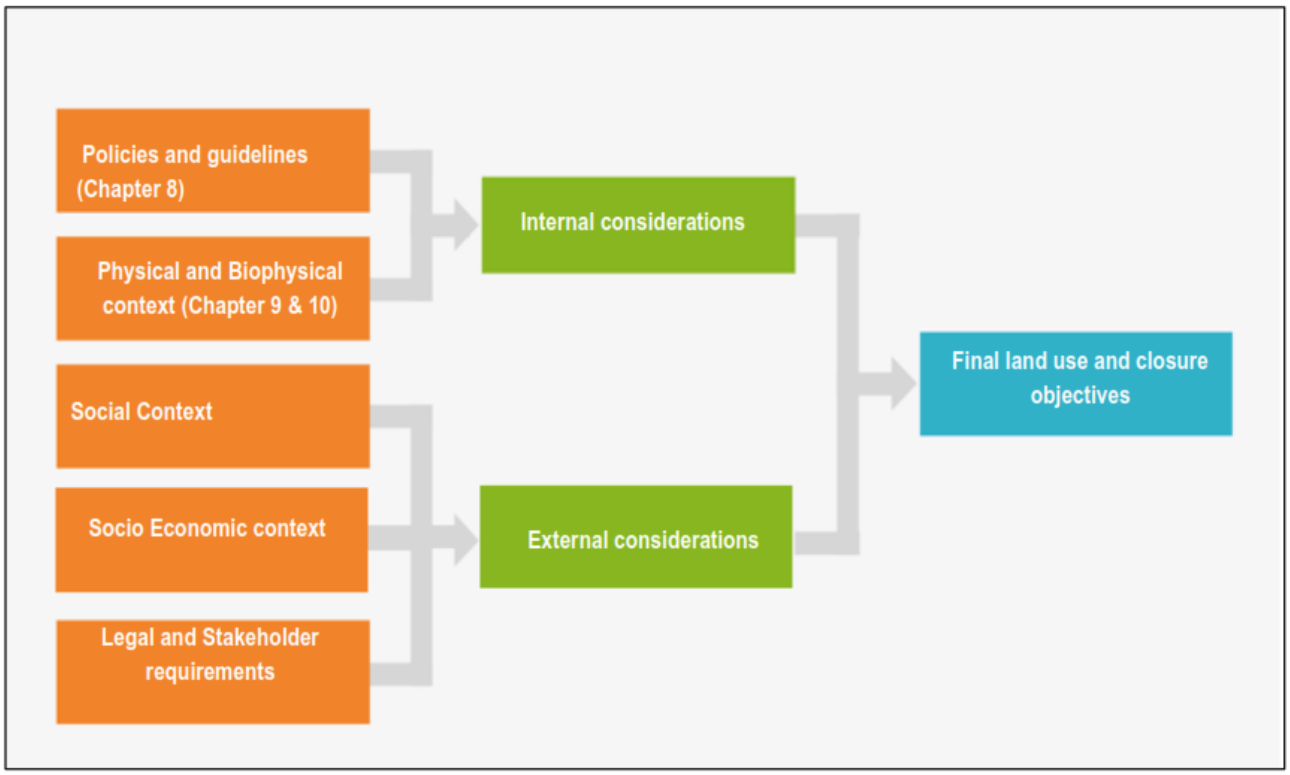

Figure 2: Driefontein Closure Objective development structure (adopted ICMM 2016 / E van Druten)

4.2 Process to manage environmental impacts

Significant environmental aspects and their associated environmental impacts were identified for the proposed Driefontein Mine as part of the impact assessment. Consideration was given to the Impact Mitigation Hierarchy in terms of the impact management objectives for the proposed mine which first aim is to avoid/prevent the impact from occurring and where this is not possible to minimize the significance of the impact. Where the impact cannot be avoided and or minimized, measures have been included that focus on the repair/restore of the environmental aspect. The identified impacts will be mitigated by implementing the measures outlined in Section 5 below.

This EMPr aims at prevention of emergencies minimising environmental risks and impacts as far as possible and therefore all possible measures are taken to eliminate or reduce the potential causes of emergencies. However, circumstances which may lead to unacceptable risks could occur, therefore emergency systems and procedures are designed to be implemented in the case of an emergency to prevent or minimise the consequential environmental damage.

An Emergency Preparedness Plan (EPP) was developed by Canyon and describes the procedures in place with regards to the preparedness and response to environmental emergencies to effectively manage emergency situations that may arise. The EPP has the following objectives:

- To categorise emergency situations through hazard identification and to define procedures for responses to the situations.
- To assign responsibilities for responding to emergency situations.

- To implement an effective system to receive, record and communicate reports of environmental incidents and emergencies; and
- To ensure that all environmental incidents or emergencies are investigated, and the necessary procedures are in place to implement corrective and preventative actions to prevent a recurrence of the incident.

Management of any potential incidents will be in terms of the relevant procedures as set out in the Mine Health and Safety Act, 1996 (Act No. 29 of 1996) (MHSA), and other relevant laws. In the controlling of an environmental emergency the relevant procedures and persons as prescribed under Section 30 of NEMA, and Section 20 of the NWA will be followed.

4.2.1 Significance of non-conformances

All non-conformances are to be rated according to criteria detailed in Table 2. The significant incident is to be communicated to the Applicant by the Mine Manger and where required to the various government departments in terms of NEMA. The reports issued to government are to be filed according to the records procedure.

4.2.2 Environmental non-conformance follow-up

The key role players logging the non-conformance on site will identify appropriate corrective actions. It is the responsibility of Mine Manager to ensure that follow-up actions are executed, and progress reports updated on the Environmental Management System (EMS) database until the non-conformance has been cleared. If trends in non-conformance reporting are identified that indicate continued poor environmental performance of certain sections, operations and / or employees, appropriate corrective and preventative measures will be discussed at relevant forums.

4.2.3 Environmental non-conformance report and investigation records

The following records will be kept in accordance with the EMS records procedure:

- Non-conformance reports; and
- Corrective / preventive actions with progress reports in the EMS database.

Table 2: Significance of environmental non-conformances

Levels	Classifications	Comments
Level 1	Is an incident that has resulted in the breach of any environmental operational procedure or standard that may have a minor impact on the environmental ecosystem and has raised no concern from local stakeholders (e.g., clean up can been rectified immediately).	All incidents logged on the EMS system and actioned (records to be kept)
Level 2	Is an incident that has resulted in the breach of any environmental operational procedure or standard that has a low impact on the environmental ecosystem and has raised concerns from local stakeholders (e.g., clean up can been done in one day - i.e., 24 hours).	
Level 3	Is any incident that resulted in a breach of legal environmental requirements (legislation- non reportable) and/or operational procedures that have a medium impact on the ecosystem and/or that has caused attention, complaints by local or external stakeholders. (e.g., short-term pollution - clean up can done within seven [7] days)	
Level 4	Is any incident that resulted in a breach of legal environmental requirements (legislation - reportable) and/or operational procedures that has a high impact on the ecosystem and/or that has caused attention, complaints by local or national stakeholders. (e.g., short-term pollution levels - where clean up may take up to one month)	Has the potential to become significant (take sections 28 to 30 of NEMA, 1998 into consideration)
Level 5	Is any incident that resulted in a breach of legal environmental requirements (legislation - reportable) and/or operational procedures that have a significant impact on the ecosystem and/or that caused attention or complaints by local, national, or international stakeholders and / or the press. (e.g., long-term pollution - clean-up will take more than a month)	Significant Incident reports required (take sections 28 to 30 of NEMA, 1998 into consideration)

4.3 Potential Risk of Acid Mine Drainage

The potential for a given rock to generate and/or neutralise acid is determined by its mineralogical composition. This includes the quantitative mineralogical composition, mineral grain size, shape and texture. The potential for Acid Mine Drainage (AMD), or poor-quality leachate, in coal mines is related to the generation of acid through the oxidation of sulphide minerals, which is caused through the exposure of these minerals (most commonly pyrite) to atmospheric oxygen. Pyrite (FeS2) reacts under oxidising conditions (abiotically or bacterially catalysed by Thiobacillus ferrooxidans) to generate acid according to the following reaction:

$$FeS_2 + \frac{15}{4} O_2 + \frac{7}{2} H_2O = FeOH_3 + 2H_2SO_4$$

In practice, this is a staged process in which the initial phases for the conversion of pyrite to ferrous and then ferric iron take place in moderately acidic environments (pH >4.5). The oxidation of ferrous iron in an acidic medium requires the catalytic influence of the bacteria (Thiobacillus ferro-oxidans). The chemical components of this acid generation process consist of the above sulphide oxidation reaction as well as acid neutralisation, which is mainly provided by carbonates and, to a lesser extent, silicates within the rock. It

is important to evaluate the potential volume as well as the quality of leachate that could be generated.

In opencast operations, the objective is to remove all the coal, therefore acid generation and neutralisation potential is based on the chemistry of the surrounding country rock (i.e., the roof (overburden) and floor of the coal seam. However, in high wall mining strips of coal are left behind to support the roof and prevent subsidence. In these instances, the acid generation potential will include the sulphur composition (volumes and speciation) within both the country rock and the coal itself, whilst the neutralisation potential remains that of the country rock only.

Should there be total coal extraction during opencast operations, with limited exposure of the floor material, the pre-mining geochemical model conducted as part of the EIA showed that there was insufficient sulphur to effect sustainable acid generation. The quality and volume of acid generated relates to the period of exposure of the coal/shale pyrite surface to oxygen before backfilling, and an anaerobic environment is created either through oxygen removal, dilution or flooding. It was thus recommended that any carbonaceous overburden or waste coal material be placed at the bottom of the pit, covered and compacted to reduce the potential for oxidation and acid generation. Any decant from all mining operations must be treated as a potentially contaminated.

Samples were collected from 2 newly drilled boreholes during the investigation (Refer to Part A Figure 41 for the location of these boreholes). The samples were submitted for geochemical analysis, including Net Acid Generation (NAG) and Acid Base Accounting (ABA). The following can be deducted:

Table 3: NAG pH Results

Final pH in NAG Test	Acid Generating Potential
>5.5	Non-Acid Generating Potential
3.5-5.5	Low Acid Generating Potential
<3.5	High Acid Generating Potential

Based on the NAG pH results, the following can be concluded:

- DFBH01 (6.34) – Non-Acid Generating Potential
- DFBH02 (7.70) – Non-Acid Generating Potential

Table 4: ABA Results

Criteria	Acid Generating Potential
If NNP=NP-AP<0	Sample is potentially Acid Generating
If NNP=NP-AP>0	Sample is potentially Acid Neutralizing

Based on the ABA results, the following can be concluded:

- DFBH01 – NNP=0.4-0.1=0.3 therefore NNP = Sample is potentially Acid Neutralizing
- DFBH02 – NNP=30.31-0.725=29.6 therefore NNP = Sample is potentially Acid Neutralizing

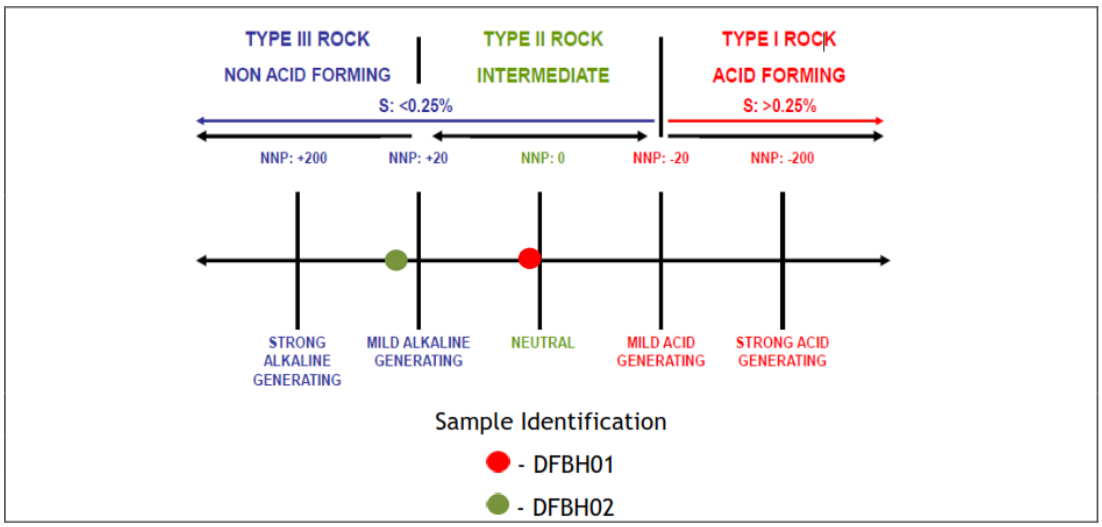

Figure 3: Interpretation of NNP values for Acid Base Accounting

4.4 Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

4.4.1 Measures to be implemented before operation

Pollution prevention starts in the planning phase of an operation through evaluation of plans and, aimed at understanding the potential impacts of alternative working methodologies and a conscious effort to select, design and implement the alternatives that maximise the ability to prevent pollution. Pre-establishment of an operation, typical pollution prevention considerations include the following:

- Before operation, a plan that includes explicit consideration of closure and rehabilitation issues must be prepared and approved. These plans should define the sequence and nature of operations and detail the methods to be used in closure and restoration. The plans as well as the numerical model should be updated regularly (every 3 to 5 years) during operation with available monitoring data. All operational planning and activities should be undertaken with eventual closure in mind, such that operations can end in a manner that minimizes the risk for AMD post closure. The following measures must be implemented before operations:
  - Waste residue deposits should be located as far as possible from the watercourses and lined to minimise leaching of minerals into the ground.
  - Water management facilities should be designed to intercept and contain as much contaminated runoff and/or seepage as possible.

- **The PCDs should be sanitarily lined with secondary containment in line with the DWS requirements.**

Photo Plate 1: Example of liner design

4.4.2 Measure to be implemented during operations

Overburden material must be separated into carbonaceous and non-carbonaceous stockpiles. The overburden material (carbonaceous and non-carbonaceous) used for backfilling, must be backfilled in the same sequence as removed during the mining phase. Backfilling of carbonaceous overburden material should not take place above the static groundwater level and/or saturated zone. This will prevent oxidation and associated chemical reactions which drives acid mine drainage processes. Backfilled carbonaceous overburden should be followed by non-carbonaceous overburden and capped with topsoil to ensure effective revegetation of disturbed areas.

Monitoring results should be evaluated and reviewed on a bi-annual basis by a registered hydrogeologist for interpretation and trend analysis. The following additional measures must be implemented during operations:

- **Apply effective storm water management principles to ensure that contaminated runoff is minimised and contained in lined PCDs.**
- **Mining should aim to remove as much of the coal seam (acid generating material) as possible.**
- **The capacity to rapidly pump water out of the pit into storage dams should be maintained. This will assist in minimising water quality deterioration due to long-term retention of storm water in contact with materials that may cause water quality deterioration.**
- **Apply passive water management measures within the operations that are aimed at minimising the potential for water quality deterioration due to the oxidation of sulphide minerals by reducing the available contact time between water and exposed sulphide minerals if determined to be necessary.**

4.4.3 Measures to be implemented after operations

The post-closure groundwater management of the opencast should be done in two phases:
Phase 1: Immediately after closure
Phase 2: After Rapid Flooding

Please note that the numerical and geochemical model needs to be updated against monitored data during the post-closure phase.

Phase 1: Immediately after closure

- **The acid producing material should be placed as low in the pits as possible, followed by the non-acid generating material.**
- **Rapid flooding should be done by diverting storm water channels and pumping of available groundwater into the pit until the acid producing material is inundated by the water.**

Phase 2: After Rapid Flooding
After the acid producing material is inundated by the water:

- **The final backfilled opencast topography should be engineered such that runoff is directed away from the opencast areas.**
- **The final layer (just below the topsoil cover) should be as clayey as possible and compacted if feasible, to reduce recharge to the opencasts.**
- **Natural berms should then be constructed to allow free drainage of surface water around the rehabilitated pit.**

4.4.4 Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

Active chemical treatment of AMD to remove metals and acidity is often an expensive, long-term liability and presents an indefinite latent risk to the long-term sustainability of the Driefontein closure objectives. Passive treatment systems have been developed that do not require continuous chemical inputs and that take advantage of naturally occurring chemical and biological processes to cleanse contaminated mine waters. The primary passive technologies include constructed wetlands, Anoxic Limestone Drains (ALD), Successive Alkalinity Producing Systems (SAPS), limestone ponds, and Open Limestone Channels (OLC). The SAPS system is recommended for the proposed mine.

4.4.4.1 SAPS AMD treatment system

A SAPS will combine the use of an ALD and an organic substrate into one system (Kepler & McCleary, 1994). It is already argued that the use of bales of straw / grass can be placed in narrow trenches as the organic material is easily accessible on site. This material will consume the dissolved oxygen and result in anoxic water conditions, effectively depleted from dissolved oxygen.

Geochemistry suggests that the lack of dissolved oxygen in the water will limit the interaction with available iron and reduce the formation of the SO_4 by- product. The

anoxic water is introduced to the underlying limestone which will passively generate bicarbonate alkalinity, in effect also reducing the availability of heavy metals. Sulphate reduction and Fe sulphide precipitation can also occur in the bales through the process of desulfurization.

Many possible variations in composition and thickness of organic matter, including the addition of limestone, desirability of promoting sulphate reduction, flow rates through organic matter, time schedule for replacement or addition of new organic matter, and precipitation of siderite in the limestone remain can be added to the operational model.

The anticipated AMD water is intercepted as a point source discharge, as will be the case should such decant occur on the Driefontein mine area. In the occasional instances where AMD water appears as seepage throughout a broader area like a hillside, cut of trenches should be constructed at the base of a hill to collect the AMD water and then provide it to the SAPS unit. An analysis of this AMD water will be required in advance of the SAPS design, but there are many consistencies that emerge due to basic water chemistry.

A SAPS can be constructed within a designed and lined trench. Approximately 1 – 1.5 m of limestone is placed in the bottom of the trench. Directly above that layer of limestone is a layer of organic material. In this case it is suggested that the bales of hay / grass be placed on top of the limestone. Also, such that it can be removed by hand and replaced (harvested). The hydrological flow is vertical, forcing the decant water to flow from the point source through the organic material, also naturally mixing with water in contact with the lower-level limestone.

The bales of hays' purpose are to prepare an anoxic environment created by the high Biochemical Oxygen Demand (BOD) of the organic material and to filter some precipitates (iron sulphide, for one) that will adhere to the organic material as the AMD water transitions to the anaerobic zone of the organic material. The limestone layer beneath increases alkalinity and raises pH levels – the anaerobic environment created by the compost above aids in the production of carbonate alkalinity as the limestone dissolves. These physical and chemical processes are required in succession to treat the AMD water efficiently, increase the water's pH, and precipitate the targeted metal ions from the waste stream when exposed to oxygen.

The chemical and pH properties of the proposed SAPS (see Figure 4) influents and effluents will routinely undergo laboratory testing as desired by the site owners or as required by regulatory agencies. Recurring inspection and maintenance of the hay / bales and limestone layers over intervals 12 months are recommended. These frequencies also depended on site conditions and flow rates. It is notable that a SAPS can operate for many years with minimal replenishment of the compost and limestone layers, achieving low operational costs. In contrast, many of the traditional AMD water treatment processes require more expensive chemical solutions involving sodium hydroxide, sodium carbonate, or hydrated lime. All of which presents its own series of risks and logistical problems.

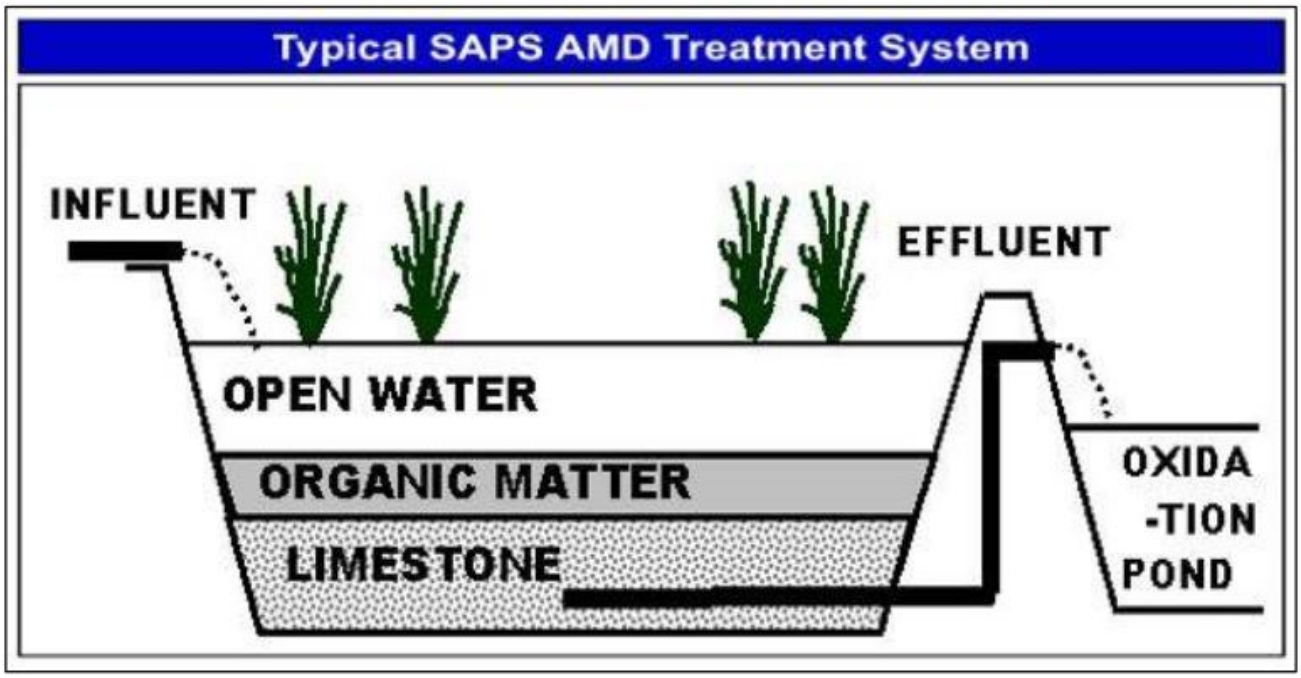

Figure 4: Typical AMD treatment system (ENVASS, 2019)

5 Volumes and rate of water use required for the operation

The volumes and rate of water uses required for the operation are as follows:

- **1590 m^3/annum potable water is required for the employees working at the mine. Potable water will be sourced from on-site boreholes and stored in JoJo tanks to be located at the contractor's yard.**
- **22 850m^3/annum is required for dust suppression purposes. Water will be sourced from the PCDs.**
- **293 727m^3/annum surplus water must be evaporated using three mechanical evaporators, one for each proposed PCD.**

5.1 Has a water use licence has been applied for?

Yes, a Water Use License Application (WULA) process is underway. The following Section 21 water uses require authorisation in terms of Section 40 of the NWA and have been applied for:

Table 5: Applicable Section 21 Water Use

Section 21 Water Use	Description
S21 (a) *Taking water from a water resource*	Pumping from borehole for the supply of potable water.
S21 (c) and (i) Impeding or diverting the flow of a watercourse and altering the bed, banks, course, or characteristics of a watercourse.	Construction of mining infrastructure within 500m of a wetland.
	Construction of culverts along the access road
	The establishment of the decant water treatment facility within 500m of a wetland.
S21 (f) Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit	Treated decant water will be discharged to the natural watercourses
S21 (g) Disposing of waste or water containing waste in a manner which may detrimentally impact on a water resource	Construction of three Pollution Control Dams (PCDs) to contain runoff from the ROM/overburden stockpiles and workshop area.
	Storing of ROM coal at two (2x) ROM stockpile area.
	Overburden stockpiling at designated stockpile areas.
	Disposal of sewage in a septic tank
	Dust suppression using potentially contaminated water from the PCDs.
	The establishment of the decant water treatment facility.
S.21 (J): Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons	Dewatering of the Northern and South-Eastern Opencast Pits.

6 Impacts to be Mitigated, Management Actions, Outcomes and Standards to be Achieved

The full impact assessment with associated mitigation and management measures are presented in Part A: Section 12.3. This section outlines the specific standards and limitations applicable to the project and provides mitigation/management measures to deal with key impacts associated with all the phases of the proposed Driefontein Mine as well as a description of the roles and responsibilities. The information contained in this section forms an integral part of this EMPr and must be adhered to at all times.

6.1 Standards and limitations applicable to the project

Specific standards and limitations applicable to the proposed project are presented below based on the applicable legislative requirements and recommendations from the specialist studies. The proposed Driefontein Mine must comply with these standards and limitations throughout the life of mine. Where applicable, these standards and limitations are referred to in the EMPr tables below.

6.1.1 Air Quality

6.1.1.1 Ambient air quality standards

National Ambient Air Quality Standards (NAAQS), including permitted frequencies of exceedance and compliance timeframes, issued by the Minister of Water and Environmental Affairs on 24 December 2009 is presented in Table below. National standards for $PM_{2.5}$ were established by the Minister of Water and Environmental Affairs on 29 June 2012.

Table 6: National Ambient Air Quality Standards for Criteria Pollutants

POLLUTANT	AVERAGING PERIOD	CONCENTRATION ($\mu g/m^3$)	FREQUENCY OF EXCEEDANCE(3)
Sulphur dioxide (SO_2)	10 minutes	500 (191)	526
	1 hour	350 (134)	88
	24 hours	125 (48)	4
	1 year	50 (19)	0
Nitrogen dioxide (NO_2)	1 hour	200 (106)	88
	1 year	40 (21)	0
Particulate Matter (PM_{10})	24 hours	75	4
	1 year	40	0
Particulate Matter ($PM_{2.5}$)	24 hours	40(1) 25(2)	0
	1 year	20(1) 15(2)	0
Ozone (O_3)	8 hours (running)	120 (61)	11
Benzene (C_6H_6)	1 year	5 (1.6)	0
Lead (Pb)	1 year	0.5	0
Carbon monoxide (CO)	1 hour	30 000 (26 000)	88
	8 hours (calculated on 1 hourly averages)	10 000 (8 700)	11

Notes:
**Values indicated in blue are expressed in part per billion (ppb)*
(1) Compliance required by 1 January 2016 – 31 December 2029.
(2) Compliance required by 1 January 2030.
(3) Frequency of exceedance refers to the number of times an exceedance is allowed within a calendar year.

The proposed Driefontein Mine falls within the Highveld Nationally Declared Air Quality Priority Area (HPA) and must therefore comply with the requirements of the HPA Air Quality Management Plan GNR 1241 (21 November 2008).

6.1.1.2 Dust deposition standards

The DEA issued National Dust Control Regulations on 1 November 2013 (Table 7). Updated draft National Dust Control Regulations were published on 25 May 2018. The regulations prescribe the method that should be used for undertaking dust-fall monitoring, which includes the use of dust bucket stations with a wind shield.

Table 7: South African National Dust Control Regulations

RESTRICTION AREAS	DUST-FALL RATE (D) (1)	REQUENCY OF EXCEEDANCE
Residential Areas	D < 600 mg/m²/day	Two within a year, no two sequential months (2)
Non-residential areas	600 < D < 1200 mg/m²/day	Two within a year, no two sequential months (2)

Notes:
(1) Averaged over 1 month (30±2-day average) (mg/m²/day)
(2) Per dust-fall monitoring site.

Any person who has exceeded the dust-fall standard must, within three months after submission of a dust-fall monitoring report, develop and submit a dust management plan to the air quality officer for approval. The Dust Management Plan (DMP) must:
a) Identify all possible sources of dust within the affected site.
b) Detail the best practicable measures to be undertaken to mitigate dust emissions.
c) Develop an implementation schedule.
d) Identify the line management responsible for implementation.
e) Incorporate the dust-fall monitoring plan.
f) Establish a register for recording all complaints received by the person regarding dust-fall, and for recording follow up actions and responses to the complainants.

The proposed Driefontein Mine must implemented a dust-fall monitoring programme in line with the National Dust Control Regulations. Should the proposed mine exceed the dust-fall standard it will be required, within three months after submission of a dust-fall monitoring report, to develop and submit a dust management plan to the air quality officer for approval which must be implemented within a month of the date of approval.

6.1.2 Noise

6.1.2.1 SANS 10103:2008, the Measurement and Rating of Environmental Noise with Respect to Annoyance, and to Speech Communication

Besides measurement techniques etc, this document provides noise levels that are expected in various areas (Rating Level). These are used by the Noise Regulations as limits of noise in the various areas. The acceptable rating levels for various districts are given in Table 8, being the maximum noise level that is acceptable at the boundary of the property for any district. The type of districts applicable to the proposed mine are (a) Rural (farmsteads & dwellings), (b) Suburban (receptors within 500m of R555), and (c) Urban (receptors within 15m of R555).

Table 8: Acceptable external noise levels within a district according to SANS 10103:2008

Type of District	Equivalent Continuous Rating Level for Noise ($L_{Req,T}$) (dBA)					
	Outdoors			Indoors with open windows		
	Day-night ($L_{Req,dn}$)	Daytime ($L_{Req,d}$)	Night-time ($L_{Req,n}$)	Day-night ($L_{R,Dn}$)	Daytime ($L_{Req,d}$)	Night-time ($L_{Req,n}$)
a) Rural districts	45	45	35	35	35	25
b) Suburban districts (little road traffic)	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts (with workshops, business premises and main roads)	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

The proposed Driefontein Mine must aim to comply with the acceptable external noise levels within the applicable districts. The procedures, as detailed in SANS10103:2008 must be applied when conducting noise measurements.

6.1.3 Blast and vibration

6.1.3.1 Mine Health and Safety Act Regulation 4.16 (2)

Various Points of Interests (POIs) are observed within 500m from the mining area. The mine must apply for the necessary authorisations as prescribed in the various acts, and specifically Mine Health and Safety Act Reg 4.16 regarding these non-mining structures/installations and comply with the regulatory requirements. Refer to Table 9 for a list of these installations. Figure 5 and Figure 6 below shows the 500m boundary around the Opencast Pit areas.

Table 9: List of possible installations within the regulatory 500 m

Tag	Description	Y	X
	North Pit		
1	Mine Activity	-62796.13	2841856.66
2	Dam	-62001.81	2842156.71
3	Dam	-61697.03	2842283.55
4	Dam	-61543.26	2842124.55
5	R555 Road	-61143.07	2842314.47
6	R555 Road	-62045.16	2841819.72
9	R555 Road	-60337.45	2842711.45
10	Buildings/Structures	-61617.94	2841960.16
11	Cultivated Fields	-60838.38	2842908.31
154	Hydrocencus Borehole (DRIE-BH3)	-63192.57	2842818.80
162	Heritage Site (DFN003 - Graves)	-60683.84	2843217.01
	South-East Pit		
91	Railway Line	-66918.69	2844891.34
95	Reservoir	-66056.65	2845147.86
96	Road	-66749.48	2843929.97
153	Hydrocencus Borehole (DRIE-BH2)	-65555.59	2845258.80
158	Hydrocencus Borehole (DRIE Dam 1)	-65362.62	2845150.38
169	Heritage Site (DFN010 - Homestead Foundation or a Grave)	-65364.90	2844919.58
170	Heritage Site (DFN011 - Graves)	-65662.36	2845318.05

Figure 5: Regulatory 500 m range for the North Pit area

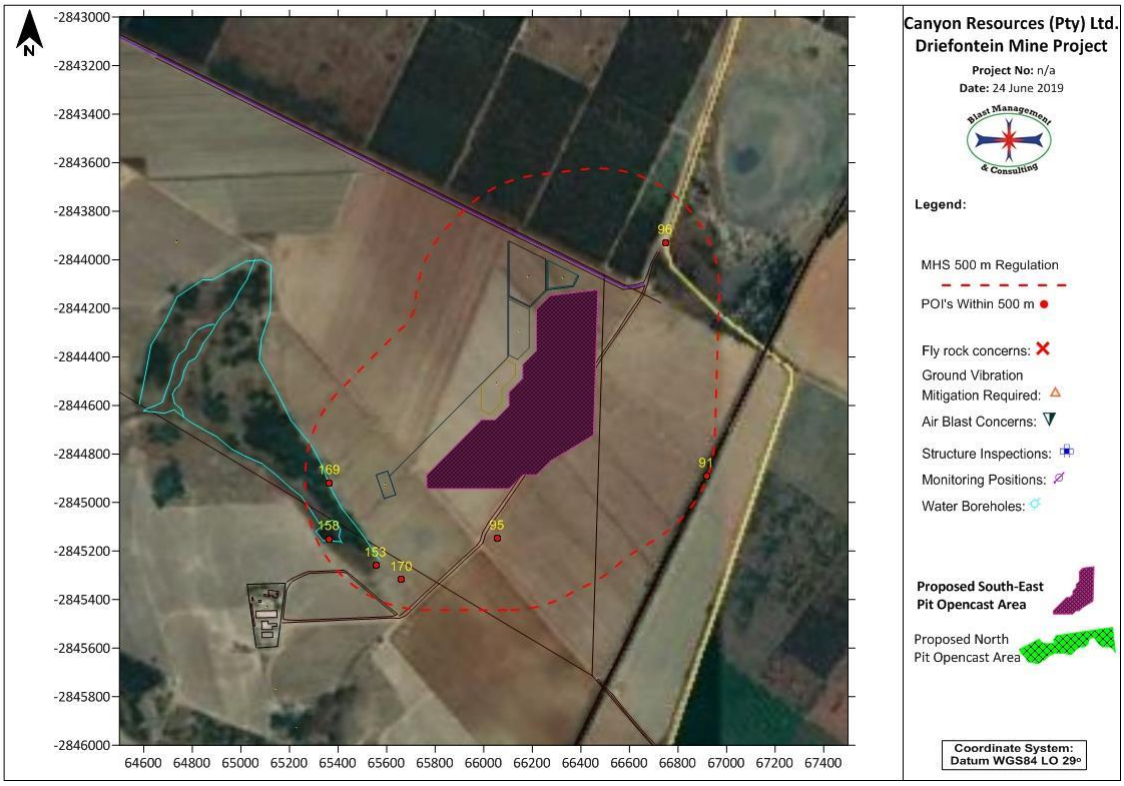

Figure 6: Regulatory 500m range for the South-East Pit area

6.1.3.2 Mine Health and Safety Act Regulation 17.6 (a)

The Mine Health and Safety Act Regulation 17.6(a) will also be applicable and will need to be considered because the location of the Northern Pit boundary is closer than 100m from private installations and the necessary legal requirements will need to be addressed. This will require an application to the DMR requesting permission to blast within 100m from infrastructure according to MHSA Reg 17.6 (a). Figure 7 shows the North pit with 100m boundary that will need to be considered with indication of infrastructure within the 100m. Please note that an icon may represent more than one structure / installation. Table 10 shows list of POIs identified.

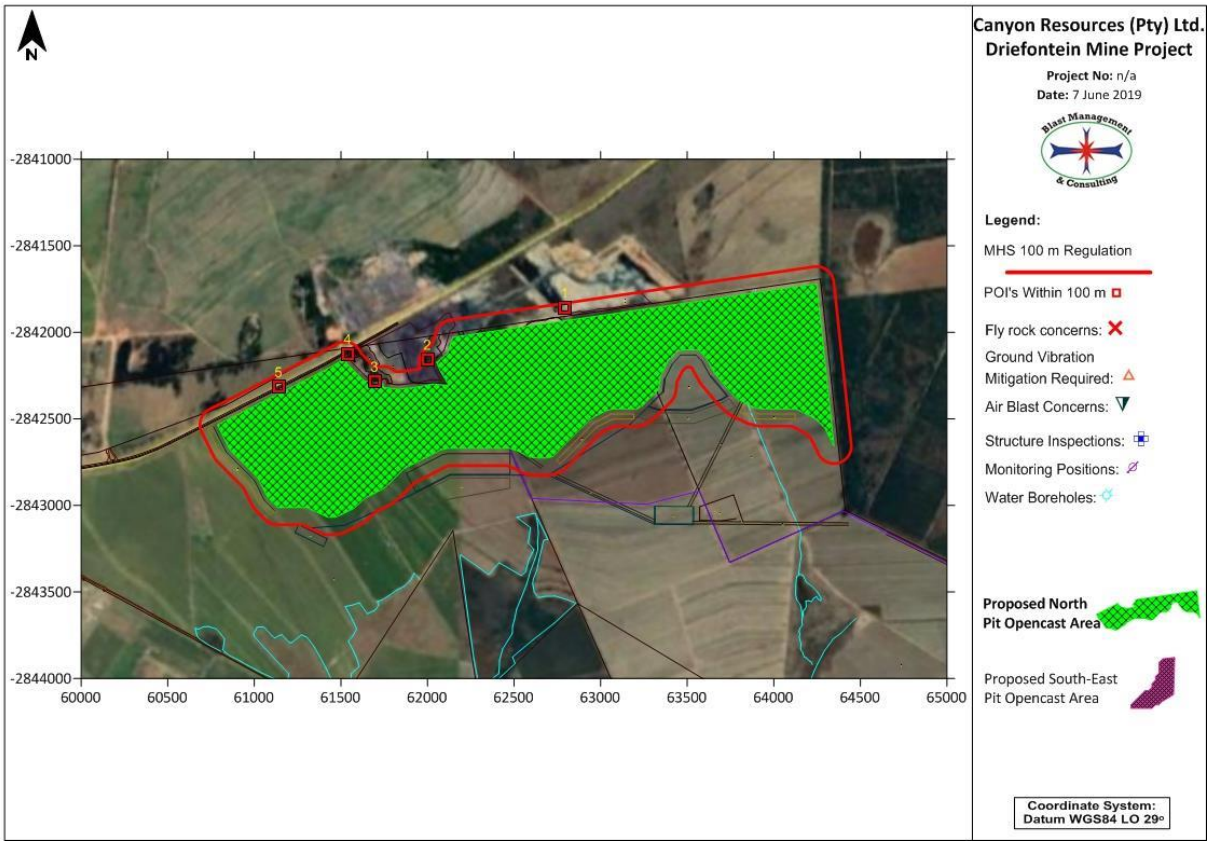

Figure 7: Regulatory 100 m range for the North pit area

Table 10: List of possible installations within the regulatory 100 m

Tag	Description	Y	X
1	Mine Activity	-62796.13	2841856.66
2	Dam	-62001.81	2842156.71
3	Dam	-61697.03	2842283.55
4	Dam	-61543.26	2842124.55
5	R555 Road	-61143.07	2842314.47

6.1.3.3 Recommended ground vibration and air blast limits

The ground vibration and air blast levels limits recommended for blasting operations in this area are provided in Table 11.

Table 11: Recommended ground vibration air blast limits

Structure Description	Ground Vibration Limit (mm/s)	Air Blast Limit (dBL)
National Roads/Tar Roads:	150	N/A
Electrical Lines:	75	N/A
Railway:	150	N/A
Transformers	25	N/A
Water Wells	50	N/A
Telecoms Tower	50	134
General Houses of proper construction	USBM Criteria or 25 mm/s	Shall not exceed 134dB at point of concern but 120 dB preferred
Houses of lesser proper construction	12.5	
Rural building – Mud houses	6	

The proposed Driefontein Mine must comply with these limits.

6.2 Roles and Responsibilities

Canyon and all Canyon's employees and contractors are responsible for the correct implementation of the EMPr. A description of each party's roles and responsibilities is provided under the headings below.

6.2.1 Description of each party's roles

6.2.1.1 Applicant

The holder of the Mining Right and Environmental Authorisation (EA) to which this EMPr relates, holds legal responsibility for compliance with this EMPr and any other arrangements must be entered into between such holder and such other party. The Applicant will appoint a General/Mine Manager that will have overall responsibility for the management of the project and the implementation of the EMPr including but not limited to the following:

- Be fully conversant with the conditions of the EA.
- Ensure that all stipulations within the EMPr are communicated and adhered to by the Contractor(s).
- Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings.
- Overall management of the project and EMPr implementation.
- Ensure that periodic environmental performance audits are undertaken on the project implementation; and
- Ensure all permits, authorisations and licenses are obtained, monitored, and adhered to.

6.2.1.2 General/Mine Manager

The Mine Manager will be employed by Canyon and be responsible to coordinate and manage the construction and operational phases of the proposed mine. Any activity, which may result in adverse environmental consequences and for which mitigation and management measures are not provided in the EMPr must first be approved by the Mine Manager before commencement. Specific responsibilities include:

- Familiarise him/herself with the EMPr and ensure compliance with the relevant legislation.
- Communicate with the ECO regarding Environmental compliance issues.
- In consultation with the Applicant order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and EA.
- Assisting in the resolution of conflicts.
- Maintenance, update, and review of the EMPr in consultation with ECO and relevant stakeholders.
- Communication of all modifications to the EMPr to the relevant stakeholders.

6.2.1.3 Area Manager

The Mine Manger will delegate duties to different area managers to coordinate and manage the construction and operational phases of the proposed mine. Specific responsibilities will include:

- Familiarise him/herself with the EMPr and ensure compliance with the relevant legislation.
- Communicate with the Mine Manager regarding Environmental compliance issues.
- Assisting in the resolution of conflicts.

6.2.1.4 Canyon's Safety, Health and Environmental (SHE) Managers

The Safety, Health and Environmental Managers will act as in-house officers who will be responsible for managing all safety, health and environmental aspects on behalf of the Mine Manager and Applicant. In this respect, the SHE Managers is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The contractors are also answerable to the SHE Managers for non- compliance with the Performance Specifications as set out in the environmental authorisation and EMPr. The SHE Managers provides feedback to the Mine Manager, who in turn reports back to Applicant/General Manager, Competent Authority and I&AP's, as required. Specific responsibilities include:

- Be aware of the findings and conclusions of the Impact Assessment and the conditions stated within the Record of Decision.
- Be familiar with the recommendations and mitigation measures of this EMPr.
- Be conversant with relevant environmental legislation, policies, and procedures, and ensure compliance with them.
- Ensure that the aspects/impacts in the EMPr which relates to safety, health and environmental issues are explained to the employees.
- Familiarise him/herself and ensure compliance with the relevant legislation.
- Monitor the implementation of the EMPr and EA throughout the project, by means of site inspections, internal audits and meetings.

- Regularly undertake site inspections to assess compliance with the EMPr and EA and take appropriate action to rectify non–conformances.
- Liaise with environmental statutory bodies, where this is deemed necessary.
- Educate the construction team about the management measures contained in the EMPr.
- Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective.
- Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements.
- Liaison between the Applicant, Contractors, authorities and other key stakeholders on all environmental concerns.
- Issuing of site instructions to the Contractors for corrective actions required.

6.2.1.5 Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) should be employed by Canyon (Pty) Ltd to act as an independent auditor assessing the level of compliance to the commitments made in the EMPr and conditions set out in the Environmental Authorisation. The ECO must, as specified by the Environmental Authorisation, submit external audit reports to the to the DMRE as and when required.

6.2.1.6 Contractors

The Contractors have the overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contracts are in line with the EMPr. The Contractors are answerable to the Mine Manager for all environmental issues associated with the project. Contractor performance will, amongst others, be assessed on health, safety, and environmental management criteria. Specific responsibilities include:

- Implementation and compliance with recommendations and conditions of the EA and EMPr, including providing the Contractor's Environmental Protection Policy and the specific Method Statements for the project.
- Ensure all site staff are trained and kept updated in terms of the EA, EMPr and other legal requirements.
- Be on site throughout the duration of the project and be dedicated to the project.
- Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site.
- Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements.
- Attend the Environmental Site Meeting.
- Undertaking corrective actions where non-compliances are registered within the stipulated timeframes.
- Report back formally on the completion of corrective actions.
- Environmental monitoring as required by applicable legislation.
- Assist the SHE Manager in maintaining all the site documentation.
- Prepare the site inspection reports and corrective action reports for submission to the SHE Manager.
- Assist the SHE Manager with the preparing of the monthly report.

6.3 Impacts to be mitigated in the respective phases

This section lists the potential impacts per activity for all the phases of the proposed Driefontein Mine, from construction (Table 12) through to operations (Table 13) to eventual decommissioning/rehabilitation, and closure (Table 14). For each impact, a set of mitigation/management measures have been identified, a time period and person responsible for implementing these measures along with the performance criteria and standards to be achieved.

Table 12: Construction Phase - EMPr

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
Geology						
Disturbance of geological profile	Opening of initial box cut through blasting and excavation of overburden material	Mining must be conducted strictly according to the MWP approved by the DMRE.	End of Construction Phase (Year 1)	Mine manager	Open the box cut in the designed area defined by the Mining Right and EA conditions	Remain within the approved Mining Right Area (MRA).
		Comply with the recommendations made by the blasting and vibration specialist.			Regulatory requirements of the Mine Health and Safety Act (Refer to Section 6.1.3 above).	Avoid structural damage, injuries, and complaints at POI's.
Topography						
Alteration of the natural topography	Soil stripping and stockpiling	Site establishment and soil stripping must only take place in designated areas.	Beginning of the construction phase (Year 1)	Mine manager	Remain within the designated footprint as defined in the EA conditions	The disturbed area must be kept to the minimum.
Soils, Land Use and Capability						
Soil erosion, compaction, and subsequent loss of soil quality	Soil stripping and stockpiling	Land clearance must only be undertaken immediately prior to construction activities and only within the development footprint.	Throughout construction phase (Year 1)	Mine manager/SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Unnecessary land clearance must be avoided.
		Stockpile different soil horizons in different areas and vegetate stockpiles.		Mine manager/ SHE Manager	Separate soil stockpiles must be clearly marked and keep inventory of stockpiles as recommended in the Closure Plan	Retain soil microbiology and the nutrient cycles as far as possible.
		Where possible, conduct the construction activities outside of the rainy season.				
		Trucks, equipment, and other vehicles must park on designated parking areas and not create additional areas at risk of soil erosion by parking outside of the demarcated areas.		Applicant	Prohibit movement of machinery outside the construction footprint as defined in the EA conditions.	Keep disturbed area as small as possible.
	Construction vehicle movement and increased human activity in and around MRA	Vehicles and equipment must travel within demarcated areas and not outside of the construction footprint.		Contractor/Mine manager		Minimize compression effects of heavy equipment.
	Construction of infrastructure	Construction materials must be delivered to a designated laydown area.		Contractor/Mine manager		
	Construction of infrastructure: - Upgrading and establishment of access and haul roads	Reduce storm water runoff on roads by installing cut-off strips on dirt roads.	At the beginning of the construction phase (Year 1)	Applicant/SHE Manager	Implement erosion control measures as specified in the Water Use License conditions	No rills formed on roads and areas next to roads.
Soil pollution	Construction vehicle movement and increased human activity in and around MRA	Maintenance must be undertaken regularly on all vehicles and construction/maintenance machinery to prevent hydrocarbon spills.	Throughout construction phase (Year 1)	Contractor Mine manager	SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements.	Soils test clean of hydrocarbon pollutants
	General and hazardous waste management	Any waste generated during construction, must be stored into designated containers,			The soil hydrocarbon levels must be monitored and remain below the values as indicated in the	Attain "cradle to grave" management of waste on site.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		and removed from the site by the construction teams.			Framework for the Management of Contaminated Land	
		Drip trays must be used when working on vehicles.				
		Any left-over construction materials must be removed from site.			Dispose waste generated by the project according to good practise waste management principles.	
Flora						
Loss of natural vegetation and intact floral habitat.	Site clearance	Construction areas must be designated by semi-permanent means/material, in order to control movement of personnel and vehicles.	Throughout construction phase (Year 1)	Contractor	Remain within the designated construction footprint as defined in the EA conditions	Direct and indirect disturbance of high and intermediate sensitivity floral habitat must be avoided.
		Construction vehicles should only use existing access roads as far as possible.				
		The volume of vegetation cleared should be limited to that which is required for construction.		Contractor		
Loss of plant species, floral diversity, and floral SCC	Site clearance	Avoid direct and indirect disturbance of high and intermediate sensitivity floral habitat by establishing the recommended buffer zone around the moist grassland areas (67m for construction).	Throughout construction phase (Year 1 - 3)	SHE Manager	Comply with the Threatened or Protected Species Regulations (2015).	Floral SCC recorded within the mining footprint area, must be relocated to suitable habitat within the study area under the supervision of a qualified ecologist.
		All the natural grassland areas along the southern boundary of the study area and within adjacent areas should be designated as No-Go areas for personnel and construction vehicles, with the exception being should personnel require access on foot for alien and invasive species control.				
		The collection of plant material for medicinal or other purposes within the study area must be strictly prohibited.				
		Open fires by construction personnel, unless within areas designated for this purpose, must be prohibited.				
	Construction of infrastructure	No new access roads are to be allowed within ecologically sensitive areas.	Construction phase (Year 1)	SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Direct and indirect disturbance of high and intermediate sensitivity floral habitat must be avoided.
Degradation of vegetation within	Soil stripping and	Topsoil stockpiles must be vegetated and	Throughout	Mine manager	Separate soil stockpiles must be clearly marked	Retain soil microbiology and the

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
the study area and surrounds due to dust, alien invasive floral species and erosion	stockpiling	managed accordingly.	construction phase (Year 1)		and keep inventory of stockpiles as recommended in the Closure Plan	nutrient cycles as far as possible.
	Soil stripping and stockpiling	A rehabilitation plan for the mine must be developed as soon as possible, taking concurrent rehabilitation and revegetation requirements into consideration.			Grass species utilised for revegetation must be indigenous to the area and specific to the Rand Highveld Grassland vegetation type	No-net loss in biodiversity.
	Site clearance	An alien and invasive species eradication strategy should be developed at the onset of the project and an invasive species management programme must be developed for implementation throughout all development phases.			Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020).	Eradication of alien invasive species.
		The volume of vegetation cleared should be limited to that which is required for construction.			Implement erosion control measures as specified in the Water Use License conditions	Minimise erosion potential, uncontrolled runoff and loss of topsoil.
	Construction vehicle movement and increased human activity in and around MRA	Dust suppression procedures must be implemented during the construction phase.			Comply with the Dust Control Regulations (Refer to Section 6.1.2.2 above).	Prevent fugitive dust settling on surrounding crops/vegetation.
Fauna						
Fragmentation of faunal habitats	Site clearance	Ensure that natural habitats within the study area are kept intact – specifically those that are connected to other natural areas outside the study area extent.	Throughout construction phase (Year 1)	SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Direct and indirect disturbance of high and intermediate sensitivity floral habitat must be avoided.
		Allow for the movement of faunal species through the human modified matrix to maintain metapopulation dynamics and prevent local extinctions.				Maintain and support the connectedness of faunal habitats
Loss of faunal habitat	Site clearance	Avoid construction in areas designated as having increased ecological sensitivity. Locate construction camps away from highly sensitive areas.	Throughout construction phase (Year 1)	SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Direct and indirect disturbance of high and intermediate sensitivity floral habitat must be avoided
		Before construction, demarcate the servitude of infrastructure and mining activities and ensure that construction impacts are contained within this area.				
		Use existing roads as far as possible and ensure that unnecessary impacts on natural vegetation do not occur, e.g., driving around remaining natural areas.			Prohibit movement of machinery outside the construction footprint as defined in the EA conditions.	

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
Disturbance of nesting avifaunal species in natural areas	Construction vehicle movement and increased human activity in and around MRA	Disturbance (e.g., noise, dust) should be avoided near areas identified as sensitive.	Throughout construction phase (Year 1)	SHE Manager	Prohibit movement of machinery outside the construction footprint as defined in the EA conditions.	Construction activities must remain as far as possible from the natural grasslands along the southern border of the application area
		Noise emanating from construction machinery and equipment must be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment.				
Harm to faunal SCC	Construction vehicle movement and increased human activity in and around MRA	All personnel must undergo induction with regards to fauna.	Throughout construction phase (Year 1)	Applicant	Comply with the Threatened or Protected Species Regulations (2015).	Prevent loss of fauna inside the MRA.
		Collection of any species, eggs or nests must not be tolerated.		Mine Manager		
	Site clearance Construction of infrastructure	Any fauna threatened by the construction activities should be removed to safety by the environmental control officer or appropriately qualified environmental officer.		SHE Manager		
Surface Water/Wetlands						
Change in hydrological function by altering the flow regime	Soil stripping and stockpiling	No unlicensed activities should take place in the watercourses and associated buffer zone.	Throughout construction phase (Year 1)	SHE Manager	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	No unauthorised activities can take place within the regulated area of a watercourse.
	Construction of infrastructure	A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse				
	Site clearance	The amount of vegetation removed should be limited.	Throughout construction phase (Year 1)	Mine manager	Remain within the designated construction footprint as defined in the EA conditions	Unnecessary land clearance must be avoided.
	Soil stripping and stockpiling	Changes to natural flow of water (surface water as well as water flowing within the soil profile) should be considered during the planning phase and mitigated effectively	Before construction commence	Applicant	Comply with the conditions of the Water Use License	Critical recharge areas should be determined in a hydropedological assessment
	Construction of infrastructure	Direct the maximum amount of clean water runoff to the natural drainage lines through the establishment of clean water trenches around the construction site.	Throughout construction phase (Year 1)	Mine manager	Implement a Storm Water Management Plan (SWMP) in line with the Water Use License conditions	High energy stormwater input into the watercourses should be prevented at all costs.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
Sedimentation/siltation and associated change in turbidity	Soil stripping and stockpiling	A temporary fence or demarcation must be erected around the works area to prevent water runoff and erosion of the disturbed or heaped soils into wetland areas.	At the beginning of construction (Year 1)	Applicant	Implement an effective storm water management plan to ensure that the water quality of the identified watercourses comply with the DWS target water quality objectives.	Reduced sediment deportation.
		Removed soil and stockpiling of soil must occur outside the extent of the watercourse to prevent siltation and increased runoff during construction.	Throughout construction phase (Year 1)	Mine manager	Remain within the designated construction footprint as defined in the EA conditions	Select construction methods and equipment that will have the least impact on watercourses.
		Monitoring should be done to ensure that sediment pollution is timeously dressed.	Throughout construction phase (Year 1)	SHE Manager	Comply with the water monitoring conditions set out in the Water Use License	Reduced sediment deportation
	Site clearance	Increased runoff due to removal of vegetation and increased soil compaction must be managed to ensure the prevention of siltation and the maximum stream bank stability.	Throughout construction phase (Year 1)	Applicant	Implement an effective storm water management plan to ensure that the water quality of the identified watercourses comply with the DWS target water quality objectives.	Reduced sediment deportation.
		Silt traps can be placed down-slope of where vegetation stripping will take place to minimise siltation in watercourses.				
		Remove only the vegetation where essential for construction and do not allow any disturbance to the adjoining natural vegetation cover.	Throughout construction (Year 1)	Mine manager/SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Retain vegetation and soil in position for as long as possible, by removing it immediately ahead of construction/earthworks in that area (DWAF, 2005).
		All exposed surfaces must be stabilised once the covering vegetation has been removed.	Throughout construction (Year 1)	Applicant/SHE Manager	Implement erosion control measures as specified in the Water Use License conditions	Minimise erosion potential, uncontrolled runoff and loss of topsoil.
		Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas.				Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.
	Construction of infrastructure	Rehabilitation of damage/impacts that arise as a result of construction must be implemented immediately upon completion of construction.	At the end of Construction Phase (Year 1)	Applicant	Implement concurrent rehabilitation in line with the Annual Rehabilitation Plan	Minimise erosion potential, uncontrolled runoff and loss of topsoil.
	Construction vehicle movement and increased human activity in and around MRA	Formalise access roads and make use of existing roads and tracks where feasible, rather than creating new routes through naturally vegetated areas.	Throughout construction phase (Year 1)	Mine manager	Prohibit movement of machinery outside the construction footprint as defined in the EA conditions.	Direct and indirect disturbance of fringe vegetation around the watercourses must be avoided

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		Buffer zones should be maintained to trap sediments.				
Changes in water quality	Construction vehicle movement and increased human activity in and around MRA	Establish the recommended buffer zones (67m) around watercourses.	At the beginning of Construction Phase (Year 1)	Applicant	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	Reduce nutrient inputs in diffuse flow
		The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse e.g., water runoff from cleaning of equipment, vehicle access etc.	At the beginning of Construction Phase (Year 1)	Applicant		No unauthorised activities can take place within the regulated area of a watercourse.
		Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat.	Throughout construction phase (Year 1)	Mine manager/Contractor	Manage hazardous substances according to the Hazardous Substances Act (No. 15 of 1973)	Minimize the risk of spillages through proper storage, handling and monitoring of fuel and chemicals used on site.
		Spill kits must be stored on site: In case of accidental spills of oil, petroleum products etc., good oil absorbent materials must be on hand to allow for the quick remediation of the spill.				
		Maintenance of construction vehicles / equipment should not take place within the watercourse or watercourse buffer.	Throughout construction phase (Year 1)	Mine manager/Contractor	Construction activities must comply with the regulations under GN704.	Prevent surface water contamination.
		Vehicles and machinery must use existing roads to access the project area as far as possible.				
	General and hazardous waste management	Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone.	Throughout construction phase (Year 1)	Applicant	Chemical toilets must be provided which should always be well serviced and spaced as per occupational health and safety laws and placed outside the buffer and 1:100-year flood lines.	No waste discharges allowed.
		Provide adequate facilities for litter disposal.			Implement good practice guidelines in terms of waste management.	
		After construction, the land must be cleared of rubbish, surplus materials, and equipment, and all parts of the land shall be left in a condition as close as possible to that prior to use.	At the end of Construction Phase (Year 1)	Applicant	Implement concurrent rehabilitation in line with the Annual Rehabilitation Plan	
Introduction and spread of alien vegetation	Site clearance	An alien vegetation eradication programmed should be implemented on the site to remove the alien vegetation from the wetland areas as priority.	Throughout construction phase (Year 1)	Applicant	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020).	Eradication of alien invasive species.
		Retain vegetation and soil in position for as long as possible, removing it immediately ahead of the proposed activity/earthworks	Throughout construction (Year 1)	Mine manager/SHE Manager	Remain within the designated construction footprint as defined in the EA conditions	Unnecessary land clearance must be avoided.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		in that area and returning it where possible afterwards.				
Loss of aquatic biota	Construction related activities	Implement all management procedures listed above for the change in hydrological regime, change in water quality, sedimentation/siltation and introduction and spread of alien vegetation.	Throughout construction (Year 1)	Mine manager/SHE Manager/Applicant and Contractors	Refer to above listed performance criteria	Refer to above listed standards to be achieved
Groundwater						
Contamination of groundwater through waste spillages	Construction vehicle movement and increased human activity in and around MRA	Refuelling of vehicles will only be allowed in designated areas.	Throughout construction phase (Year 1)	Contractor/ Mine manager	Construction activities must comply with the regulations under GN704.	Minimize the risk of spillages through proper storage, handling and monitoring of fuel and chemicals used on site.
		Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat.				
		Remove any spills as soon as it occurs along with the polluted soil and dispose of it in the appropriate manner, depending on the size of the spill.				
	General and hazardous waste management	Spill kits must be available on site.		Area manager	Manage hazardous substances according to the Hazardous Substances Act (No. 15 of 1973)	
		Provide adequate facilities for waste disposal.				
		Proper storage, handling and monitoring of fuel and chemicals.				
Air quality						
Decrease in the ambient air quality due to emissions (dustfall, PM_{10} and $PM_{2.5}$) associated with construction activities	Construction vehicle movement and increased human activity in and around MRA	Dust suppression procedures should be implemented.	Throughout construction phase (Year 1)	Applicant/ Mine manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Reduce and control dust on the access road and construction sites.
		The construction vehicles must remain on site as far as possible during the construction period.				
		Define routes for the circulation of heavy machinery and vehicles and restrict machines' movement to the necessary areas.				
		Control the number of trucks on the road, weight of trucks and travelling speed limits.	Throughout construction phase (Year 1)	Mine manager / SHE Manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Speed limits must be complied with and if not warnings and speeding fines should be issued.
		Switch off engines whilst not in use.				
		Establish a maintenance schedule to ensure proper maintenance of the trucks & mobile equipment.				
	Site clearance Soil stripping and stockpiling	Time construction activity strategically and avoid carrying out activities with high dust-causing potential during strong wind conditions.	Throughout construction phase (Year 1)	Applicant/ Mine manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Limit construction activities as far as possible during periods of high wind.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		Pre-water all areas to be disturbed during dry and windy weather conditions.				
		Where possible, the original vegetation, e.g., trees, shrubs and grass cover must be maintained for as long as possible to dissipate wind velocity at the ground surface, where dust lift off occurs.				Should it not be possible to retain and/or maintain vegetation, ensure that clearing of the site is done using a phased approach, i.e., clear areas as required in stages of the operation.
		Conduct regular visual site inspections to ensure the dust mitigation measures are being implemented and assess whether further mitigation is required for any of the dust emission sources				Reduce and control dust on the access road and construction sites.
		Conduct monthly dustfall monitoring and continuous PM10 monitoring.				
Noise						
Increase in the ambient noise levels	Construction of infrastructure	A berm designed to act as acoustical screen or barrier must be constructed during the day, at the pit areas in relation to receptors R1 and R6.	At the beginning of the construction phase (Year 1)	Applicant / SHE Manager	Comply with the acceptable external noise levels according to SANS 10103:2008 within the applicable districts listed in Section 6.1.2 above.	The acoustical berm must be constructed according to the specifications recommended by the noise specialist. .
		If a stockpile is to be sloped, it should be done with the slope gradient facing away from a receptor (R1). If technically feasible, the tip of the sloped stockpiles (e.g., discard dumps/mineral residue deposits etc.) should have a berm implemented on them (to be discussed with team engineers).				
	Construction vehicle movement and increased human activity in and around MRA	Equipment should consider silencers on exhaust ports, to lower the nosiest points on the heavy vehicles.	Throughout construction phase (Year 1)	Mine manager		Minimize noise emissions near sensitive receptors
		The construction vehicles must remain on site as far as possible during the construction period.				
Visual						
Increased visual intrusion and change to sense of place through dust plumes	Construction vehicle movement and increased human activity in and around MRA	Implement wet suppression in combination with chemical surfactants to provide more extensive wetting on the access roads.	Throughout construction phase (Year 1)	Applicant/ Mine manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Reduce and control dust on the access road and construction sites.
		Have clearly defined hauling routes/vehicle access areas.				
		Ensure vehicles keep to the speed limit to				

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		reduce dust.				
		All main hauling roads should be treated for dust suppression.				
		Control the number of trucks on the road, weight of trucks and the travelling speed.				
Deterioration of visual quality and sense of place for sensitive receptors (residents), surrounding road users and tourists.	Construction related activities	Keep disturbed areas as small as possible and if practically possible, establish construction camp in areas that are already disturbed.	Throughout construction phase (Year 1)	Mine manager/ SHE Manager	Adhere to the recommended mitigation measures	Minimise the severity of the visual impact
		Keep the construction site neat, clean, and organised in order to maintain a tidy appearance.				
		Reduce the Project Area and Mining Area to the smallest area possible; locate the ROM stockpile and contractor's yard as close as possible to the Mining Area.				
	Soil stripping and stockpiling	Keep stockpile heights as low as possible				
	Site clearance	Eradication of vegetation should be done in a 'natural manner', avoiding harsh straight lines.	Beginning of construction phase (Year 1)	Applicant	Adhere to the recommended mitigation measures	"Hide" the source of the visual impact from view, by placing visually appealing elements between the viewer and the source of the visual impact
		The minimum amount of existing vegetation and topsoil should be removed from construction areas.				
		Establish vegetative screens along the western and southern boundaries of the project site using indigenous plant species.				
	General and hazardous waste management	Remove rubble off site as soon as possible or place it in a container to keep the site free from additional unsightly elements.	Throughout construction phase (Year 1)	Mine manager/ SHE Manager	Ensure that rubble, litter, and disused construction materials are managed and removed regularly.	Maintain the construction site in a neat and orderly condition at all times;
Increased visual intrusion and change to sense of place through night-time illumination	Construction of infrastructure	Refrain from installing permanent lighting where light is required intermittently.	Throughout construction phase (Year 1)	Applicant	Adhere to the recommended mitigation measures to minimise light pollution	Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination;
		Security flood lighting should only be used where necessary and carefully directed, preferably away from sensitive viewing areas, i.e., the farmhouses falling within the viewshed and the roads near the site.				
		Downward facing lights should be installed on the site				

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
Heritage and palaeontological resources						
Damage to burial ground/ graves	Soil stripping and stockpiling	Demarcate sites with at least a 100m buffer and avoid them. A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by SAHRA BGG).	Prior to construction phase (Year 1)	Applicant SHE Manager Heritage specialist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	Retain and avoid burial grounds and graves. If this is not possible, the graves must be relocated after completion of a detailed grave relocation process.
Damage to fossil resources	Opening of initial box cut through blasting and excavation of overburden material	If fossil remains are discovered, either on the surface or exposed by new excavations the Chance Find Protocol must be implemented.	Throughout construction phase (Year 1)	Applicant SHE Manager Palaeontologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Fossils may not be excavated, broken, moved, or destroyed without prior assessment and without a permit from the relevant heritage resources authority.
Traffic						
Decrease in road safety conditions and deterioration of road network due to increase in heavy vehicles.	Construction vehicle movement and increased human activity in and around MRA	The drivers of all trucks should be equipped with specialised road safety and driving training.	Throughout construction phase (Year 1)	Contractors	Ensure all site staff are trained and kept updated in terms of the EA, EMPr and other legal requirements.	Reduce the impact of the mine from an intersection performance, road safety, pedestrian safety, and public transport perspective.
		Communicate with the STLM with regards to potholes and possible repairs to the road surfaces that might be required and repair access roads that have been damaged because of construction vehicles.		Applicant	Implement the D1433 road upgrades recommended by traffic engineer.	
		Make a complaints' register available at the entrance to the construction site and address complaints speedily.				
		The D1433 road should be upgraded and widened to 3.5 meters per direction in order to accommodate the construction vehicles.				
Potential conflict of site vehicles with pedestrians		The D1433 should be upgraded with a sufficient shoulder for pedestrians to safely walk on – a recommended minimum of 1.5 meters can be provided.				
Blasting and vibration						
Ground vibrations and air blasts causing structural damage and nuisance	Opening of initial box cut through blasting and excavation of overburden material	Specific blast design must be done, using shorter and smaller diameter blast holes.	End of construction phase (Year 1)	Applicant/Contractor	Comply with the regulatory requirements of the Mine Health and Safety Act (Refer to Section 6.1.3 above). Submit the necessary blasting application to the DMRE for bench	Avoid structural damage and complaints at POI's.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
					deliveries, mining within 100m of structures, as well as blasting within 500m from structures to be protected.	
		Do blast design that considers the actual blasting, and the ground vibration levels to be adhered too.				
		Only apply electronic initiation systems to facilitate single hole firing.				
		Implement mitigation in the form of maximum charge mass that will be allowed to maintain safe levels of ground vibration and minimum distance between blast and problematic POI's				
Damage and injuries caused by fly rock		Make use of increased stemming lengths and specific stemming material to manage fly rock - crushed aggregate of specific size.		Mine manager	Best practices should always be implemented to precent a breach of the blast clearance zone.	No injuries and/or damage at POI's caused by fly rock.
		Specific blast design must be done, with shorter and smaller diameter blast holes.				
		Ensure use of correct explosive product.				
		Charge and blast the same day.				
		Ensure use of water-resistant product in wet holes.				
		A minimum unsafe zone of 402m must be cleared of people, animals, and equipment before blasting.				
		Clearance distances must be set, and road travel managed during blasting operations specifically when blasting is done within 500m of the R555, D1433 and gravel roads.				
Socio Economic						
Creation of local employment opportunities	Appointment of employees and contractors	Appoint locals and contractors from Ward 9 or the wider STLM for construction and specialised tasks where possible.	Beginning of the construction phase (Year 1)	Applicant	Establish a Forum prior to construction commencing, represented by Canyon Resources, community groupings (i.e., Youth, Land, Women and so forth), Ward Councillor and the STLM LED Department, that makes the targets of procurement and employment clear to the local communities and promotes transparency.	Enhance positive impacts through good management practises
		Set targets for local procurement, employment, and enterprise development.				
		Appoint a Community Liaison Officer (CLO) for the duration of the construction phase if necessary.				
Influx of jobseekers		Should local SMMEs and local employment be required, set clear goals, and ensure that the Contractor Services Management Plan	Throughout construction phase (Year 1)	Applicant/Contractors		Do not create unrealistic job expectations and communicate details of the construction period to

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		(CSMP) reflects targets with regards to local SMMEs and local employment.				the STLM by using the Forum
		Each contractor is required to submit its own accommodation and transport plan.				Implement the guidelines of the CSMP for the duration of the construction period.
		Apart from security personnel, no workers/contractors to be housed on site.				
		No recruitment of temporary workers at the entrance of the construction site or project area.				
Increase in conflict as a result of construction related and employment issues		Establish a communication protocol whereby construction and employment related information is transferred to local communities.	Throughout construction phase (Year 1)	Applicant	Include the Ward Councillor, LED Manager, and local community representatives of Ward 9 in the needs assessment and LED project identification for the SLP. Also include these role-players when the SLP is updated and reviewed and give feedback on targets achieved.	Ensure transparency and communication with the affected communities through the Forum
		Ensure that the appointed CLO understands customs and traditions of the local communities, is fluent in the local languages, and is accessible for workers and other locals.				
Utilization of new HDSA supplies, SMME and other small businesses as a result of local procurement (Positive)		Use the Municipality's database of existing SMMEs (Mr. Nkosi. LED Manager: STLM. 3 May 2019) if the need arises.	Beginning of the construction phase (Year 1)	Applicant	Adhere to the SLP requirements/commitments	Ensure that locals are trained and prepared to tender.
		Make the requirements (skills, procurement opportunities, women and youth minimum thresholds and so forth) available to the Forum and the STLM LED Unit in advance, (e.g., four months prior to construction commencing).				
		Implement training for HDSA small businesses and make it compulsory for suppliers to form partnerships with HDSAs and local SMMEs to provide mentorship and ensure skills transfer.				
		Once appointed, monitor the social performance of contractors, and determine how contractors fair on each key performance area (KPI).				
Increase in salaries and wages, and local procurement of goods (limited) and service		Use local labour, local contractors, SMMEs and local service providers, wherever possible, and make this compulsory for the	Throughout the construction phase (Year 1)	Applicant	Adhere to the SLP requirements/commitments	Maximise the local content of the construction phase

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		main contractor by including minimum thresholds in the Contractor Services Management plan (CSMP).				
		As part of the tender documents the Contractor must provide subcontracting values per package and the plan on how to meet BEE procurement and SMMEs targets assigned, as defined in the social management plan that he submits as part of his tender document.				
		Implement relevant measures should the contractors not comply (impose penalties, termination where necessary, review of future prospective work etc.)				
Income generated through the sale of agricultural land for mining purposes	Construction related activities	If required, appoint an independent Valuer to determine the market value of the land and to ensure fair compensation for land acquired for mining purposes.	Before construction commence (Year 1)	Applicant	Consult the directly affected farmers about the mine's proposed sequencing plan and potential compensation.	Minimise the impact on existing agricultural activities.
		Fence off the construction areas to restrict movement of cattle into construction sites.				
		Regular dust suppression to minimise dust settling on crops and on grazing vegetation.				
		Erect the contractor's camp as close as possible to the open pit/surface infrastructure or to an area with low agricultural potential to minimise the negative impacts on productive farming land.				
		Implement all road safety measures as proposed in this report to ensure safety of livestock.				
Disruptions in daily living and movement patterns for surrounding landowners and communities due to higher traffic volumes and intrusion impacts (dust, noise, light pollution, etc.)	Construction related activities	Announce disruptions, road closures (if any) and so forth by using the local media, road sign boards and other Municipal structures.	Throughout construction phase (Year 1)	Applicant/Mine Manager	Adhere to the recommendations by relevant specialists, particularly around reducing dust, noise, visual and traffic impacts.	Reduce the potential exposure of people and households to noise and dust pollution and maintain acceptable levels of service at all the affected intersections.
		Provide a schedule of the construction and blasting activities to landowners and relevant I&APs.				
		Erect signboards indicating accesses to the construction site.				

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		Impose penalties for reckless drivers to enforce compliance to traffic rules.				
		Inspect trucks and other heavy vehicles on a regular basis to avoid oil spillages and unroadworthy vehicles that could lead to accidents.				
		Limit all activities to the development footprint of the proposed construction site.				
		Fence off the development footprint of the construction site prior to the commencement of site clearing and other construction activities.				
		Keep the local SAPS, other emergency services and Ward Councillors informed about the construction progress, timelines and blasting schedule.				
		Provide workers with identity tags and instate strict security measures at the access points to discourage unauthorised people entering the construction site.				
		Workers should not be allowed to remain in the construction area when they are off duty.				
		Implement safety and security measures, such as fencing, 24-hour security guards, CCTV cameras, random security checks and access control.				
		Generally, construction activities should not take place before 8am and after 5pm and not on Sundays and public holidays.				
		Ensure that all construction machinery is well maintained and has the required silencers, if required.				
		Vehicles carrying dusty materials should be securely covered before leaving the site.				
		Appropriate and regular dust alleviation with water on gravel and dirt areas and roads.				

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		Consider the predominant wind direction when siting stockpiles to reduce the likelihood of affecting sensitive receptors and monitor the dust fall out concentrations.				
Health and safety risks for workers	Construction related activities	Provide employees with first aid training to prepare them to respond to accidents on site. Make first aid kits available at various strategic locations of the operation. Construction workers to wear protective clothing (e.g., masks that minimize dust inhalation and clothing that protects against sunburn). Enforce the use of earplugs where relevant. Lock away dangerous plant, equipment and material when not supervised or in use. Provide safe and clean drinking water and instil regular water breaks to keep workers hydrated. Provide sufficient ablution facilities (chemical/portable toilets, etc.) at strategic locations that are cleaned regularly. Utilise and increase existing mine security and procedures and 24-hour security in and around the construction area. Designate a suitable area for cooking fires (if required). Ensure good visibility at the accesses to the site.	Throughout construction phase (Year 1)	Applicant/Mine Manager	Comply with the Occupational Health and Safety Act (OHSA) to keep worker exposures to the minimum.	Avoid and/or minimise risks to and impacts on the health and safety of the mine workers
Community health and safety risks	Construction related activities	Provide security to the farmers during construction. Join existing community policing forums and/or similar community structures. Make the contact details of the main Contractor available to surrounding landowners and attend to any matters expediently. Implement measures to suppress dust, such	Throughout construction phase (Year 1)	Applicant/Mine manager	Comply with the Environmental Health and Safety (EHS) Guidelines and the provision of the International Finance Corporation (IFC)'s Performance Standard 4 "Community Health, Safety and Security	Avoid and/or minimise risks to and impacts on the health and safety of the local community from both routine and non-routine circumstances.

Potential Environmental Impact: Construction phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria (compliance with standards)	Standards to be achieved
		as spraying water on gravel roads, surfaces, and stockpiles on a regular basis.				
		Dispose of the various types of waste generated in the appropriate manner at licensed waste landfill sites at regular intervals.				
		Erect a safety fence around the entire construction site to prevent illegal trespassing of humans and livestock.				
		Display “danger” warning signs and “no public access” signs at all potential accesses, paths and along the periphery of the construction areas in English and the local languages.				
		Make the procedure to lodge complaints available to the surrounding property owners and Ward Councillor to enable them to lodge complaints when problems with regards to community and/or environmental health arise.				

Table 13: Operational Phase - EMPr

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
Geology						
Disturbance of geological profile	Opencast mining and earth work activities	Mining must be conducted strictly according to the MWP submitted to the DMRE.	Throughout operational phase (Year 2-6)	Applicant	Remain within the designated mining area defined by the Mining Right and EA conditions	Optimally exploit the resource in terms of tonnage of rock mined and cost as provided for in the mine plan.
		Comply with the recommendations made by the blasting and vibration specialist			Regulatory requirements of the Mine Health and Safety Act (Refer to Section 6.1.3 above).	Avoid structural damage, injuries, and complaints at POI's.
Topography						
Alteration/modification of the surface topography	Ongoing vegetation clearance, soil stripping and stockpiling	Minimise the size of the disturbed area	Throughout operational phase (Year 2-6)	Mine manager/ SHE Manager	Implement the mitigation measures recommended by the visual specialist to minimise visual impacts.	Activities must remain inside demarcated mine boundary.
	Overburden stockpiling	Limit the height of the overburden dumps as far as possible and ensure dumps are placed in the designated areas.				
Soils, Land Use and Capability						
Soil erosion, compaction, and subsequent loss of soil quality	Ongoing vegetation clearance, soil stripping and stockpiling	Unnecessary land clearance must be avoided.	Throughout operational phase (Year 2-6)	Mine manager/ SHE Manager	Remain within the designated operational footprint as defined in the EA Conditions	Minimise the areas where soil surfaces will be exposed to soil erosion
		Stockpile different soil horizons in different areas and revegetate stockpiles		Mine manager/ SHE Manager	Separate soil stockpiles must be clearly marked and keep inventory of stockpiles as described in the Closure Plan	
		The slope of the topsoil stockpiles must not be more than 15% to limit erosion from the stockpiles.		Mine manager/ SHE Manager	Implement erosion control measures as specified in the Water Use License conditions	
		The stormwater management plan should be followed in order to protect surrounding land from erosion that may occur during thunderstorms.				The surrounding area must have no to minimal signs of erosion
	Operational vehicle and increased human activity in and around the MRA	Trucks, equipment, and other vehicles must park on designated parking areas and not create additional areas at risk of soil erosion by parking outside of the demarcated areas.		Contractor/Mine manager	Prohibit movement of machinery outside the operational footprint as defined in the EA Conditions	Reduce compaction and erosion of soil and maintain existing arable land capability outside the operational footprint.
		Vehicles and equipment must travel within demarcated areas and not outside of the operational footprint.		Contractor/Mine manager		
		Develop a designated parking area for coal trucks that will be queuing to collect coal in order to avoid trucks parking in nearby		Applicant		

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		agricultural areas.				
	Concurrent rehabilitation	Rip replaced soils when it reaches a depth of 500 mm, and again once all soil has been replaced.	Throughout operational phase (Year 2 - 6)	Mine manager	Bulk density less than 1.5 kg/m^{-3} in rehabilitated soils	No-net loss in land capability.
		Use specific tracks for the tipping trucks when restoring the topsoil, to diminish the compacted soil area.				
Soil pollution	Operational vehicle and increased human activity in and around the MRA	Maintenance must be undertaken regularly on all vehicles and operational machinery to prevent hydrocarbon spills.	Throughout operational phase (Year 2-6)	Mine manager	SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements.	Soils test clean of pollutants.
		Ensure drivers follow required safety precautions and road rules		Contractor	Comply with the Environmental Health and Safety (EHS) Guidelines	Avoid accidents
	General and hazardous waste management	Any waste generated during operation, must be stored into designated containers, and removed from the site by registered contractors.		Area manager	The soil hydrocarbon levels must be monitored and remain below the values as indicated in the Framework for the Management of Contaminated Land	Attain "cradle to grave" management of waste on site.
		Drip trays must be used when working on vehicles to avoid contamination.				
		Clean-up of hydrocarbon spills if it occurs, test soils for contamination and perform best clean up method.				
	Coal handling and processing	Soil pollution monitoring must be conducted annually around all possible sources of soil contamination on site such as the ROM stockpiles, PCDs and along the haul roads.		Applicant/SHE Manager	The soil salinity and anionic salt levels (sulphates, nitrates and phosphates) must be monitored and remain below the values as indicated in the Framework for the Management of Contaminated Land	Avoid the contamination of soil resources on site and around the site with coal waste.
		Manage dirty and polluted water on site through storage and treatment with suitable infrastructure such as pollution control dams.		Mine manager		
		Preventing wind blowing coal dust onto stockpiles, by minimizing dust generation through implementation of mitigation measures listed under air quality.		Mine manager/SHE manager		
Loss of high potential cultivated land and crop production	Opencast mining and earth work activities	Implement mitigation measures under soil erosion, compaction and pollution listed above.	Throughout operational phase (Year 2-6)	See above responsible person	See above performance criteria	See above standards
		Consult the directly affected farmers about the mine's proposed sequencing plan and potential compensation.	Before construction commence (Year 1)	Applicant	Develop and implement a Soil Management	Ensure that agricultural activities inside the MRA continue alongside mining.

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		If required, appoint an independent Valuer to determine the market value of the land and to ensure fair compensation for land acquired for mining purposes or compensate the farmer for annual loss of income during the life of mine.			Plan for the control of impacts affecting the soil, land use and land capability within the MRA.	
	Concurrent rehabilitation	Topsoil and subsoil should be replaced in the correct sequence on soft overburden material to ensure that subsurface limiting layers are not created.	Throughout operational phase (Year 2-6)	Applicant	Implement concurrent rehabilitation according to the annual rehabilitation plan submitted and updated as part of the Closure Plan	No-net loss in land capability.
		Reshaping of footprint area to allow for naturally free draining topography.				
		Soil should be spread, treated with fertilizer or ameliorants (if required) and revegetated, naturally or with indigenous seeds (as required), in one consecutive operation, to reduce the potential for soil loss to wind and water erosion.				
Loss of grazing land and animal production	Opencast mining and earth work activities	The area utilized for mining must be kept to the minimum needed for the successful implementation of the operation.	Throughout operational phase (Year 2-6)	Applicant	Consult the directly affected farmers about the mine's proposed sequencing plan and potential compensation.	Minimise the impact on existing agricultural activities.
		Fence the mining area to restrict access and prevent injuries to livestock.	At the start of the operational phase (Year 2)	Applicant	Remain within the designated operational footprint as defined in the EA Conditions	Prevent injuries and/or loss of livestock due to mining activities
Loss of agricultural employment opportunities	Opencast mining and earth work activities	Employ farm employees at the mine where possible.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant	All farm employees at risk of losing their jobs as a result of the proposed mine, must be assisted, as far as possible and in line with the SLP commitments, in ensuring they don't lose their livelihood.	To avoid the displacement of farm employees and to ensure their livelihood as well as that of their dependents, are protected.
		Provide training and support, in line with the SLP commitments, to assist farm employees to find suitable employment opportunities elsewhere.				
Flora						
Loss of natural vegetation and intact floral habitat.	Ongoing vegetation clearance, soil stripping and stockpiling	Only areas earmarked for immediate opencast mining (per section) should be cleared of vegetation to limit erosion potential.	Throughout the operational phase (Year 2-6)	Mine manager/SHE manager	Remain within the designated operational footprint as defined in the EA conditions	Direct and indirect disturbance of high and intermediate sensitivity floral habitat must be avoided.
		Topsoil should be removed prior to opencast mining, stored separately and adequately, and replace adequate topsoil (at least to a depth of 1m) during rehabilitation.				
	General and hazardous waste	Contamination of natural habitat from any				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
	management	potential source must be prevented and a suitable waste management plan must be developed and implemented.				
	Concurrent rehabilitation	A concurrent rehabilitation and re-vegetation plan should be implemented as and when areas become available for rehabilitation.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant	The rehabilitation plan must be updated annually taking concurrent rehabilitation and revegetation requirements into consideration.	No-net loss in biodiversity.
		Implement an alien and invasive plant species management and eradication plan during the operational phase to prevent spread of alien species into surrounding natural grasslands.		Applicant	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020)	Eradicate invasive species along the site boundaries, paying specific attention to the eradication of NEMBA Category 1b invasive species.
Loss of plant species, floral diversity, and floral SCC.	Ongoing vegetation clearance, soil stripping and stockpiling	The operational footprint must be clearly demarcated by semi-permanent means.	Throughout the operational phase (Year 2 – 6)	Mine manager/SHE manager	Comply with the Threatened or Protected Species Regulations (2015).	Floral SCC recorded within the mining footprint area, must be relocated to suitable habitat within the study area under the supervision of a qualified ecologist.
		Areas beyond the designated operational areas should remain No-Go areas for mining personnel and vehicles.				
		The collection of plant material for medicinal or other purposes within the study area should be strictly prohibited.				
		Effluents of any nature must be prevented from entering wetland related habitat.	Throughout the operational phase (Year 2 – 6)	Mine manager/SHE manager	Implement a Storm Water Management Plan (SWMP) in line with the Water Use License conditions	No wastewater discharges will be allowed
		Implement a fire management programme, providing protection for natural grassland and wetland areas.	Throughout the operational phase (Year 2 – 6)	Mine manager/ SHE Manager	Veld fires and the possibility of fires spreading and damaging private land and structures, mine infrastructure, livestock and crops must be prevented	No illicit fires must be allowed during any phases of the proposed mining development.
Degradation of vegetation within the study area and surrounds due to dust, alien invasive species and erosion.	Ongoing vegetation clearance, soil stripping and stockpiling	Implement an alien and invasive plant species management and eradication plan during the operational phase to prevent spread of alien species into surrounding natural grasslands.	Throughout the operational phase (Year 2-6)	Mine manager	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020).	Eradication of alien invasive species.
	Operational vehicle movement and increased human activity in and around the MRA	Dust suppression procedures should be implemented to reduce and control dust emitting from the access road and stockpile areas.			Comply with the Dust Control Regulations (Refer to Section 6.1.2.2 above).	Prevent fugitive dust settling on surrounding crops/vegetation.
Loss/harm to faunal SCC.	Operational vehicle movement and increased human activity in and around the MRA	Speed limits must be established and adhered to by all vehicles.	Throughout the operational phase (Year	Contractors	Comply with the Threatened or Protected Species Regulations (2015).	Prevent loss of fauna inside the MRA.

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
			2-6)			
		All onsite traffic must be restricted to designated roads.		Mine manager		
		The illegal collection and hunting of any animals should be strictly forbidden by anyone except landowners with the appropriate permits where required.		SHE Manager/Contractors		
	Storm water management	Any dams or evaporation ponds (e.g., PCO) should be covered or fenced to prevent larger animals from accessing these areas.		SHE Manager		
Disturbance of nesting avifaunal species in natural areas.	Operational vehicle movement and increased human activity in and around the MRA	Areas beyond the designated development footprint areas should remain No-Go areas for mining personnel and vehicles.	Throughout the operational phase (Year 2-6)	SHE Manager/Contractors	Prohibit movement of machinery outside the construction footprint as defined in the EA conditions.	Construction activities must remain as far as possible from the natural grasslands along the southern border of the application area
		Noise emanating from construction machinery and equipment should be kept at a minimum by the fitting of exhaust silencers and through the regular maintenance of construction vehicles and equipment.				
Change in ecological processes maintaining faunal habitat	Operation of workshop areas and bulk fuel storage facility	Implement a fire management programme.	Throughout the operational phase (Year 2-6)	Mine manager	Establish and maintain fire breaks	Protect natural grassland and wetland areas from fires.
Surface Water/Wetlands						
Change in hydrological function by altering the flow regime	Opencast mining and earth work activities	Operational activities should not take place within watercourses or buffer zones.	Throughout the operational phase (Year 2-6)	SHE Manager	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	No unauthorised activities can take place within the regulated area of a watercourse.
		Development should include measures to ensure that the flow paths and storage mechanisms in the soil should be disturbed as little as possible, to sustain hydrological and biogeochemical connectivity.	Throughout the operational phase (Year 2-6)	Applicant	Comply with the conditions of the Water Use License	Critical recharge areas should be determined in a hydropedological assessment
	Operational vehicle movement and increased human activity in and around the MRA	Operational vehicles must stay on dedicated roads/servitudes	Throughout the operational phase (Year 2-6)	Mine manager	Remain within the designated construction footprint as defined in the EA conditions	No unauthorised activities can take place within the regulated area of a watercourse.
	Dewatering of opencast pits	A wetland offset strategy should be formulated should loss of hydrological zonation be detected in downslope wetlands	If required during or after operational phase (Year 2-7 onwards)	Applicant	Implementation of mitigation measures will assist with avoiding loss of and maintaining the functionality of the aquatic ecosystems within the project area and enable the project to comply with the requirements of the NWA	Wetland loss must be avoided and impacts on wetland habitat reduced and/or avoided
	Storm water management	Implement a SWMP whereby clean storm water runoff is diverted to the natural drainage lines and dirty storm water runoff is contained and recycled.	Throughout the operational phase (Year 2-6)	Mine manager/SHE Manager	Implement a Storm Water Management Plan (SWMP) in line with the Water Use License conditions	High energy stormwater input into the watercourses should be prevented at all costs.

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
	Concurrent rehabilitation	Adapt mining process to ensure continuous rehabilitation during operational phase by rehabilitating all areas as soon as they are not required for further operations for the life of the mine.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/Mine manager	The rehabilitation plan must be updated annually taking concurrent rehabilitation and revegetation requirements into consideration.	The rehabilitated areas must be free draining with no signs of erosion.
Sedimentation/siltation and associated change in turbidity	Opencast mining and earth work activities	Maintain buffer zones in which no activities can take place to trap sediments.	Throughout the operational phase (Year 2-6)	SHE Manager	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	No unauthorised activities can take place within the regulated area of a watercourse.
	Operational vehicle movement and increased human activity in and around the MRA	Make use of a single access road during operations.	Throughout the operational phase (Year 2-6)	Mine manager	Remain within the designated construction footprint as defined in the EA conditions	No unauthorised activities can take place within the regulated area of a watercourse.
	Ongoing vegetation clearance, soil stripping and stockpiling/ Storm water management	Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the work areas.	Throughout the operational phase (Year 2-6)	Applicant/SHE Manager	Implement erosion control measures as specified in the Water Use License conditions	Minimise erosion potential, uncontrolled runoff and loss of topsoil.
		Runoff from roads must be managed to avoid erosion and pollution problems.				
		If any water is released into the receiving environment the velocity of storm water must be attenuated and spread by making use of trench breakers and gabion structures.				
		Prevent runoff from the haul roads from entering the receiving environment.				
	Concurrent rehabilitation	Adapt mining process to ensure continuous rehabilitation during operational phase by rehabilitating all areas as soon as they are not required for further operations for the life of the mine.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/Mine manager	The rehabilitation plan must be updated annually taking concurrent rehabilitation and revegetation requirements into consideration.	Activities should not impact on rehabilitated areas and where soil or vegetation disturbances took place, this should be rehabilitated immediately.
	Ongoing vegetation clearance, soil stripping and stockpiling/ Storm water management	Monitoring should be done to ensure that sediment pollution is timeously addressed.	Throughout the operational phase (Year 2-6)	Applicant/SHE Manager	Comply with the water monitoring conditions set out in the Water Use License	Reduced sediment deportation
Changes in water quality	Opencast mining and earth work activities	After construction, the land must be cleared of rubbish, surplus materials, and equipment.	At the beginning of the operational phase (Year 2)	Applicant	Implement concurrent rehabilitation in line with the Annual Rehabilitation Plan.	No-net loss in land capability and biodiversity.
		Maintain the recommended buffer zones to trap sediments with associated toxins.	Throughout the operational phase (Year 2-6)	Applicant	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	No unauthorised activities can take place within the regulated area of a watercourse.
	Storm water management	A storm water cut-off drain should be constructed between the mining area and	Throughout the operational phase (Year	Applicant/SHE Manager	Implement a SWMP in line with the Water Use License conditions	Prevent contamination of surrounding surface water

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		the aquatic system to ensure that storm water flowing through the site is prevented from entering downstream watercourses.	2-6)			resources
		Runoff water from the overburden dumps, ROM stockpiles and any other contaminated stormwater should be channelled into PCDs.				
		Seepage drains should be maintained and channelled into the PCDs.				
		Bunded areas must be connected to the PCD system or dirty water from these areas should be pumped to the PCDs.				
		The runoff should be routinely monitored for acidity and salinity.			Implement water monitoring programme in line with the Water Use License conditions	Detect potential increases in salinity or acidic drainage water early to rectify problem areas asap.
		Water quality should be routinely monitored at aquatic ecosystems associated with the mining activities.				
	General and hazardous waste management/Sewage management	Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone.	Throughout the operational phase (Year 2-6)	Applicant/SHE Manager	Ensure waste management is done within good practice guidelines.	Implement and maintain a closed sewage reticulation system.
		Spill kits must be stored on site: In case of accidental spills of oil, petroleum products etc., good oil absorbent materials must be on hand to allow for the quick remediation of the spill.	Throughout the operational phase (Year 2-6)	Mine manager/Contractor	Manage hazardous substances according to the Hazardous Substances Act (No. 15 of 1973)	Minimize the risk of spillages through proper storage, handling and monitoring of fuel and chemicals used on site.
		Vehicles must be kept in good working order and leaks must be fixed immediately on an oil absorbent mat.				
		No maintenance (including refuelling) or storing of machinery near the aquatic areas.				
		Domestic waste must be collected in waste bins that are located on site. The collected waste must be disposed of at a municipal landfill facility.	Throughout the operational phase (Year 2-6))	Area manager/Contractor	Implement good practice guidelines in terms of waste management.	Prevent contamination of surface water resources through ineffective waste management
		The waste bins must be marked clearly indicating what waste must be disposed of in what bin.				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Employees must be encouraged to re-use, recycle, and reduce waste where possible.				
Introduction and spread of alien vegetation	Ongoing vegetation clearance, soil stripping and stockpiling	An alien vegetation eradication programmed should be implemented on the site to remove the alien vegetation from the wetland areas as priority.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/SHE Manager	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020)	Eradicate invasive species along the site boundaries, paying specific attention to the wetland's areas along the southern boundary.
		Monitor the establishment of alien invasive species within the areas affected by the operation and take immediate corrective action where invasive species are observed to establish.			Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020).	Eradication of alien invasive species within areas affected by mining.
	Concurrent rehabilitation	Rehabilitate or re-vegetate disturbed areas throughout the life of mine.			The rehabilitation plan must be updated annually taking concurrent rehabilitation and revegetation requirements into consideration.	No-net loss in land capability and biodiversity.
Loss and disturbance of watercourse habitat and fringe vegetation	Opencast mining and earth work activities	Apply and maintain the recommended buffer zones around wetlands.	Throughout the operational phase (Year 2-6)	SHE Manager	Any activities within 500m of riparian areas are subject to authorization by means of a water use license.	No unauthorised activities can take place within the regulated area of a watercourse.
	Storm water management/Dewatering of opencast pits	If surface water monitoring shows that the surrounding watercourses are affected by mine dewatering, discharge of clean water into the tributaries should be considered.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant	Comply with the conditions of the Water Use License	Flow in the Klein Olifants River or its tributaries must not be affected by dewatering.
		Loss of wetland habitat resulting from loss of shallow interflow must be offset through improvements to downslope wetlands.		Applicant	Implement a SWMP in line with the Water Use License conditions	No loss of wetland habitat
		Regular monitoring for wetland integrity and function should be undertaken in the long-term.		Applicant/SHE Manager	Conduct a Wetland Functionality assessment in line with the Water Use License conditions	Surrounding wetlands integrity and function must not be affected by mining.
Loss of aquatic biota	Operation related activities	Implement all management procedures listed above for the change in hydrological regime, change in water quality, sedimentation/siltation, spread of alien vegetation and disturbance of watercourse habitat.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Mine manager/SHE Manager/Applicant and Area Managers	Refer to above listed performance criteria	Refer to above listed standards to be achieved

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
Groundwater						
Leaching/Seeping of contaminants into the sub surface	ROM Coal handling and stockpiling/Storm water management/Overburden stockpiling	All waste storage facilities must be lined according to the geochemical waste classifications and relevant regulations.	Throughout operational phase (Year 2-6)	Mine manger/ SHE Manager	Comply with the conditions of the Water Use License listed under Section 21(g) water uses	Deterioration of groundwater quality must be prevented wherever possible and minimised where complete prevention is not possible.
		Water that has been in contact with residue must be kept within the confines of the MRD until evaporated, treated to rendered acceptable for release, or re-used in some other way.				
		The storm water management plan (SWMP) must make provision for the maximum precipitation to be expected over a period of 24 hours with a probability of once in one hundred years.				
		Where leachate is generated, it must be contained separately from water which is only slightly polluted through contact with the waste.				
		A freeboard of at least 0.5 m must be provided for the PCDs above the predicted maximum water level.				
		Implement the groundwater monitoring program described in this EMPr.				
		Monitor water storage facilities, particularly pollution control dams, to manage the risk of spillage from the dams				
	Concurrent rehabilitation	Rehabilitation should be planned to promote free drainage and to minimise or eliminate ponding of storm water.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant	On-going rehabilitation as mining operations progress is required.	Implement as many closure measures as possible during the operational phase, while conducting appropriate monitoring programmes to demonstrate actual performance of the various management actions during the life of mine.
Aquifer contamination caused by polluted water migrating away from the mining area (pollution plume)	Opencast mining and earth work activities	Mining should remove all coal from the opencasts and separate acid forming and non-acid forming material.	Throughout operational phase (Year 2-6)	Mine manager	Implement all recommendations made by the groundwater specialist to ensure that the groundwater quality within the study area will comply with the DWS target water quality objective and will be of sufficient quality that can still be used by surrounding groundwater users.	Deterioration of groundwater quality must be prevented wherever possible and minimised where complete prevention is not possible.
		Major underground fractures encountered while mining must be sealed by grouting, both on inflow and outflow areas.				
		Where possible, reduce the extent of the opencast pit in potential decant areas.				
	Dewatering of opencast pits	The capacity to rapidly pump water out of	Throughout operational	Mine manager		

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		the pit into storage dams should be maintained to minimise water quality deterioration due to long-term retention of storm water in contact with acid generating materials.	phase (Year 2-6)			
	Storm water management	Berms should be constructed around the opencast pits to minimise the flow of any surface water or floodwater into mine workings.	Throughout operational phase (Year 2-6)	Mine manager/SHE Manager		
	Concurrent rehabilitation	Deposit acid forming material at the base of the pit.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Mine manager	Implement concurrent rehabilitation in line with the Annual Rehabilitation Plan.	Implement as many closure measures as possible during the operational phase, while conducting appropriate monitoring programmes to demonstrate actual performance of the various management actions during the life of mine.
		All mined areas should be flooded as soon as possible to minimise oxygen from reacting with the remaining pyrite.		Mine manager		
		Apply passive water management measures within the operations that are aimed at minimising the potential for water quality deterioration.		Applicant		Rehabilitated land shall be left in a condition as close as possible to that prior to construction.
Lowering of groundwater levels	Dewatering of opencast pits	If it can be proven that the mine is indeed affecting the quantity of groundwater available to certain users, the affected parties should be compensated.	Throughout operational phase (Year 2-6)	Applicant	Comply with the conditions of the Water Use License listed under Section 21(j) water uses	Supply the affected groundwater users with the same quantity and quality water
		Water stored in pit should be utilised locally for dust suppression, as far as possible.	Throughout operational phase (Year 2-6)	Applicant/Mine manager		Water pumped out should be captured and managed in the mine water balance.
		The numerical model must be updated during operation of the opencast by using the measured inflows, water levels and drilling and pump test information.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/SHE Manager		Re-calibrate and refine the impact prediction during operations and update management measures accordingly.
		Implement the groundwater monitoring program described in this EMPr.				
Air quality						
Decrease in the ambient air quality due to emissions (dustfall, PM_{10} and $PM_{2.5}$) associated with operational activities	Opencast mining and earth work activities/ROM Coal handling and stockpiling/Overburden stockpiling	Implement water sprays for material handling operations (e.g., wet material before conveying coal and while offloading trucks), drilling, blasting, bulldozing activities, stockpiles and material storage areas.	Throughout operational phase (Year 2-6)	Mine manager/SHE Manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors. .	Reduce dust and particulate matter emission as far as possible
		Use of vegetation, topsoil and/or rock				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		armour on large stockpiles and dumps that are prone to wind erosion.				
		Immediate clean-up of any material (i.e., coal, waste rock/overburden and topsoil) spillages.				
	Operational vehicle movement and increased human activity in and around the MRA	Implement wet suppression in combination with chemical surfactants on haul roads.		SHE Manager/Contractors		
		Have clearly defined hauling routes/vehicle access areas.				
		Control the number of trucks on the road, weight of trucks and the travelling speed.				
		Establish a maintenance schedule to ensure proper maintenance of the trucks & mobile equipment.				
		Conduct regular visual site inspections to assess whether further mitigation is required for any of the dust emission sources				
Noise						
Increase in ambient noise levels	Opencast mining and earth work activities/	Ensure that the acoustical berms, constructed in relation to receptors R1 and R6, are maintained during operations.	Throughout operational phase (Year 2-6)	Applicant/SHE Manager	Comply with the acceptable external noise levels according to SANS 10103:2008 within the applicable districts listed in Section 6.1.2 above.	The acoustical berm must be constructed according to the specifications recommended by the noise specialist. .
		Use overburden stockpiles to assist as acoustical screens.				
		Any area where a tip is to be implemented should not be higher than a berm (and in relation to a receptor).				Tips should be placed as close to a berm as possible in relation to a receptor's locality.
	Operational vehicle movement and increased human activity in and around the MRA	Contractors should install acoustical mufflers on the exhaust outlets of all heavy vehicles.	Throughout operational phase (Year 2-6)	Contractors/SHE Manager		Minimize noise emissions near sensitive receptors
		Equipment should consider silencers on exhaust ports, to lower the nosiest points on the heavy vehicles.				
		Ensure all equipment is well maintained and functioning optimally.				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		The daytime use of reverse alarms must be minimised. To minimise the noise nuisance caused by reverse alarms, the implementation of less tonal, more broadband character etc. reverse alarms should be considered.				
		A Biannual Environmental Noise Measurement Programme (Monitoring Programme) needs to be implemented.		Applicant/SHE Manager		Onsite noise measurements should be considered on a frequent basis, to help identify any fault or loud equipment that may require enclosures or maintenance.
		A contact line should be made available whereby receptors could lodge a complaint.		SHE Manager		Address and document complaints
Visual						
Increased visual intrusion and change to sense of place through dust plumes	Operational vehicle movement and increased human activity in and around the MRA	Suppress dust generated from material handling operations and mining operations through wet suppression in combination with chemical surfactants. The loading, transfer and discharge of materials should take place with a minimum height of fall.	Throughout operational phase (Year 2-6)	Mine manager/SHE Manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Reduce and control dust at the haul roads and opencast pits.
		Have clearly defined hauling routes/vehicle access areas.				
		All main hauling roads should be treated for dust suppression.				
		Control the number of trucks on the road, weight of trucks and the travelling speed.				
Deterioration of visual quality and sense of place for sensitive receptors (residents), surrounding road users and tourists.	Overburden stockpiling	The design of the slopes should be as gradual as possible.	Throughout operational phase (Year 2-6)	Applicant/SHE Manager	Maintain the landscape to a high aesthetic standard to retain a high visual quality for visitors and observers	"Hide" the source of the visual impact from view, by placing visually appealing elements between the viewer and the source of the visual impact
		Keep stockpile heights as low as possible (<20m)				
	Ongoing vegetation clearance, soil stripping and stockpiling	Trees and shrubs must be used to screen structures and break stark contrasting lines, where required.				
		Introduce landscaping measures such as vegetated berms.				
	Concurrent rehabilitation	Start the rehabilitation of disturbed areas as soon as practically possible to restrict				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		long stages of exposed soil and possible erosion.				
Increased visual intrusion and change to sense of place through night-time illumination	Operation related activities	Outdoor lighting must be strictly controlled to prevent light pollution.	Throughout operational phase (Year 2-6)	Applicant/SHE Manager	Lights must be mounted at an appropriate height, to provide maximum illumination while minimizing light pollution into the surrounding area.	Plan the lighting requirements of the facilities to ensure that lighting meets the need to keep the site secure and safe, without resulting in excessive illumination;
		Sources of light must as far as possible be shielded by physical barriers such as a planted trees and shrubs or built structures.				
		Use should be made of down-lighting to prevent excessive light from shining up into the night sky.				
		Where possible, use should be made of directional lighting which uses devices to direct light at the areas of activity, also preventing unnecessary illumination of the surrounding area.				
		Consider installing anti-reflective coating on metal surfaces			Reduce the sunlight that is reflected and increase the amount of sunlight that is absorbed during daytime	Reduced effect of glare and reflection of metal infrastructure.
Heritage and Palaeontological Resources						
Damage to burial ground/ graves	Ongoing vegetation clearance, soil stripping and stockpiling	Demarcate sites with at least a 100m buffer and avoid them.	Prior to construction and throughout operational phase (Year 1-6)	Applicant SHE Manager Heritage specialist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	Retain and avoid burial grounds and graves. If this is not possible, the graves must be relocated after completion of a detailed grave relocation process.
		A Grave Management Plan should be developed for the graves, to be implemented during the construction and operation phases (which needs approval by SAHRA BGG).				
Damage to fossil resources	Opencast mining and earth work activities	If fossil remains are discovered, either on the surface or exposed by new excavations the Chance Find Protocol must be implemented.	Throughout operational phase (Year 2-6)	Applicant SHE Manager Palaeontologist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 of NHRA	Fossils may not be excavated, broken, moved, or destroyed without prior assessment and without a permit from the relevant heritage resources authority.
Blasting and vibration						
Ground vibrations and air blasts causing structural damage and nuisance	Opencast mining and earth work activities	Specific blast design must be done, using shorter and smaller diameter blast holes.	Throughout operational phase (Year 2-6)	Applicant/Contractor	Comply with the regulatory requirements of the Mine Health and Safety Act (Refer to Section 6.1.3 above). Submit the necessary blasting application to the DMRE for bench deliveries, mining within 100m of structures, as well as blasting within 500m from structures to be protected.	Avoid structural damage and complaints at POI's.
		Do blast design that considers the actual blasting, and the ground vibration levels to be adhered too.				
		Only apply electronic initiation systems to facilitate single hole firing.				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Implement mitigation in the form of maximum charge mass that will be allowed to maintain safe levels of ground vibration and minimum distance between blast and problematic POI's.				
		Do not blast during the following times: - too early in the morning or too late in the afternoon in winter. - When there is fog and/or low overcast clouds. - In the dark. - When wind is blowing strongly in the direction of an outside receptor.				
		Develop a mitigation plan to determine if the boreholes located in the area of influence will be retained or replaced.				The boreholes affected by blasting operations must be replaced by the Applicant.
Damage and injuries caused by fly rock	Opencast mining and earth work activities	Make use of increased stemming lengths and specific stemming material to manage fly rock - crushed aggregate of specific size.	Throughout operational phase (Year 2-6)	Mine manager	Best practices should always be implemented to precent a breach of the blast clearance zone.	No injuries and/or damage at POI's caused by fly rock.
		Specific blast design must be done, with shorter and smaller diameter blast holes.				
		Ensure use of correct explosive product.				
		Charge and blast the same day.				
		Ensure use of water-resistant product in wet holes.				
		A minimum unsafe zone of 402m must be cleared of people, animals, and equipment before blasting.				
		Clearance distances must be set, and road travel managed during blasting operations specifically when blasting is done within 500m of the R555, D1433 and gravel roads.				
Traffic						
Decrease in road safety conditions and deterioration of road network due to increase in heavy vehicles.	Operational vehicle movement and increased human activity in and around the MRA	The drivers of all trucks should be equipped with specialised road safety and driving training.	Throughout operational phase (Year 2-6)	Applicant	Ensure all site staff are trained and kept updated in terms of the EA, EMPr and other legal requirements.	Reduce the impact of the mine from an intersection performance, road safety, pedestrian safety, and public transport perspective.
		Appropriate road markings and warning signs should be implemented during the mine operating phase for safety purposes.			Implement the D1433 road upgrades recommended by traffic engineer.	

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Communicate with the STLM with regards to potholes and possible repairs to the road surfaces that might be required and repair access roads that have been damaged because of haul trucks.				
Potential conflict of site vehicles with pedestrians		The D1433 road should be upgraded and widened to 3.5 meters per direction in order to accommodate the haulage trucks.				
		The D1433 should be upgraded with a sufficient shoulder for pedestrians to safely walk on – a recommended minimum of 1.5 meters can be provided.				
		Public transport facilities should be provided along the D1433 close to the access to the mine and at the intersection of the D1433/R104 and D1433/R555 for taxis to drop and pick up employees.				
Socio Economic						
Creation of local employment opportunities	Implementation of the Social and Labour Plan (SLP)	Formulate and implement the affirmative procurement strategy once the mining right has been awarded.	Before construction (Year 1)	Applicant	Establish a Forum prior to operations commencing, represented by Canyon Resources, community groupings (i.e., Youth, Land, Women and so forth), Ward Councillor and the STLM LED Department, that makes the targets of procurement and employment clear to the local communities and promotes transparency.	Enhance positive impacts through good management practises
		Maximise the number of locals sourced for employment.	At the beginning of the operational phase (Year 1-2)			
Influx of outsiders/migrant workers		Do not create unrealistic job expectations and set clear goals with regards to local employment, career progression and so forth.	Throughout the operational phase (Year 2 – 6)	Applicant		Ensure transparency during the employment processes and make use of the correct channels (Ward Councillor, the Forum and relevant STLM structures) when SMMEs and local businesses are identified. Provide feedback when tenders are awarded.
		Contractors must submit a transport plan ensuring that employees can be transported to and from their places of residence.				Link with the STLM and IDP in this regard and implement the SLP guidelines (Project SLP).
		Draw up a housing plan that sets out how Canyon will be dealing with employees from outside the Municipal boundaries.				
		Monitor the above goals of SLP implementation and housing provision through the Forum.				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Establish a clear communication channel between the private landowners and mine and maintain good relations.				Deal with illegal structures expediently, follow the correct legal procedures and support the landowners in this regard.
Utilization of new HDSA supplies, SMME and other small businesses as a result of local procurement	Implementation of the Social and Labour Plan (SLP)	Maximise the number of locals sourced for SMME development, local procurement and local supporting industries.	Throughout the operational phase (Year 2-6)	Applicant	Adhere to the SLP requirements/commitments	Ensure that locals are trained and prepared to tender.
		Give preference to local communities and gradually extend the labour sending area to the wider municipality, district and province.				
Increase in salaries and wages, and local procurement of goods (limited) and service	Implementation of the Social and Labour Plan (SLP)	Specifically provide opportunities for workers from disadvantaged backgrounds and target local communities for economic, social and educational development.	Throughout the operational phase (Year 2-6)	Applicant	Adhere to the SLP requirements/commitments	Maximise the local content of the operational phase
		Supply a Value Chain Analysis and needs requirement to the STLM so that they can assist in preparing the youth, women, and entrepreneurs.				
		Assist the SMMEs and other small businesses with training, equipment and other "gaps" identified during the needs assessment.				
		Provide feedback to the communities and the STLM when tenders have been awarded to ensure transparency throughout the process.				
Loss of high potential farmland, access to livelihoods and decrease in land values	Operational phase related activities	Engage with the landowners to draw up a map with no-go areas to minimise negative impacts on current land use.	Before operational phase commences (end of Year 1)	Applicant	Remain within the designated operational footprint as defined in the EA Conditions	Minimise the impact on existing agricultural activities
		Reduce the project area and development footprint to the smallest area possible; locate the ROM stockpile and contractor's yard as close as possible to the mining area.				
		Ensure that all surrounding landowners are familiar with the procedures to lodge complaints and attend to the issues at hand expediently.				
		Implement all the mitigation and management measures as proposed in the Geohydrological Report and Air, Visual and Noise Impact Assessments to address	Throughout the operational phase (Year 2-6)	Mine manager/SHE manager	Adhere to mitigations measures proposed by the groundwater, air quality, noise, visual and blast/vibration specialists.	Potential negative impacts because of the mine (dust, noise, land invasions, security issues, etc.) should be addressed pro-

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		intrusion and pollution impacts that could result in degradation of agricultural land.				actively, to avoid it having an impact on land values.
Skills development, training capacity building, upliftment of communities, income generation and contract opportunities for HDSA's	Implementation of the Social and Labour Plan (SLP)	Maximise the local content of the SLP recommendations and projects. Do a needs assessment of Ward 9 with the STLM LED Unit and align the projects with the IDP.	Throughout the operational phase (Year 2-6)	Applicant	Adhere to the SLP requirements/commitments	Ensure that real community-based needs are addressed.
		Involve the LED Unit, Ward Councilor, and other community groups (Youth groups, Community development workers, etc.) in the SLP processes and draw up a 'Community Engagement Plan' (CMP) which should include principles and guidelines with the purpose to guide the management of community related issues.				
		Publish LED projects in English and one other local language as prescribed by the new Mining Charter.				
		The Applicant's SLP Manager / CLO must communicate with the authorities on issues pertaining to the SLP and submit annual reports as required in the Mining Right.				
		Make gender-based issues a definite focus of the need's assessment/skills development action plan				Ensure that equity of minority groups (women, youth and the disabled) are included in the SLP for bursaries, training and employment opportunities.
		Focus on the local communities (specifically Ward 9) when students are identified for bursaries, internships and so forth.				Maximise the local content of the operational phase
		Be transparent and provide feedback to the communities and the STLM when tenders, bursaries, training opportunities etc. are awarded.				
		Identify and record the level of procurement from HDSA companies on a quarterly basis, as well as geographical sources of procurement.				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Encourage and set goals for established companies to form partnerships with HDSAs.				
		Where necessary and feasible, provide mentoring and capacity building assistance to HDSA suppliers.				
		Establish Future Forum, as stipulated in the SLP and Mining Charter, and hold regular meetings/feedback sessions so that the employees, local communities and Unions are aware of the goals, strategies and progress of SLP implementation.				
		Mobilize the Department of Labour Social Plan Services (e.g., Technical assistance, Job Advice Centre, Retrenchment Response Team etc.).				
Negative community mobilization and labour disputes	Operational phase related activities	Appoint a dedicated CLO that understands local customs and is proficient in the local languages and make the communication procedures and channels clear to the community, if required.	Throughout the operational phase (Year 2-6)	Applicant	Adhere to the SLP requirements/commitments	Ensure transparency through the regular feedback meetings of the Future Forum and/or an Environmental Management Committee.
		Be vigilant not to raise unrealistic expectation amongst the local communities with regards to employment, skills requirements, and new community projects.				
		Attend to issues as soon as they occur and conduct meetings with the community leadership / Ward Councilor / STLM structures to provide feedback on previous matters.				
Increase in crime and security issues	Operational vehicle movement and increased human activity in and around the MRA	Establish a clear communication channel between the private landowners and mine and maintain good relations.	Throughout the operational phase (Year 2-6)	Applicant	Comply with the provision of the International Finance Corporation (IFC)'s Performance Standard 4 "Community Health, Safety and Security	Ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimises risks to the community's safety and security.
Change to the sense of place	Operational vehicle movement and increased human activity in and around the MRA	Clearly identify all sensitive receptors of ground vibration and sound; and survey the quality of the housing and infrastructure prior to blasting activities commencing.	Throughout the operational phase (Year 2-6)	Mine manager	Comply with the regulatory requirements of the Mine Health and Safety Act (Refer to Section 6.1.3 above). Submit the necessary blasting application to the DMRE for bench deliveries, mining within 100m of structures, as well as blasting within 500m from structures to	Implement all recommendations made by the Blasting Specialist.

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		Consult with the affected parties on the most effective ways that blasting schedules be communicated to them (notice boards, text messages, verbal notifications, etc.). Notify affected parties in advance.			be protected.	
		Conduct ongoing engagements, to ensure that blasting for the project occurs in a manner that has the least impact on people and the environment.				
		Ensure that locals are aware of the channels to raise complaints	Throughout the operational phase (Year 2-6)	Applicant	Establish an internal Environmental Monitoring Committee to which complains can be submitted	Keep a complaints' register at the entrance to the Project Area/Surface Layout Area,
		Where relevant install silencers on machinery and trucks.			Comply with the acceptable external noise levels according to SANS 10103:2008 within the applicable districts listed in Section 6.1.2 above.	Minimize noise emissions near sensitive receptors
Disruptions in daily living and movement patterns for surrounding landowners and communities due to higher traffic volumes	Operational vehicle movement and increased human activity in and around the MRA	Implement all mitigation measures listed under Traffic above.	Throughout the operational phase (Year 2-6)	Applicant	Implement the D1433 road upgrades recommended by traffic engineer.	Reduce and mitigate potential road safety issues, pedestrian safety, and traffic congestion.
		Impose penalties for reckless drivers, to enforce compliance to traffic rules and speed limits.				
		Inspect trucks and other heavy vehicles on a regular basis to avoid oil spillages and unroadworthy vehicles that could result in accidents.		Mine manager/Contractors		
		Display a contact number on trucks where motorists can report reckless driving.		Applicant		
		Provide suitable pick-up and drop-off areas for public transport (buses and taxis).				
		Limit operations and the movement of trucks on the access and haul roads to reasonable daytime hours and when possible, not on Sundays and public holidays.				
		Access and haul roads regularly graded; and measures implemented to suppress dust (spraying of water on road surfaces).		SHE manager		
Decrease in the quality of life due to intrusion impacts (dust, noise, light pollution, etc.)	Operational phase related activities	Implement the mitigation measures listed above under dust, noise, blasting, visual, and socio economic.	Throughout the operational phase (Year 2-6)	Applicant/Mine manager/SHE manager/Contractors	Refer to above listed performance criteria	Refer to above listed standards
Health and safety risks for workers	Operational phase related activities	Provide safe and clean drinking water and instill regular water breaks to keep workers hydrated.	Throughout operational phase (Year 2-6)	Mine manager/Applicant	Operational Health and Safety procedures and requirements of the Mining Right as well as the Water Use License to be implemented and monitored as prescribed by the guidelines of	Avoid and/or minimise risks to and impacts on the health and safety of the mine workers.
		Dust monitoring and implementation of				

Potential Environmental Impacts: Operational Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		sufficient dust suppression methods. Employees are to be provided with dust masks that minimize dust inhalation. Issue employees with earplugs and instruct them how to use it. Implement awareness campaigns (HIV/AIDS/TB, blood pressure, Body Mass Index, Fatigue management, overall emphasis on healthy lifestyle, chronic disease management and wellness), to improve knowledge in the workplace and in the surrounding communities, provision of homebased care and counselling; and educating the people at schools and in the community about the pandemics. Ensure knowledge and implementation of the mine's Environmental Emergency Procedures. Finance awareness campaigns through funds allocated to through the SLP. Ensure that the personnel on the proposed mine are trained in first aid and procedures to follow, in case of fire breakouts and other emergency situations.			the MPRDA and the National Water Act 36 of 1998 (NWA).	
Community health and safety risks	Operational phase related activities	Limit the number of access gates and ensure 24-hour security and other relevant security measures. Post information boards about public safety hazards and emergency contact information. Implement fire breaks to prevent the spreading of veld fires. Fence the entire surface infrastructure area and PCDs and erect signboards in English and the local languages that warn of the dangers of trespassing at the accesses and along the periphery. Implement SWMP to prevent contaminated or dirty water from escaping the mine area. Support community volunteer programs through expansion of the community-based peer health educator group.	Throughout operational phase (Year 2-6)	Mine manager/Applicant	Comply with the Environmental Health and Safety (EHS) Guidelines and the provision of the International Finance Corporation (IFC)'s Performance Standard 4 "Community Health, Safety and Security.	Avoid and/or minimise risks to and impacts on the health and safety of the local community from both routine and non-routine circumstances.

Table 14: Decommissioning/Rehabilitation and Closure Phase - EMPr

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
Topography						
Restoration of the pre-mining topography (positive)	Final backfill of open pit and closing of the final void	Backfill and level the disturbed site's excavated areas in line with the recommendations made by the groundwater specialist.	At the start of decommissioning and rehabilitation (Year 7)	Mine manager/Applicant	Achieve the planned Post Closure Land Use (PCLU)	Minimise acid generating potential
		Topsoil and subsoil should be replaced in the correct sequence on soft overburden material.				Ensure that subsurface limiting layers are not created
	Cleaning, landscaping, and replacement of soils over the disturbed area	The rehabilitated areas must be shaped to emulate the pre-mining topography as close as possible.				The rehabilitated area must be safe, stable, and free draining.
Subsidence of the rehabilitated area	Final backfill of open pit and closing of the final void	Conduct on-going monitoring for subsidence and or cracking to surface.				
		Where needed implement backfilling of cracks and landscaping of collapsed areas.				
Soils, Land Use and Capability						
Soil erosion, compaction, and subsequent loss of soil quality/pre-mining land capability and use	Dismantling and removal of mining infrastructure	Trucks, equipment, and other vehicles must park on designated parking areas and not create additional areas at risk of soil erosion by parking outside of the demarcated areas.	Throughout decommissioning and rehabilitation (Year 7)	Mine manager/ SHE Manager	Prohibit movement of machinery outside the mine's footprint as defined in the EA conditions and Mining Right.	Minimize compression effects of heavy equipment.
		Vehicles and equipment must travel within demarcated areas and not outside of the disturbed footprint.		Contractor/Mine manager		
	Rehabilitation of compacted areas	Use deep ripper equipment during the decommissioning and rehabilitation phase to alleviate deep compaction as effectively as possible.		Applicant	Achieve the planned Post Closure Land Use (PCLU)	No-net loss in land capability.
Soil pollution	Waste generation and disposal	Maintenance must be undertaken regularly on all vehicles and decommissioning machinery to prevent hydrocarbon spills.	Throughout decommissioning and rehabilitation (Year 7)	Contractor/Mine manager	SANS / SABS / SA legislative requirements regarding vehicle and equipment maintenance and operating requirements.	Minimize the risk of spillages through proper storage, handling and monitoring of general and hazardous waste generated on site.
		Remove all contaminated soil to recognised and licensed waste sites if not able to be contained below groundwater levels in final void.				
		Any waste generated during decommissioning, must be stored into			Implement good practice guidelines in terms of waste	Attain "cradle to grave" management of waste on site.

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		designated containers and removed from the site by registered contractors.			management.	
Loss of soil quality	Cleaning, landscaping, and replacement of soils over the disturbed area	Implement mitigation measures under soil erosion, compaction and pollution listed above.	Throughout decommissioning and rehabilitation (Year 7)	SHE manager/Applicant	Achieve the planned Post Closure Land Use (PCLU)	No-net loss in land capability.
		Soil should be spread, treated with fertilizer or ameliorants (if required) and re-vegetated, naturally or with indigenous seeds (as required).				
		Remove all unwanted infrastructure including haul roads.				
		Conduct on-going monitoring for subsidence and or cracking to surface.	After decommissioning and rehabilitation during closure (Year 8 onwards)			The rehabilitated area must be safe, stable, and free draining.
		Where needed implement backfilling of cracks and landscaping of collapsed areas.				
Return to arable land and crop production	Rehabilitation and post closure management activities	Implement soil management plan and rehabilitation plan.	Closure (Year 9 – 20)	Applicant	Achieve the planned Post Closure Land Use (PCLU)	No-net loss in land capability.
Flora and Fauna						
Degradation of vegetation within the study area and surrounds due to unsuccessful rehabilitation	Cleaning, landscaping, and replacement of soils over the disturbed area	Rehabilitation of natural vegetation should proceed in accordance with a rehabilitation plan.	Throughout operation phase and during decommissioning/rehabilitation (Year 2-7)	Applicant	Achieve the planned Post Closure Land Use (PCLU)	No-net loss in biodiversity.
		Concurrent rehabilitation efforts should be documented in terms of species used, soil amelioration and other variables, acting as rehabilitation trials.				
		Special attention should be paid to alien and invasive control within these areas.	Throughout decommissioning and rehabilitation (Year 7)	Applicant		
		All soils compacted as a result of mining activities should be ripped, profiled and revegetated as required.				
		Rehabilitation success and plant species establishment on mining areas must be monitored for a period of three years.	After decommissioning and rehabilitation during closure (Year 8-10)	Applicant		
	Dismantling and removal of mining infrastructure	All infrastructure must be removed, and footprint areas rehabilitated, unless otherwise agreed upon.	Throughout decommissioning and rehabilitation (Year 7)	SHE manager/Applicant		
Alien Infestation resulting from the introduction of species not naturally occurring in the area.	Cleaning, landscaping, and replacement of soils over the disturbed	An invasive species management programme must continue to be implemented after closure.	Throughout decommissioning, rehabilitation, and closure phase (Year 7 onwards)	SHE manager/Applicant	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species	Eradication of alien invasive species.

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
	area	The use of herbicides in alien eradication should be avoided to prevent contamination of water sources and inadvertent loss of indigenous species.			Regulations (2020).	
		Any erosion noted within natural grassland areas must be rectified immediately through soft engineering techniques if noted.				Minimise erosion potential, uncontrolled runoff, and loss of topsoil.
Disturbance or persecution of faunal SCC	Dismantling and removal of mining infrastructure	Faunal SCC threatened by decommissioning activities should be removed to safety.	As and when required during decommissioning and rehabilitation, (Year 7)	SHE Manager	Comply with the Threatened or Protected Species Regulations (2015).	Prevent loss of fauna inside the MRA.
Return of flora and faunal species to rehabilitated areas (positive)	Mine closure	Avoid repeated burning and grazing new growth immediately after a burn every year.	After decommissioning and rehabilitation during closure (Year 8-10)	Applicant/ SHE Manager	Achieve the planned Post Closure Land Use (PCLU)	Prevent soil erosion, loss of nutrients, and the loss of the leaf litter
		Prevent prolonged over-grazing Prevent prolonged over-grazing over rehabilitated areas.				
		Rehabilitation success and plant species establishment on mining areas must be monitored during the post-closure phase of the project for a period of three years.				
		Any priority floral species rescued and relocated during the mining process, should be monitored to determine their re-establishment success.			Comply with the Threatened or Protected Species Regulations (2015	Prevent loss of flora SCC during relocation.
Surface Water/Wetlands						
Change in hydrological function by altering the flow regime	Rehabilitation of the PCDs and associated infrastructure	Continue with effective storm water management during the decommissioning phase.	Decommissioning and rehabilitation (Year 7)	Mine manager/Applicant	Implement a Storm Water Management Plan (SWMP) in line with the Water Use License conditions	High energy stormwater input into the watercourses should be prevented at all costs.
	Cleaning, landscaping, and replacement of soils over the disturbed area	Topography should be engineered such that runoff is directed away from the opencast areas.	Throughout decommissioning, rehabilitation, and closure phase (Year 7 onwards)	Applicant/SHE manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	The rehabilitated area must be safe, stable, and free draining.
Sedimentation/siltation and associated change in turbidity	Cleaning, landscaping, and replacement of soils over the disturbed area	Decommissioning activities around watercourses must be restricted to the dryer winter months.	Decommissioning and rehabilitation (Year 7)	SHE Manager /Applicant	Comply with the Water Use License conditions which relate to rehabilitation and closure	Ensure that the surface water quality within the study area will comply with the DWS target water quality objective.
		Maintain silt traps until the disturbed area has been re-vegetated to contain				

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		silt transported downslope during rainfall events.				
		Cordon off areas that are under rehabilitation as no-go areas using danger tape and steel droppers. If necessary, these areas should be fenced off to prevent vehicular, pedestrian and livestock access.				
		Buffer zones, around wetland areas, should be maintained to trap sediments.				
		Any new erosion gullies must be remediated immediately.				
	Rehabilitation of compacted areas	Re-vegetate areas with a suitable mix of grass species, where required, taking cognisance of locally endemic species.				
Change in water quality	Final backfill of open pit and closing of the final void	Implement the mitigation measures described under groundwater below to reduce the nature (strength) and volume of AMD.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/Mine manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	Ensure that the surface water quality within the study area will comply with the DWS target water quality objective.
	Rehabilitation of the PCDs and associated infrastructure	The water storage facilities that are not needed for future use must only be breached and rehabilitated when the water qualities are such that the water can be released.	Decommissioning and rehabilitation (Year 7)	Applicant/Mine manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	Storm water leaving the site downstream must be clean and of the same quality as in situ before it enters the site (upstream)
	Waste generation and disposal	All stockpile areas must be cleaned, ripped, and contaminated soil disposed of site.	Decommissioning and rehabilitation (Year 7)	Applicant/SHE manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	Storm water leaving the site downstream must be clean and of the same quality as in situ before it enters the site (upstream)
		Waste should be removed off-site by specialist contractors for disposal.				
		Spills must be cleaned up as soon as possible.				
Loss of aquatic biota	Wastewater treatment	Implement the mitigation measures listed above under changes to water quality	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/Mine manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	Impacts on aquatic biota especially SCC avoided
		Implement decant treatment system approved by DWS.				

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
Introduction and spread of alien vegetation	Cleaning, landscaping, and replacement of soils over the disturbed area	An alien vegetation eradication programmed should be implemented on the site to remove the alien vegetation from the wetland areas during decommissioning and after closure.	Throughout decommissioning, rehabilitation, and closure phase (Year 7 onwards)	SHE manager/Applicant	Alien invasive floral species must be controlled in terms of the Alien and Invasive Species Regulations (2020).	Eradication of alien invasive species.
Groundwater						
Groundwater rebound and potential decant resulting in water quality deterioration	Final backfill of open pit and closing of the final void	All sulphate containing waste material must be stored at the bottom of the opencast pits and flooded as soon as possible to exclude oxygen.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Mine manager/Applicant	Comply with the Water Use License conditions which relate to rehabilitation and closure	Ensure that the groundwater quality within the study area will comply with the DWS target water quality objective
		Backfill material should be compacted, and surface water flow should be routed around the backfilled opencasts to reduce recharge to a maximal extent.				
	Water treatment	Should seepage or decant occur, the water must be redirected via trenching to an evaporation dam that is sanitarily lined with secondary containment.	After decommissioning, rehabilitation, and closure phase (Year 8 onwards)	Applicant		The potential decant from the mine must be identified and covered in the closure plan and financial provision.
		Develop and implement the decant management strategy approved by DWS.				
Aquifer contamination caused by polluted water migrating away from the mining area (pollution plume)	Final backfill of open pit and closing of the final void	The acid producing material must be placed as low in the pits as possible, followed by the non-acid generating material.	Throughout operational phase and continuing during decommissioning, rehabilitation, and closure (Year 2-7 onwards)	Applicant/Mine manager	Comply with the Water Use License conditions which relate to rehabilitation and closure	Ensure that the groundwater quality within the study area will comply with the DWS target water quality objective
		All mined areas should be flooded as soon as possible to minimise oxygen from reacting with the remaining pyrite.				
		The final layer (just below the topsoil cover) should be as clayey as possible and compacted if feasible, to reduce recharge to the decommissioned mines.				
		The final backfilled opencast topography must be engineered such that runoff is directed away from the mining areas.				
		Natural berms must be constructed to allow free drainage of surface water around the rehabilitated pit				
		Surface and groundwater quality and quantity monitoring should be continued until a steady state is reached.				

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
Air quality						
Decrease in the ambient air quality due to emissions (dustfall, PM_{10} and $PM_{2.5}$) associated with decommissioning and rehabilitation activities	Dismantling and removal of mining infrastructure	Dust suppression procedures should be implemented.	Decommissioning and rehabilitation (Year 7)	SHE manager/Applicant	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Reduce and control dust on the access road and rehabilitated areas.
		Define routes for the circulation of heavy machinery and vehicles and restrict machines' movement to the necessary areas.				
		Control the number of trucks on the road, weight of trucks and travelling speed limits.				
		Switch off engines whilst not in use.				
	Cleaning, landscaping, and replacement of soils over the disturbed area	Time decommissioning activities strategically and avoid carrying out activities with high dust-causing potential during strong wind conditions.				
Visual						
Increased visual intrusion and change to sense of place through dust plumes	Dismantling and removal of mining infrastructure	Dust suppression measures should be in place at all times.	Decommissioning and rehabilitation (Year 7)	Applicant/ Mine manager	Comply with the National Ambient Air Quality Standards and Dust Control Regulations, 2013 at all discrete receptors.	Reduce and control dust on the access road and rehabilitated areas.
Deterioration of visual quality and sense of place for sensitive receptors	Final backfill of open pit and closing of the final void resulting in a depression in the landscape	Overburden stockpiled on site must be used for backfilling of the previous mined-out void to limit the number of overburden stockpiles visible.	Throughout decommissioning, rehabilitation, and closure phase (Year 7 onwards)	Applicant/ SHE Manager Applicant	Achieve the planned Post Closure Land Use (PCLU)	Prevent permanent landscape scarring and alteration to the landscape character and sense of place due to ineffective rehabilitation
		Remove all built infrastructure.				
		Stabilise and backfill the opencast pit, and contour to ensure it is free draining.				
	Cleaning, landscaping, and replacement of soils over the disturbed area	Restore disturbed surfaces as closely as possible to their original topography and revegetate using locally occurring grass species.				
	Rehabilitation of compacted areas	Conduct on-going monitoring and maintenance of the rehabilitated pits to ensure that vegetation establishes successfully, and that erosion does not occur.				
		Start the rehabilitation of disturbed areas as soon as practically possible in				

Potential Environmental Impacts: Decommissioning/Rehabilitation and Closure Phase	Activity	Mitigation Measures	Time Period for Implementation	Responsible Person	Performance criteria	Standards to be achieved
		order to restrict long stages of exposed soil and possible erosion.				
	General and hazardous waste management	Ensure that rubble, litter, and disused materials are managed and removed regularly.				
	Mine closure	Where new vegetation is proposed to be introduced to the site, an ecological approach to rehabilitation, as opposed to a horticultural approach should be adopted.	After decommissioning, rehabilitation, and closure phase (Year 8 onwards)			
		Appoint a registered landscape architect (with SACLAP) to draw up a planting plan along these principles.				
Socio Economic						
Job losses and retrenchments	Retrenchment	Implement training programs throughout the life of the mine in order to promote long term sustainability of employees.	After decommissioning, rehabilitation, and closure phase (Year 8 onwards)	Applicant	Implement the commitments in the SLP that relates to retrenchments, job losses and responsibilities of the Future Forum	Enhance local training and skills-development during the life of mine
Injuries caused by falls, drowning, land slips and derelict buildings.	Mine closure	Develop a clear policy for the management of emergencies or accidents in the community as a direct result of the projects activities.	After decommissioning, rehabilitation, and closure phase (Year 31 onwards)	Applicant	Comply with the provision of the International Finance Corporation (IFC)'s Performance Standard 4 "Community Health, Safety and Security	Ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or minimises risks to the community's safety and security.

7 Financial Provision

The information in this section was taken from the Closure Plan developed by ENVASS for the proposed Driefontein Mine.

7.1 Description of the closure objectives and extent to which they align with the baseline characterisation

Initial and baseline domain specific closure objectives are presented in this section. Each Domain is also classified in terms of its initial relinquishment criteria (Table 16-20). These objectives and more specific relinquish criterion are read with the design principles presented in Table 21 below, more specifically guiding the manner of decommissioning, rehabilitation and ultimately the final closure activities.

Table 15: Driefontein closure objectives

Closure Domain	Closure Objectives
Domain 1: Offices and associated infrastructural areas	Demolish all mine related buildings and return the area to arable land.
Domain 2: Water infrastructure including the water management infrastructure	Demolish all channels, drains and PCDs at the point of aftercare.
Domain 3: ROM and overburden storage areas	Areas to be rehabilitated to support cultivation and arable land use, including total removal of sacrificial layers and creation of a free draining landscape.
Domain 4: Topsoil Stockpiles and temporary Berms	Total removal of topsoil stockpiles, incorporated with the rehabilitation programme. Placement of berms, pending the content in as overburden (hard and most likely with high AMD potential) in at lower levels followed by surface shaping and placement of soft material and topsoils sequentially.
Domain 5: Linear infrastructure, roads, electricity lines and fencing,	The main access road and parking area will be rehabilitated to arable land, partial removal of access road. All other roads and linear removals not required by end users will be rehabilitated to cultivation land status, free draining.
Domain 6 and 7: North Pit and South Pit	The landform will be free draining, rehabilitated to secure a land use status compatible with arability, safe for human access and visually non-intrusive.
Domain 8 Post-closure monitoring aspects	Follow a 5-year post closure monitoring and modelling programme to report on physical and biophysical stability prior to the formal closure application
Domain 9: Cost of closure risks and the cost of Regulatory Aspects, associated with a closure application	Annually re-assess closure risk, particular associated with landform and land use, as well as shallow and deep ground water aquifer pollution due to any source of pollution

Table 16: Offices and infrastructure: Key closure relinquishment criterion (baseline)

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Domain 1: Offices and Infrastructural Areas					
All surface infrastructure removed; concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Contaminated land: Soils in and around the facility subjected to a contaminated land assessment (if needed) which indicates how identified areas requiring clean-up have been rehabilitated (locations, volumes, disposal, surface profiling, re-vegetation, etc.)	All soils in Arable areas should for part of a free draining landscape with a soil Depth > 250 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Free draining above NGL, plated (scraped) without fly rock contamination, homogenous soil cover representing a horizon, even slope, 2 m contoured which effectively prevents high runoff velocity and erosion	Water management infrastructure operating according to design specifications, under a range of rainfall conditions, and over time (landform design).	Legally approved transfer agreements in place for retained infrastructure. Post- Mining Management Plan in place, indicating ongoing care-and- maintenance requirements of retained infrastructure and land use agreements in place.

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Availability of a detailed site-specific asset register that indicates status of infrastructure – what was demolished and removed, and what remains. The register includes ownership and details of new owner/s as well as intended use.	Soil Preparation: Soils should have been ripped to the full depth of the replaced soil layer, thereafter, tilled to produce a seed-bed suitable for the plant species selected for seeding. .	Achievement of predefined area (ha or % of rehabilitated area) per land capability class implemented and rehabilitated areas functioning in terms of predefined land capability classes (independent land capability assessment) and implemented a sowing, planting program on both cultivated and arable land with no signs of excessive and or uncontrolled erosion		For rehabilitation planning on active mine sites, a dedicated network of clean versus dirty water separation interventions are required to prevent clean runoff water from becoming contaminated, and from contaminated water affecting 'clean' land or water	

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Infrastructural footprint areas have been rehabilitated (shaped and revegetated) according to agreed-on site-wide surface landform design.	Faunal recolonisation: Best measured by the creation of habitats which suitable for shelter, feeding and breeding. Improvement of such areas should be evident after a 24 months monitoring cycle, particular toward key bird, amphibian, invertebrates, reptilian and mammals which should be suggested by a specialist at the offset of the post closure aftercare process.				

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
	Air Quality and Noise: Achievement of pre mining air quality and dust fallout fall rate (D) (mg / m2 / day, 30-day average) D < 600 600 < D < 1200 levels. As well as average noise level below 60 bd.				

Table 17: Water Management infrastructure: Key closure relinquishment criterion (baseline)

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Domain 2: Water Management Infrastructure					
All surface infrastructure removed; concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Contaminated land: Soils in and around the facility subjected to a contaminated land assessment (if needed) which indicates how identified areas requiring clean-up have been rehabilitated (locations, volumes, disposal, surface profiling, re-vegetation, etc.)	All soils in Arable areas should for part of a free draining landscape with a soil Depth > 250 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Free draining above NGL, plated (scraped) without fly rock contamination, homogenous soil cover representing a horizon, even slope, 2 m contoured which effectively prevents high runoff velocity and erosion	Water management infrastructure operating according to design specifications, under a range of rainfall conditions, and over time (landform design).	Legally approved transfer agreements in place for retained infrastructure. Post- Mining Management Plan in place, indicating ongoing care-and-maintenance requirements of retained infrastructure and land use agreements in place.

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Availability of a detailed site-specific asset register that indicates status of infrastructure – what was demolished and removed, and what remains. The register includes ownership and details of new owner/s as well as intended use.	Basel cover: Pastures should comprise at least three perennial species suitable for grazing - Presence of a creeping (binding) grass on steeper slopes or where soils are erodible should be obvious and well recorded. The pasture yields should be verified by a specialist to be able to support the intended livestock production rates. Vegetation cover should at least be at 15% basal cover - one-third of which is provided by perennial species richness. The areas at large are at least 80% of that recorded at the analogue site or predefined criteria, with not more than 10 percent of the annual assessment plots failing to record this level of diversity	All soils in Grazing areas should for part of a free draining landscape with a soil Depth > 300 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum		For rehabilitation planning on active mine sites, a dedicated network of clean versus dirty water separation interventions are required to prevent clean runoff water from becoming contaminated, and from contaminated water affecting 'clean' land or water	

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Infrastructural footprint areas have been rehabilitated (shaped and revegetated) according to agreed-on site-wide surface landform design.	Recommended species: Those at Driefontein are Digitaria decumbent (Pongola or lowveld finger grass), Pennisetum clandestinum (Kikuyu, seeded), Chloris gayana (Rhodes grass, seeded) and Cynodon dactylon (Kweek, Puerto Rico, seeded).				
All surface infrastructure removed; concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Fertilizer During planting: Adequate fertiliser was applied during the planting phase and at least a 24-month maintenance cycle of fertilizer dressings is recorded				

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
	Species Establishment: Ongoing monitoring should show that the Target plant species persist; that undesirable species that affect the intended land use do not dominate (e.g., Increaser I & II species do not replace higher value species). Further that Control measures have effectively eradicated invasive species or, for species with long-lived seed, annual maintenance measures are preventing re-infestation.				
	Soil Preparation: Soils should have been ripped to the full depth of the replaced soil layer, thereafter, tilled to produce a seed-bed suitable for the plant species selected for seeding. .				

Table 18: ROM and overburden storage area: Key closure relinquishment criterion (baseline)

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Domain 3: ROM and Overburden Storage area					
All surface infrastructure removed; concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Contaminated land: Soils in and around the facility subjected to a contaminated land assessment (if needed) which indicates how identified areas requiring clean-up have been rehabilitated (locations, volumes, disposal, surface profiling, re-vegetation, etc.)	All soils in Arable areas should for part of a free draining landscape with a soil Depth > 250 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Free draining above NGL, plated (scraped) without fly rock contamination, homogenous soil cover representing a horizon, even slope, 2 m contoured which effectively prevents high runoff velocity and erosion	Water management infrastructure operating according to design specifications, under a range of rainfall conditions, and over time (landform design).	Legally approved transfer agreements in place for retained infrastructure. Post- Mining Management Plan in place, indicating ongoing care-and-maintenance requirements of retained infrastructure and land use agreements in place.

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Availability of a detailed site-specific asset register that indicates status of infrastructure – what was demolished and removed, and what remains. The register includes ownership and details of new owner/s as well as intended use.	Recommended species: Those at Driefontein are Digitaria decumbent (Pongola or lowveld finger grass), Pennisetum clandestinum (Kikuyu, seeded), Chloris gayana (Rhodes grass, seeded) and Cynodon dactylon (Kweek, Puerto Rico, seeded).	All soils in Grazing areas should for part of a free draining landscape with a soil Depth > 300 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum		For rehabilitation planning on active mine sites, a dedicated network of clean versus dirty water separation interventions are required to prevent clean runoff water from becoming contaminated, and from contaminated water affecting 'clean' land or water	

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Infrastructural footprint areas have been rehabilitated (shaped and revegetated) according to agreed-on site-wide surface landform design.	Basel cover: Pastures should comprise at least three perennial species suitable for grazing - Presence of a creeping (binding) grass on steeper slopes or where soils are erodible should be obvious and well recorded. The pasture yields should be verified by a specialist to be able to support the intended livestock production rates. Vegetation cover should at least be at 15% basal cover - one-third of which is provided by perennial species richness. The areas at large are at least 80% of that recorded at the analogue site or predefined criteria, with not more than 10 percent of the annual assessment plots failing to record this level of diversity				

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
	Fertilizer During planting: Adequate fertiliser was applied during the planting phase and at least a 24-month maintenance cycle of fertilizer dressings is recorded				
	Species Establishment: Ongoing monitoring should show that the Target plant species persist; that undesirable species that affect the intended land use do not dominate (e.g., Increaser I & II species do not replace higher value species). Further that Control measures have effectively eradicated invasive species or, for species with long-lived seed, annual maintenance measures are preventing re-infestation.				

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
	Soil Preparation: Soils should have been ripped to the full depth of the replaced soil layer, thereafter, tilled to produce a seed-bed suitable for the plant species selected for seeding. .				

Table 19: Linear infrastructure, fencing and roads: Key Closure Relinquishment Criterion

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Domain 5: Linear infrastructure, fencing, and roads					
Rehabilitated infrastructural footprint areas have been rehabilitation (shaped and revegetated) according to agreed-on site-wide surface landform design.	Basel cover: Pastures should comprise at least three perennial species suitable for grazing - Presence of a creeping (binding) grass on steeper slopes or where soils are erodible should be obvious and well recorded. The pasture yields should be verified by a specialist to be able to support the intended livestock production rates. Vegetation cover should at least be at 15% basal cover - one-third of which is provided by perennial species richness. The areas at large are at least 80% of that recorded at the analogue site or predefined criteria, with not more than 10 percent of the annual assessment plots failing to record this level of diversity	All soils in Arable areas should for part of a free draining landscape with a soil Depth > 250 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Free draining above NGL, plated (scraped) without fly rock contamination, homogenous soil cover representing a horizon, even slope, 2 m contoured which effectively prevents high runoff velocity and erosion	For rehabilitation planning on active mine sites, a dedicated network of clean versus dirty water separation interventions are required to prevent clean runoff water from becoming contaminated, and from contaminated water affecting 'clean' land or water	Legally approved transfer agreements in place for retained infrastructure. Post- Mining Management Plan in place, indicating ongoing care-and-maintenance requirements of retained infrastructure and land use agreements in place.

Table 20: Mining Pits: Key relinquishment criteria

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Domain 6 & 7: Mining Pits (North and Southeast)					
All surface infrastructure removed; concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Basel cover: Pastures should comprise at least three perennial species suitable for grazing - Presence of a creeping (binding) grass on steeper slopes or where soils are erodible should be obvious and well recorded. The pasture yields should be verified by a specialist to be able to support the intended livestock production rates. Vegetation cover should at least be at 15% basal cover - one-third of which is provided by perennial species richness. The areas at large are at least 80% of that recorded at the analogue site or predefined criteria, with not more than 10 percent of the annual assessment plots failing to record this level of diversity	All soils in Grazing areas should for part of a free draining landscape with a soil Depth > 300 mm, non-saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Free draining above NGL, plated (scraped) without fly rock contamination, homogenous soil cover representing a horizon, even slope, 2 m contoured which effectively prevents high runoff velocity and erosion	For rehabilitation planning on active mine sites, a dedicated network of clean versus dirty water separation interventions are required to prevent clean runoff water from becoming contaminated, and from contaminated water affecting 'clean' land or water	Legally approved transfer agreements in place for retained infrastructure. Post- Mining Management Plan in place, indicating ongoing care-and-maintenance requirements of retained infrastructure and land use agreements in place.

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
All surface infrastructure removed, concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of offsite in an approved waste disposal facility.	Recommended species: Those at Driefontein are Digitaria decumbent (Pongola or lowveld finger grass), Pennisetum clandestinum (Kikuyu, seeded), Chloris gayana (Rhodes grass, seeded) and Cynodon dactylon (Kweek, Puerto Rico, seeded).		Annual Topdressing: A programme of subsequent, annual topdressing with nitrogen, as growth proceeds should be in place for more than 2 growth seasons	Water management infrastructure operating according to design specifications, under a range of rainfall conditions, and over time (landform design).	

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
All surface infrastructure removed, concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Fertilizer During planting: Adequate fertiliser was applied during the planting phase and at least a 24 months maintenance cycle of fertilizer dressings is recorded	All soils in cultivation areas should for part of a free draining landscape with a soil Depth > 250 mm, non- saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum	Air Quality and Noise: Achievement of pre mining air quality, dust fallout Dust fall rate (D) (mg / m2 / day, 30-day average) D < 600 600 < D < 1200 levels. As well as average noise level below 60 bd.		

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
All surface infrastructure removed, concrete foundations removed up to 500mm below surface, pipes and lines removed and disposed of off-site in an approved waste disposal facility.	Species Diversity: Identified Arable species, from commercially available seed banks, that are well-adapted to local climatic conditions, as well as the soil conditions and that can provide functionality are used as part of the predefined post- mining land use/s. The area must have undergone 24 months of monitoring to confirm pre-existing species establishment. Planting should be done seasonally correct and alien species management programme be documented and or being executed for more than 24 months with no sign of alien invasions.	Achievement of predefined area (ha or % of rehabilitated area) per land capability class implemented and rehabilitated areas functioning in terms of predefined land capability classes (independent land capability assessment) and implemented a sowing, planting program on both cultivated and arable land with no signs of excessive and or uncontrolled erosion			

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Lime Application: Records of Lime application with the placement of soils, as well as superphosphate fertiliser (as required - reported by land capability report).	Species Establishment: Ongoing monitoring should show that the Target plant species persist; that undesirable species that affect the intended land use do not dominate (e.g. Increaser I & II species do not replace higher value species). Further that Control measures have effectively eradicated invasive species or, for species with long-lived seed, annual maintenance measures are preventing re-infestation.	All soils in Grazing areas should for part of a free draining landscape with a soil Depth > 300 mm, non-saline / sodic, PH (KCl) between 5,5 and 8,5, slope between 1:7 (14%) and 1:5 (20%) maximum			

Physical Relinquishment Criteria	Biophysical Relinquishment criteria	Land Capability	Landform	Water Uses	Social and Socio-economic Relinquishment criteria
Soil Preparation: Soils should have been ripped to the full depth of the replaced soil layer, thereafter, tilled to produce a seed-bed suitable for the plant species selected for seeding.	Faunal recolonization: Best measured by the creation of habitats which suitable for shelter, feeding and breeding. improvement of such areas should be evident after a 24 month monitoring cycle, particular toward key bird, amphibian, invertebrates, reptilian and mammals which should be suggested by a specialist at the offset of the post closure aftercare process.				

The key design principles for closure are presented in the table below.

Table 21: Key design principles for closure

Opencast pit closure and soil management	Rehabilitation activities will be undertaken concurrently with mining, with a detailed rehabilitation plan being prepared once the mine plans have been finalised.
	The final post mining topography will be free draining to minimise the potential of water to accumulate and ingress into the spoils.
	Concurrent backfilling will be undertaken during the mining sequence. This will be achieved by placing the overburden from the active cut into a mined out cut.
	Overburden will be placed on the pit high wall so that the potential to utilise dozers as opposed to load and haul, for material placement is maximised.
	Once the overburden has been placed, either by load and haul or by dozer, formation work will be undertaken by bulldozing the overburden to the approximate land contours.
	The final surface will be prepared using bulldozers to create a surface suitable for revegetation.
	Stockpiled soil material will be used in the preparation of the landform surface. The soil depths placed on the overburden are dependent on the required post closure land use for each pit being rehabilitated. As this will only be determined once a detailed rehabilitation plan has been developed, specific soil replacement details are not yet available. However, the following guidelines in terms of thickness of soil (subsoil and topsoil) will be adhered to during soil replacement: • Arable: Topsoil and subsoil depth of 750 mm. • Grazing: Topsoil and subsoil depth of 250 mm. • Wilderness: Topsoil and subsoil less than 250 mm.
	As soils are prone to compaction during replacement, thereby limiting effective rooting depth, the following will be adhered to during soil replacement: • Appropriate equipment will be used and where possible, soils will be replaced to the greatest possible thickness in single lifts. • Soils will be moved when dry to minimise compaction. If they have to be moved when wet, shovel and truck will be used where possible to minimise the compaction associated with bowl scrapers when moving wet soils. • Where multi-layer soil profiles are re-created, running over the lower layers with heavy equipment should be minimised. • Dozers as opposed to graders will be used to smooth replaced soils. • Deep ripping, to the full rooting depth will be undertaken following soil replacement.
Final landform	The final landform will be designed in a manner such that any deficit (assuming a swell factor of 1.2) in material available for rehabilitation arising as a result of the removal of the coal seams, will be placed to reach NGL (as close as possible) without a final void.
	The final landform will be determined once the detailed rehabilitation plan has been completed. However, as slope influences the erodibility of soils, the final slopes need to be sufficiently gentle to prevent erosion of the soils replaced during rehabilitation. The rehabilitation plan will be developed so that the following guidelines with regards to slope are adhered to: • Arable land: slopes will where possible not exceed 1:10 • Grazing land: slopes will where possible not exceed 1:5
Revegetation	A Biodiversity Action Plan (BAP) specific to the Driefontein MRA should be developed and refined to inform planting and basal cover requirements in the different pits and rehabilitated lands in line with the intended post mining land uses.
	Prior to establishing vegetation on the rehabilitated areas, soil samples will be collected to ensure that the soil quality is similar to that which existed pre-mining, as defined in the soils baseline study. If these analyses indicated that ameliorants are required to establish a soil quality consistent with that required by the vegetation, the ameliorants will be added during the vegetation program.
Sequencing	Following the completion of the rehabilitation of the final void, a period of post closure monitoring will be entered. During this period, the rehabilitated areas will be monitored

	on a quarterly basis to ensure that settlement of the overburden is not creating low points in which water could accumulate.
	Should low points which are considered a risk for the accumulation of water be identified, material will be imported to return the landscape to a free draining form.
	During the monitoring period, the rehabilitated areas will be monitored for signs of significant erosion. If identified, erosion control measures will be implemented.
	If after a period of three years no significant signs of subsidence or erosion are identified, the land will then be handed to a third party for land use as identified in the final rehabilitation plan.
Waste management	The mineral waste associated with mining activities will be placed back into mined out areas and covered with topsoil as addressed in the conceptual rehabilitation plan.
Acid mine drainage management	The overburden, interborder and partings material will be stockpiled on the basis of their acid producing potential as predicted from the geochemical test work, and particularly from the results of the kinetic column leach tests.
	Stockpiles will be small with a maximum height of 15 metres and located at the edge of the pit to minimise transport and subsequent backfilling costs.
	Rainfall runoff from the stockpiles will be monitored and analysed for evidence of acid production and elevated metals and salts.
	Small volumes of contaminated water will be captured where found and used in dust suppression, mainly within the pit.
	From an Acid Rock Drainage (ARD) management viewpoint the stockpiles with the highest potential to produce acid will be backfilled into the deepest parts of the void where they will be below the groundwater level.

7.2 Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

Effective mine closure planning and implementation considers the views, concerns, aspirations, efforts, and knowledge of internal and external stakeholders to identify mutually beneficial closure outcomes for the company and its host communities. Stakeholder engagement serves as a critical aspect of managing social risks of closure.

Refer to a list of comments relating to closure below:

Table 22: IAP comments relating to closure

IAP	Comment relating to closure
Mr Jan Roux & Willem Roux (Landowners)	What happens with the land after mining because it will never be able to regain its pre mining potential?
Mr Jan Roux	The impact on the groundwater quantity and quality is a major concern because their farming practises is depended on existing supply boreholes.
Chris Foster (Adjacent Landowner) - SAFCOAL	Soil – productivity of soil is high. How will this be affected past mine life?
	Is the post closure monitoring period recommended in the draft scoping report long enough considering the potential impacts of the pollution plume post mining?

	Will soil studies be done in order to determine the post mining land use?
Leon Jacobs (Adjacent Landowner) – JLF Logistics	Water supply – will our water supply be affected in any way? As these premises do not only serve as business but also the home of many residents.

Part A Section 9.4 contains a summary of all the issues and concerns raised during the consultation process to date. The final EIAR will be updated with comments received during the commenting period.

7.3 Rehabilitation plan

Refer to Appendix 6.12 for the complete Rehabilitation, Decommissioning and Closure Plan compiled by ENVASS Scientific Services for the proposed Driefontein Mine.

The Driefontein Closure execution plan is formulated based on an analysis done on the Biophysical, Physical, Social and Socio-economic Influences prevalent on the mine and how these might influence closure. These influences where further contextualized by assessing company policy and legal requirements against the LOM. Refer to the table below the consolidated rehabilitation plan.

Table 23: Consolidated actions, objectives and responsible parties for Driefontein rehabilitation activities

Rehabilitation areas	Actions	Rehabilitation objectives	Responsible parties
Landform redesign	Design the final landform and develop a change management process to inform final landform design.	Design the final landform to determine topography in conjunction with surrounding areas with consideration to the material balance.	• Mine management • Environmental engineer
Natural surface water and ground water	Return all-natural surface water and ground water back to pre-mining with consideration of post mining land use and water quality objectives	• Natural surface water drainage lines to be designed as part of the final landform design • Groundwater recharge will require a full management plan to identify possible surface stability issues and final decant to the surface water bodies • Wetland system returned to original flow, or in accordance with the approved water uses for the proposed Driefontein mine.	• Hydrogeologist • Hydrologist • Hydropedologist • Wetland specialist • Mine management
Acid Mine Drainage (AMD)	Develop a management plan to mitigate AMD on mine site	• Identify and manage all current areas of Acid mine drainage on site	• Hydrogeologist • Rehabilitation specialist

Rehabilitation areas	Actions	Rehabilitation objectives	Responsible parties
		• Predict possible areas of decant after water has rebound in mine sites • Create appropriate mitigation for future post mine decant (surface water) or plumes (underground water) • Align with a long term water treatment plan and or plant – passive and or active treatment with consideration to post mining land use – agriculture / grazing, if required.	• Water treatment engineers • Mine management
General inherent rubble and wastes (post classification i.t.o waste classification regulations)	Transport rubble and dispose in pit	All building rubble should be adequately disposed of in the open pits	• Rehabilitation contractor • Mine Manager • Closure contractor
ROM storage area	Design the final landform and develop a change management process to inform final landform design.	Design the final landform to determine topography in conjunction with surrounding areas	• Mine management • Environmental engineer
	Adjust slopes and construct final landform to prevent erosion and minimise visual impact	• Prevent erosion	• Rehabilitation contractor • Mine Management
	Topsoil, grade newly rehabilitated area and allow natural revegetation (or hydro-seed) of the footprint	• Topsoil to a minimum depth of 300 mm (30 cm) • Encourage re-vegetation or implement hydro-seeding of waste rock • Facilitate the reintroduction of indigenous vegetation	• Rehabilitation contractor • Mine Management • Hydro-seeding contractor

Rehabilitation areas	Actions	Rehabilitation objectives	Responsible parties
Buildings and infrastructure – Footprints	Rip all building and paved footprint areas	• Loosen soil • Aid germination of seeds and encourage roots to take hold	• Rehabilitation contractor • Mine Manager
	Topsoil and allow natural revegetation of the footprints	• Topsoil to a minimum depth of 300 mm • Re-vegetate using flora indigenous to the area.	• Rehabilitation contractor • Hydro-seeding specialist (contractor) • Mine Manager • Environmental Manager
Haul and access roads (Privately owned)	Rip and Scarify	• Demolish all haul and access roads (rip and scarify to loosen soil) where required • Encourage plant growth and natural seeding (encourage roots to take hold) • Aid germination of seeds	• Rehabilitation contractor • Mine Manager
	Topsoil and allow natural revegetation	• Return areas back to natural vegetation state (restore land for potential grazing purposes) where required • Only plant and re-vegetate with indigenous flora	• Rehabilitation contractor • Hydro-seeding specialist (contractor) • Mine Manager • Environmental Manager

7.4 Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives

The rehabilitation plan has been compiled with the aim to meet the primary closure objective which is to remove the mining infrastructure and rehabilitate the land to arable land potential, free draining, in line with the Natural Ground Level (NGL) to maintain a sustainable environment for surrounding receptors arable land use post closure. Refer to Appendix 6.12 for the complete Rehabilitation, Decommissioning and Closure Plan compiled by ENVASS Scientific Services for the proposed Driefontein Mine.

7.5 Quantum of the financial provision required to manage and rehabilitate the environment

A bill of quantities was produced for the proposed opencast operation, which is then superimposed over a LOM schedule to determine where each of the closure components might or will be subjected to either decommissioning and or rehabilitation. The quantum is linked to a contractor-based unit rate, linked to machine and operating hours with an AA (automobile association) reported fuel price used as a variable. The closure cost assessment is further augmented by an estimated cost of closure risk response as well as an inclusion of regulatory cost of closure.

7.5.1 Unscheduled closure costs (Year 1)

The Driefontein mine works schedule presents the North Pit at approximately 180 ha which will be mined progressive be mined equally over an appreciated 5-year cycle. Surface construction is planned for the first 6 months of the 1st year associated with liability intake on aspects such as offices, road, ROM and waste areas as well as an estimated 36 ha of opencast mining on the North Block.

Un-scheduled or unplanned closure after year 1 assumes that all infrastructure is decommissioned and removed and that the 36 ha of opencast mine is not concurrently backfilled and rehabilitated. The unscheduled closure provision also requires the implementation of the aftercare measures associated with monitoring and closure risk responses.

It is estimated that the proposed Driefontein mine will raise an initial unscheduled post construction (year 1) closure liability of approximately R68 158 286.00 which includes P&G, Contingencies and VAT, aftercare costs, closure risk responses and cost of closure applications.

Refer to the detailed calculations in Annexure 30.1 of the Rehabilitation, Decommissioning and Closure Plan attached as Appendix 6.12 to this report.

Table 24: Unscheduled Year 1 (P&G / Vat included)

	Domain	Year 1
1	Offices and Admin buildings	R340 648
2	Water, Stormwater management and Pollution control Infrastructure	R1 764 195*
3	ROM, and Overburden stockpiles	R3 564 770
4	Topsoil stockpiles and berms	R107 328
5	Fencing, Roads, Electricity, and linear Infrastructure	
6	North Pit	**R30 741 973**
7	South Pit	
	Subtotal 1	**R36 518 914**
	Contingency (10%)	R3 651 891
	Preliminary and general allowances (12%)	R4 382 270
	Subtotal 2	**R44 553 075**
8	Post Closure Aspects	R9 150 000
9	Risk Based and regulatory allowances	R5 565 000
	Total	**R59 268 075**
	Vat (15%)	R8 890 211
	Grand Total	**R68 158 286**

***Costs subject to change based on final project process flow schedule**

7.5.2 Scheduled closure cost

The Driefontein mine works schedule shows that the North Pit is approximately 180 ha which will progressively be mined equally over approximately 5 years after construction. Under scheduled mining is the programme qualified to include the backfill, shaping and seeding practices. For estimation purposes an approximate 36 ha per annum is subjected to mining and rehabilitation. The South Pit is scheduled to be mined in years 6 and 7 with approximately 25 ha per annum based on information available.

The Scheduled closure cost assessment for year 1, accepting that the liability intake on surface infrastructure as reported on under Domains 1 to 5 will not need to be removed is calculated at R43 130 988.00 inclusive of P&G, Contingencies and VAT. This allocation is largely linked to the anticipated mining area of approximately 36 ha which will require concurrent rehabilitation.

The scheduled closure cost estimates assuming that a concurrent rehabilitation of the opencast pits will take place is presented in Table 25 below for Year 1-7.

Refer to the detailed calculations in Annexure 30.2 of the Rehabilitation, Decommissioning and Closure Plan attached as Appendix 6.12 to this report.

Table 25: Driefontein scheduled closure costs (P&G / VAT included)

	Domain	year 1	year 2	year 3	year 4	year 5	year 6	year 7	Aftercare
1	Offices and Admin buildings	R0	R0	R0	R0	R0	R0	R340 648	R0
2	Water, Stormwater management and Pollution control Infrastructure	R0	R0	R0	R0	R0	R0	R1 764 195	R0
3	Product, ROM, Discard and Overburden stockpiles	R0	R0	R0	R0	R0	R0	R3 564 770	R0
4	Topsoil stockpiles and berms	R0	R0	R0	R0	R0	R0	R85 425	R0
5	Fencing, Roads, Electricity and linear Infrastructure	R0	R0	R0	R0	R0	R0	R177 755	R0
6	North Pit	R30 741 973	R30 741 973	R30 741 973	R30 741 973	R30 741 973	R0	R0	R0
7	South Pit	R0	R0	R0	R0	R0	R21 348 592	R21 348 592	R0
	Subtotal 1	R30 741 973	R30 741 973	R30 741 973	R30 741 973	R30 741 973	R21 348 592	R27 281 385	R0
	Contingency (10%)	R3 074 197	R3 074 197	R3 074 197	R3 074 197	R3 074 197	R2 134 859	R2 728 139	R0
	Preliminary and general allowances (12%)	R3 689 037	R3 689 037	R3 689 037	R3 689 037	R3 689 037	R2 561 831	R3 273 766	R0
	Subtotal 2	R37 505 207	R37 505 207	R37 505 207	R37 505 207	R37 505 207	R26 045 283	R33 283 290	R0
8	Post Closure Aspects	R0	R0	R0	R0	R0	R0	R0	R9 150 000
9	Risk Based and regulatory allowances	R0	R0	R0	R0	R0	R0	R0	R5 565 000
	Total	R37 505 207	R37 505 207	R37 505 207	R37 505 207	R37 505 207	R26 045 283	R33 283 290	R14 715 000
	Vat (15%)	R5 625 781	R5 625 781	R5 625 781	R5 625 781	R5 625 781	R3 906 792	R4 992 493	R2 207 250
	Grand Total	**R43 130 988**	**R43 130 988**	**R43 130 988**	**R43 130 988**	**R43 130 988**	**R29 952 075**	**R38 275 783**	**R16 922 250**

7.5.3 Confirm that the financial provision will be provided as determined

The financial provision will be provided if the Mining Right is granted as a legal requirement. The rehabilitation plan will be revisited, and the financial provision updated with new findings on an annual basis.

8 Mechanisms for monitoring compliance with and performance assessment against the environmental management programme

The mine manager at the Driefontein Mine will be responsible to ensure that the EMPr and monitoring program are implemented. Canyon has in-house Safety, Health, and Environmental Managers (SHE) who will be responsible to monitor compliance with the EMPr and along with the Mine Manager ensure that the contractors comply with the EMPr and that all the environmental monitoring delegated to consultants are implemented correctly. The SHE and/or Mine Manager will also act as a conflict manager between Canyon and the appointed contractors if issues arise with regards to the implementation of the EMPr. The following measures will be implemented by Canyon to ensure that the conditions in the EMPr are complied with:

- **The responsibility of implementing and complying with the conditions of the EMPr will form part of the contractor's appointment agreement.**
- **All appointed contractors must be familiar with the EMPr and understand their responsibility to operate accordingly.**
- **The SHE Manager must inform contractors about no go areas such as sensitive environmental areas and/or neighbouring properties.**
- **The contractors must inform the SHE Manager of any environmental incident or breach of the EMPr and it is the responsibility of the SHE Manager to inform the Mine Manager thereof within 24 hours.**
- **An independent Environmental Control Officer (ECO) will be appointed to audit the compliance with the EMPr.**

8.1 Description of proposed monitoring programs

The goal of environmental management is to promote economic growth in a sustainable manner. The proposed coal mining operation does pose several risks to the environment therefor monitoring programs must be implemented throughout the life of mine. Reports will be submitted to the relevant competent authorities as and when required. Different reports will be required on a monthly and annual basis to monitor compliance to the management objectives, conformance targets and applicable legislation. It is the Applicant's responsibility to review the monitoring reports compiled by independent specialists and to implement remediation measures should a change in the baseline information become evident. The proposed monitoring programs are described under the headings below.

8.1.1 Groundwater monitoring program

The proposed monitoring program must be adhered to unless otherwise specified in the Water Use License.

8.1.1.1 Groundwater Monitoring System

A groundwater monitoring system must adhere to the criteria mentioned below. As a result, the system should be developed accordingly.

8.1.1.2 Source, plume, impact, and background monitoring

A groundwater monitoring network should contain monitoring positions which can assess the groundwater status at certain areas. The boreholes can be grouped classification according to the following purposes:

- **Source monitoring: Monitoring boreholes are placed close to or in the source of contamination to evaluate the impact thereof on the groundwater chemistry.**
- **Plume monitoring: Monitoring boreholes are placed in the primary groundwater plume's migration path to evaluate the migration rates and chemical changes along the pathway.**
- **Impact monitoring: Monitoring of possible impacts of contaminated groundwater on sensitive ecosystems or other receptors. These monitoring points are also installed as early warning systems for contamination break-through at areas of concern.**
- **Background monitoring: Background groundwater quality is essential to evaluate the impact of a specific action/pollution source on the groundwater chemistry.**

8.1.1.3 System response monitoring network

Groundwater levels: The response of water levels to abstraction is monitored. Static water levels are also used to determine the flow direction and hydraulic gradient within an aquifer. Where possible all of the monitoring borehole's water levels need to be recorded during each monitoring event.

8.1.1.4 Monitoring frequency

In the operational phase and closure phase, quarterly monitoring of groundwater quality and groundwater levels is recommended. It is important to note that a groundwater monitoring network should also be dynamic. This means that the network should be extended over time to accommodate the migration of potential contaminants through the aquifer as well as the expansion of infrastructure and/or addition of possible pollution sources.

8.1.1.5 Monitoring parameters

The identification of the monitoring parameters is crucial and depends on the chemistry of possible pollution sources. They comprise a set of physical and/or chemical parameters (e.g., groundwater levels and predetermined organic and inorganic chemical constituents). Once a pollution indicator has been identified it can be used as a substitute to full analysis and therefore save costs. The use of pollution indicators should be validated on a regular basis in the different sampling positions. The parameters should be revised after each sampling event; some metals may be added to the analyses during the operational phase, especially if the pH drops. The parameters specified in the Water Use Licence (WUL) will be monitored against but if no parameters are contained in the WUL the following must be used.

8.1.1.5.1 *Abbreviated analysis (pollution indicators)*

Physical Parameters:

- **Groundwater levels**

Chemical Parameters:

- **Field measurements:**
  - **pH, EC**
- **Laboratory analyses:**
  - **Major anions and cations (Ca, Na, Cl, SO_4)**
  - **Other parameters (EC)**

8.1.1.5.2 *Full analysis*

Physical Parameters:

- **Groundwater levels**

Chemical Parameters:

- **Field measurements:**
  - **pH, EC**
- **Laboratory analyses:**
  - **Anions and cations (Ca, Mg, Na, K, NO_3, Cl, SO_4, F, Fe, Mn, Al, & Alkalinity)**
  - **Other parameters (pH, EC, TDS)**
  - **Petroleum hydrocarbon contaminants (where applicable, near workshops and petroleum handling facilities)**
  - **Sewage related contaminants (E. Coli, faecal coliforms) in borehole in proximity to septic tanks.**

8.1.1.6 Monitoring boreholes

DWAF (1998) states that "A monitoring hole must be such that the section of the groundwater most likely to be polluted first, is suitably penetrated to ensure the most realistic monitoring result" (*Department of Water Affairs and Forestry (DWAF). (1998). Minimum Requirements for the Water Monitoring at Waste Management Facilities. CTP Book Printers. Cape Town*).

Currently a monitoring network does not exist for the proposed mine. The recommended boreholes are listed in Table 26 and the areas to site these monitoring boreholes are shown in Figure 8. These boreholes can be utilised for water level and quality monitoring during operations and after decommissioning of the site.

However, a monitoring network should be dynamic. This means that the network should be extended over time to accommodate the migration of contaminants through the aquifer as well as the expansion of infrastructure and/or addition of possible pollution sources. An audit on the monitoring network should be conducted annually. The proposed monitoring network should be implemented when operations at the mine commences.

Table 26: Proposed Monitoring Positions (New boreholes to be sited by geophysics)

ID	Latitude (South)	Longitude (East)	Owner	Property	Borehole Depth (mbgl)	Reasoning	Requirement	Frequency	Existing/New
Groundwater									
DFBH1	-25.70646	29.65633	Jan Roux	Driefontein 398	31	Impact Monitoring	Impact Monitoring	Quarterly	Existing
DFBH2	-25.71500	29.65965	Jan Roux	Driefontein 398	43	Impact Monitoring	Impact Monitoring	Quarterly	Existing
DFBH3	-25.69601	29.63540	Jan Roux	Driefontein 398	31	Impact Monitoring	Impact Monitoring	Quarterly	Existing
DRIE-BH1	-25.71490	29.64804	Jan Roux	Driefontein 398	Unknown	Impact Monitoring	Impact Monitoring	Quarterly	Existing
DRIE-BH2	-25.71500	29.65965	Jan Roux	Driefontein 398	Unknown	Impact Monitoring	Impact Monitoring	Quarterly	Existing
Drie-BH3	-25.69600	29.63540	Jan Roux	Driefontein 398	Unknown	Impact Monitoring	Impact Monitoring	Quarterly	Existing
MONBH1	-25.68914	29.60523	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New
MONBH2	-25.69167	29.60674	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New
MONBH3	-25.68128	29.64075	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New
MONBH4	-25.69031	29.64139	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New
MONBH5	-25.71006	29.66055	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New
MONBH6	-25.71077	29.65306	Jan Roux	Driefontein 398	40	Impact Monitoring	Impact Monitoring	Quarterly	New

ID	Latitude (South)	Longitude (East)	Owner	Property	Borehole Depth (mbgl)	Reasoning	Requirement	Frequency	Existing/New
Surface water									
Drie-Dam1	-25.71255	29.651272	Jan Roux	Driefontein 398	NA	Impact Monitoring	Impact Monitoring	Quarterly	Existing
DRIE-SPRING 1	-25.702302	29.648215	Jan Roux	Driefontein 398	N/A	Impact Monitoring	Impact Monitoring	Quarterly	Existing

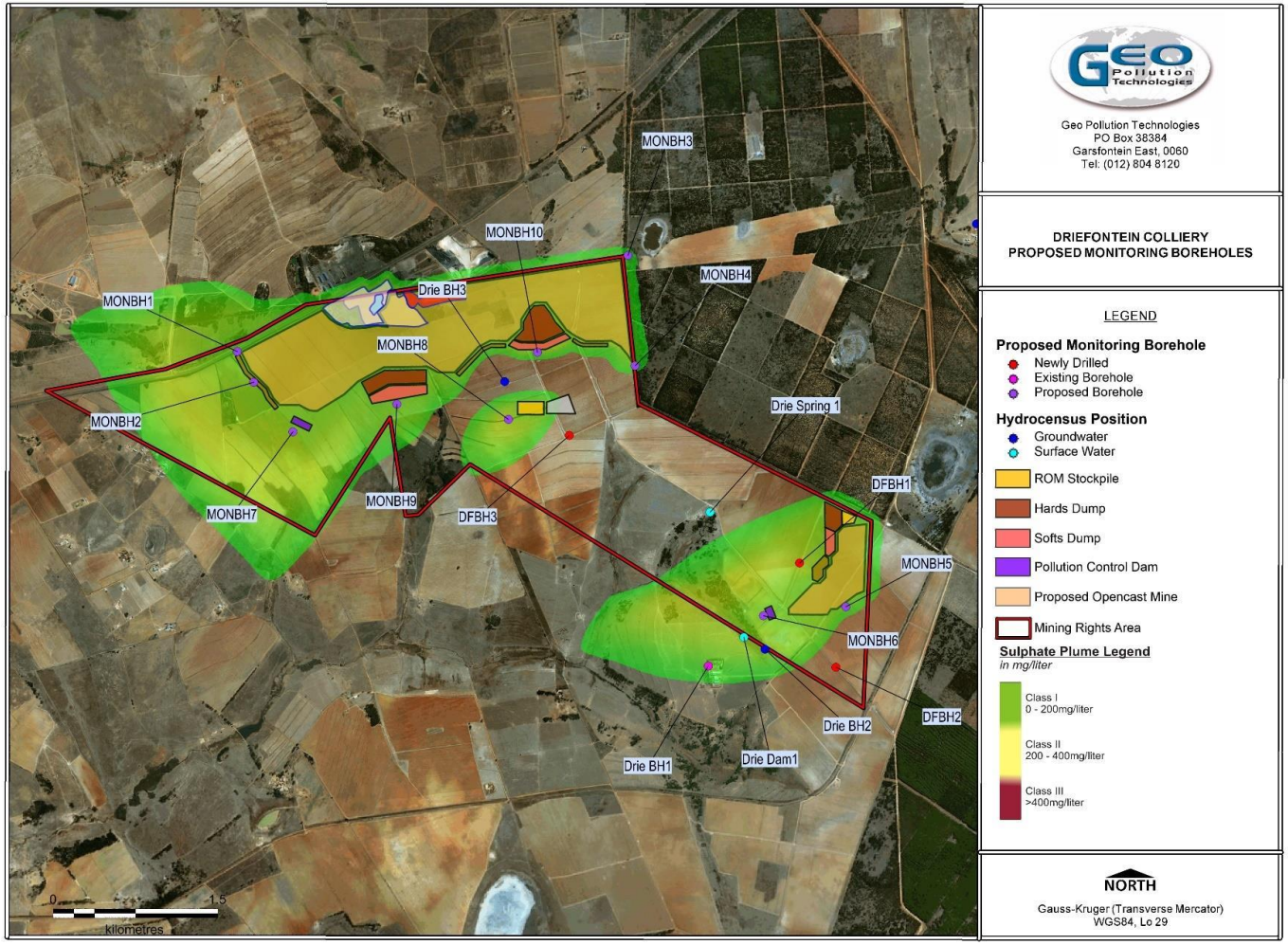

Figure 8: Proposed monitoring positions (new boreholes to be sited by geophysics

8.1.2 Surface water and wetlands

The proposed monitoring programs must be adhered to unless otherwise specified in the Water Use License.

8.1.2.1 Wetlands

Biannual monitoring of wetland integrity should be conducted during the operational phase of the mine for the delineated wetlands listed and indicated in the figure below:

- **Channelled valley bottom wetland (CVB),**
- **Unchanneled valley bottom wetlands (UVB); and**
- **Pan**

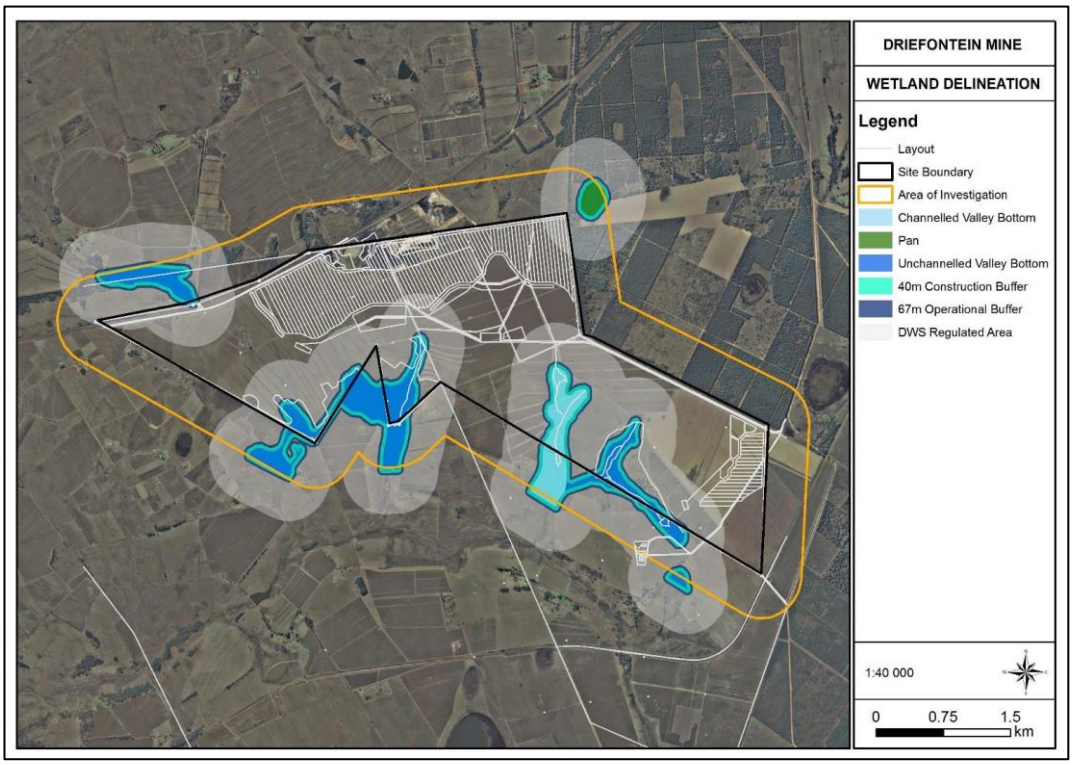

Figure 9: Delineated wetlands

8.1.2.2 Surface water

Surface water monitoring must be conducted on a monthly basis during the construction and operational phases. During decommissioning, rehabilitation and closure quarterly surface water monitoring must be conducted.

Any spills require sampling to be done within 24 hours. It is imperative that the tributaries of the Klein Olifants River be monitored and sampled on a monthly basis and or 24 hours after a spill. This is to ensure that any impacts on the surface water quality be identified as soon as possible.

The parameters specified in the Water Use Licence (WUL) will be monitored against but if no parameters are contained in the WUL the following must be used.

Chemical Parameters:

- **Field measurements:**
  - **pH, EC**
- **Laboratory analyses:**
  - **Anions and cations (Ca, Mg, Na, K, NO_3, Cl, SO_4, F, Fe, Mn, Al, & Alkalinity)**
  - **Other parameters (pH, EC, TDS)**
  - **Petroleum hydrocarbon contaminants (where applicable, near workshops and petroleum handling facilities).**

The recommended surface water sampling points are listed in Table 27 and the positions are shown in Figure 10.

Table 27: Proposed surface water monitoring positions

Number	Description	Latitude (S)	Longitude (E)
DSW 1	Unnamed tributary of the Klein Olifants River, downstream of MRA	25°42'51.78"S	29°38'5.49"E
DSW 2	Unnamed tributary of the Klein Olifants River, located just south of the MRA, close to the headwaters of the non-perennial tributary	25°42'21.06"S	29°37'14.05"E
DSW 3	Unnamed tributary of the Klein Olifants River, downstream of MRA	25°42'50.68"S	29°36'58.71"E
DSW 4	Unnamed tributary of the Klein Olifants River, downstream of MRA	25°43'1.37"S	29°38'25.49"E
DSW 5	Unnamed tributary of the Klein Olifants River, located inside the study area, close to the headwaters of the non-perennial tributary	25°42'18.74"S	29°38'21.18"E
DSW 6	Unnamed tributary of the Klein Olifants River, located in the headwaters of the non-perennial tributary to the west of the MRA	25°42'19.40"S	29°36'30.71"E
DSW 7	Pan upstream of MRA	25°40'49.76"S	29°38'34.59"E
DSW 8	Spruit on the Bankfontein 375 property north of the Northern opencast pit upstream of MRA	25°41'21.72"S	29°35'50.13"E

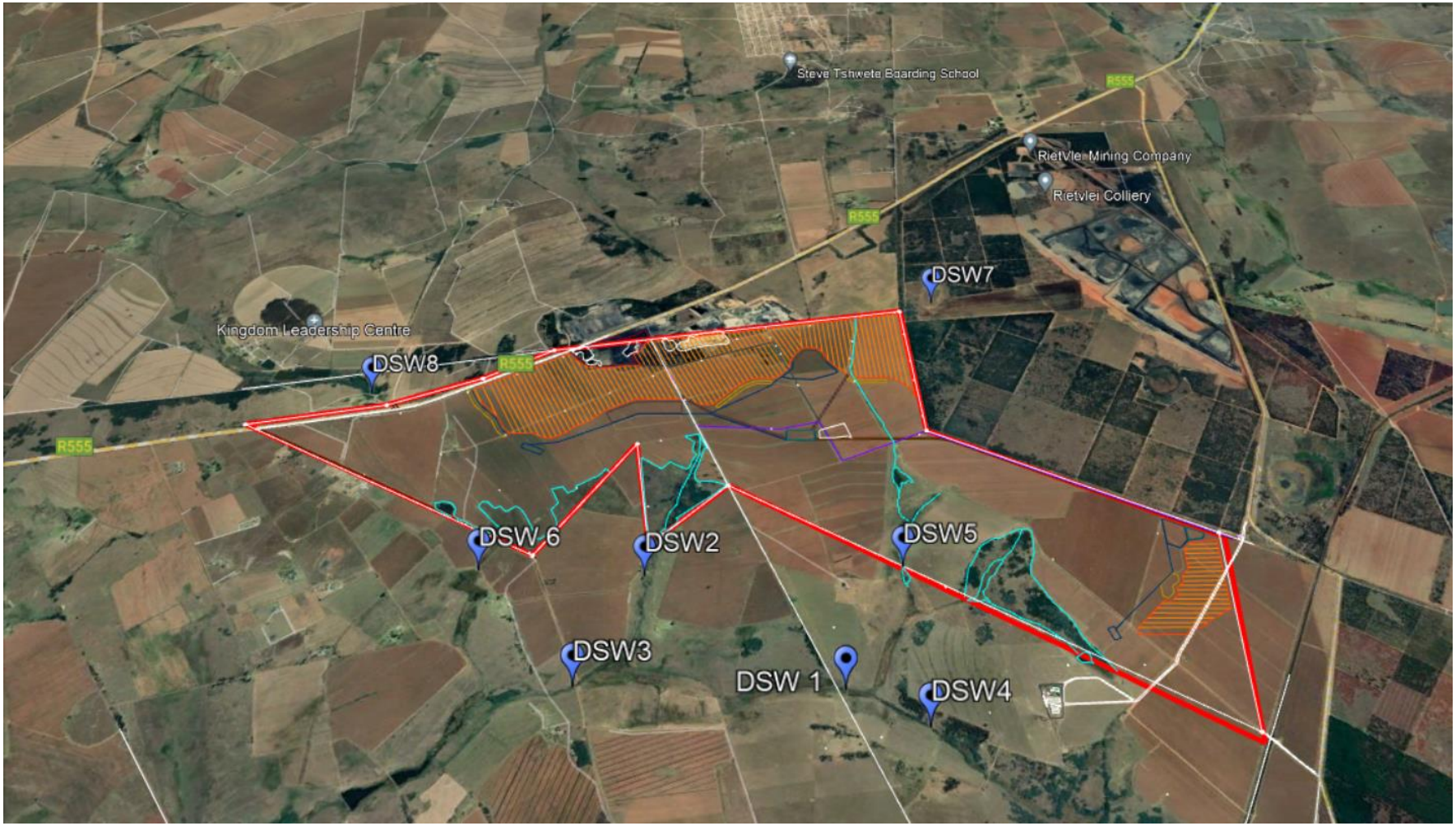

Figure 10: Surface water sampling points

8.1.2.3 Biomonitoring

During the construction period, aquatic biomonitoring should be conducted on a quarterly basis and during the operational phase, it is recommended that biomonitoring should be conducted on a bi-annual basis.

This assessment should include the latest version of SASS, IHAS, VEGRAI, FRAI and additionally diatoms should be considered as a biomonitoring tool.

A description of the recommended sampling points is provided in Table 28 and the positions of these points are shown in Figure 11.

Table 28: Sampling points for biomonitoring at the proposed Driefontein Mine

SURVEY SITE	LATITUDE	LONGITUDE	SITE DESCRIPTION
DBM1	-25.714383°	29.634858°	DOWNSTREAM OF STUDY AREA/AFFECTED SAMPLING POINT ▪ In an unnamed tributary of the Klein Olifants River, downstream of DBM4 and DBM5. ▪ Assess impacts of study area on the unnamed tributary flowing into the Klein Olifants River.
DBM2	-25.705849°	29.620569°	DOWNSTREAM OF STUDY AREA/AFFECTED SAMPLING POINT ▪ In an unnamed tributary of the Klein Olifants River, upstream of DBM3. ▪ Located just south of the study area, close to the headwaters of the non-perennial tributary. ▪ Assess impacts of study area on the unnamed tributary flowing into the Klein Olifants River.
DBM3	-25.714078°	29.616308°	DOWNSTREAM OF STUDY AREA/AFFECTED SAMPLING POINT ▪ In an unnamed tributary of the Klein Olifants River, downstream of DBM1, DBM2, DBM4, and DBM5. ▪ Measures impacts of study area on the unnamed tributary flowing into the Klein Olifants River.
DBM4	-25.717047°	29.640414°	DOWNSTREAM OF STUDY AREA/REFERENCE SAMPLING POINT ▪ In an unnamed tributary of the Klein Olifants River, upstream of DBM1. ▪ Acts as reference site for DBM5 and DBM1
DBM5	-25.705206°	29.639218°	LOCATED INSIDE THE STUDY AREA/AFFECTED SAMPLING POINT ▪ In an unnamed tributary of the Klein Olifants River, upstream of DBM1. ▪ Located inside the study area, close to the headwaters of the non-perennial tributary. ▪ Assess impacts of study area on the unnamed tributary flowing into the Klein Olifants River.

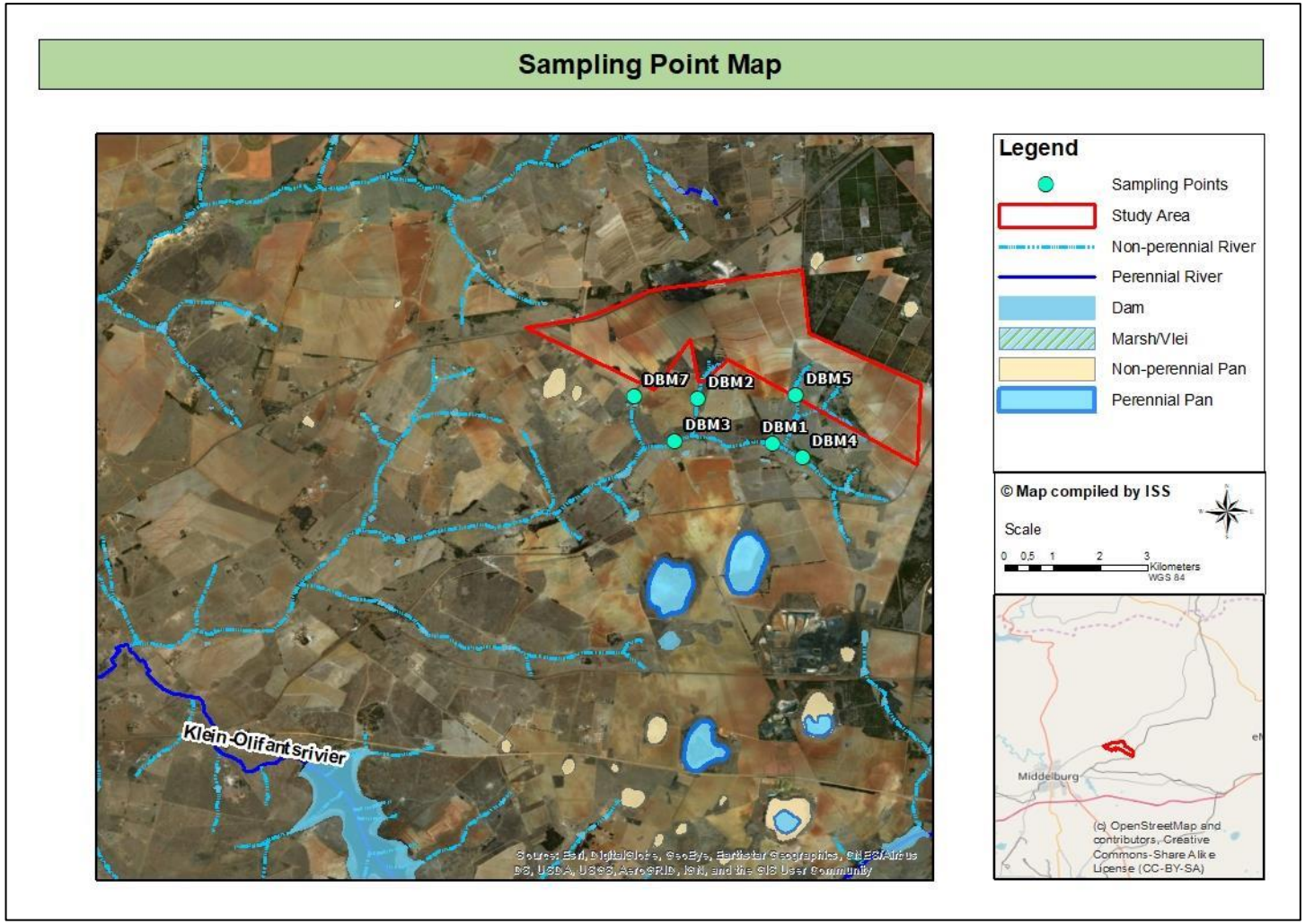

Figure 11: Biomonitoring sampling points (***Please note DBM 7 is not suitable for future sampling)*

8.1.3 Soils, land use and capability

Soil pollution monitoring must be conducted annually around all possible sources of soil contamination on site such as the ROM stockpiles, PCDs, workshop area, and along the haul roads.

Ongoing evaluation of the nutrient status of the growth medium will be needed throughout the life of the project and into the rehabilitation phase on a quarterly basis.

During the rehabilitation exercise preliminary soil quality monitoring should be carried out to accurately determine the fertilizer requirements that will be needed. Additional soil sampling should also be carried out annually until the levels of nutrients, specifically magnesium, phosphorus and potassium, are at the required levels for sustainable growth. Once the desired nutritional status has been achieved, it is recommended that the interval between sampling is increased. An annual environmental audit should be undertaken. If growth problems develop, ad hoc, sampling should be carried out to determine the problem.

Soils should be sampled and analysed for the following parameters:

- **pH (H_2O); Phosphorus (Bray I).**
- **Electrical conductivity; Calcium mg/kg.**
- **Cation exchange capacity; Sodium mg/kg.**
- **Magnesium mg/kg; Potassium mg/kg; Zinc mg/kg.**
- **Clay Organic matter content (C %)**

The following maintenance is recommended:

- **The area must be fenced, and all animals kept off the area until the vegetation is self-sustaining.**
- **Newly seeded/planted areas must be protected against compaction and erosion.**
- **Traffic must be limited while the vegetation is establishing itself.**
- **Plants must be watered and weeded as required on a regular and managed basis were possible and practical.**
- **A check for pests and diseases must be conducted.**
- **Replace unhealthy or dead plant material.**
- **Fertilise, hydro seeded and grassed areas soon after germination.**
- **Repair any damage caused by erosion, bulking, cracking or subsidence, and**
- **Backfilling and landscaping of areas to be free draining.**

8.1.4 Flora and Fauna monitoring requirements

Floral monitoring activities should take place during both the construction and operational phases of the proposed mine. Floral monitoring requirements foreseen are limited to management of alien and invasive vegetation and the monitoring of edge effects within adjacent natural areas, unless the mine layout (including access roads) and activities change in such a way to encroach on sensitive habitats.

Proposed monitoring should include monthly internal alien and invasive species assessments during the construction phase of the project, as well as biannual (twice per year) assessments during the operational phase. Where alien and invasive species, specifically those listed under NEMBA as Category 1b species, are noted, immediate eradication actions should be undertaken.

Moreover, monitoring of faunal communities in the natural grassland areas should take place annually (wet season) to determine the effect of the construction and operational phases on community composition (structure, function and richness). Monitoring changes in faunal habitat extent and productivity via remote sensing is also recommended.

During the closure and decommissioning phase, annual monitoring of any revegetation activities undertaken should take place in order to evaluate the effectiveness of rehabilitation. This should be done through determining the relative alien to indigenous plant ratio, the percentage of cover and relative species diversity over the course of the project during which rehabilitation measures are being implemented. Any natural areas, including wetlands in close proximity to mining operations, must also be checked regularly for erosion and any erosion noted must be rectified immediately using soft engineering techniques.

In addition, in the unlikely event that any floral SCC be encountered within the project footprint area and subsequently rescued and relocated, the relocation success of such plants must be monitored annually during the growing season for a period of three years by visual inspection.

8.1.5 Air quality monitoring program

Dust fallout monitoring and PM_{10} monitoring must be conducted pre operation and during the operation of the mine, to assess the real-time impacts of proposed mining operations on air quality. A description of the monitoring requirements is provided in Table 29 and the positions of the recommended monitoring localities are shown in Figure 12.

Figure 12: Locality of recommended dust fallout monitoring sites (green pins) at Driefontein Coal Mine

Table 29: Recommended air quality monitoring requirements

POLLUTANT	ACTIVITIES	MONITORING PROGRAM			
		MONITORING	TIMEFRAME (√ = yes) (X = no)		
			Pre - operation	During - operation	Post – operation
Fugitive Dust – dust-fall & PM_{10}	Material handling operations; exposed areas, stockpiles/dumps, mining activity (excavators, front- end loaders, etc.); truck loading and offloading operations; drilling, blasting, bulldozing, crushing and screening. Vehicle dust entrainment, truck exhaust emissions and any other mining vehicle/equipment exhaust emissions	Implement dust-fall monitoring as per the National Dust Control Regulations (2013) and reporting. As PM_{10} concentrations are predicted to be high, the proposed mine should undertake PM_{10} monitoring.	Monthly for dust-fall & PM_{10} (required to determine baseline dust- fall rates and PM_{10} concentrations)	Monthly for dust-fall & PM_{10}	X (not required if mining areas are fully rehabilitated)

8.1.6 Noise Monitoring Program

A bi-annual noise measurement programme must be conducted at receptors where potential impacts could occur. Boundary measurements are also proposed to ensure compliance with GN R154.

Measurements at Receptors:

- **Measurements near or at receptors R1 & R6 (Refer to Figure 13 below for the location of these receptors) as well as any additional receptors the noise consultant feels should be included. No measurements are to be conducted if the receptors are relocated. The Environmental measurements should be conducted at I&AP's i.e., farmsteads, receptors, communities, dwellings etc.**
- **The measurements should be conducted prior to construction to ensure baseline findings. Measurements should further be conducted during all construction and operational phases.**
- **The methodology as proposed by SANS10103:2008 should be used. Compliance with the Noise Control Regulations should be met (none compliance +7dBA Rating, see Section 6.1.2 for receptors Rating).**
- **Measurements should be conducted in terms of equivalent values (impulse), with statistical and octave data proposed for further assessment. Metrological (wind) conditions should be logged. International (fast) measurements could be considered for comparison with the International Finance Corporation requirements.**
- **Where feasible longer term (+24 hours) unattended (and should include shorter-term attended) measurements should be conducted.**

Measurements at boundary:

- **The boundary of the property/farm portion/mining rights area should not be exceeded by 61-dBA 24 hour or similar (controlled zone).**

Other measurements (not compulsory):

- **(Recommended, but not required) If feasible Engineering test should be conducted during Environmental measurements to identify any noisy equipment requiring enclosures, or equipment where maintenance is required.**

Notes:

- **The bi-annual measurement report should be reviewed after the first 2 years. If no receptors are based within 1,000m of the project**

footprint then the frequency of measurements should be reduced; and

- Reporting should be compiled and submitted to relevant authorities. The ToR of the report should include SANS10103:2008 methodologies in it, with the Noise Control Regulations limits applied.

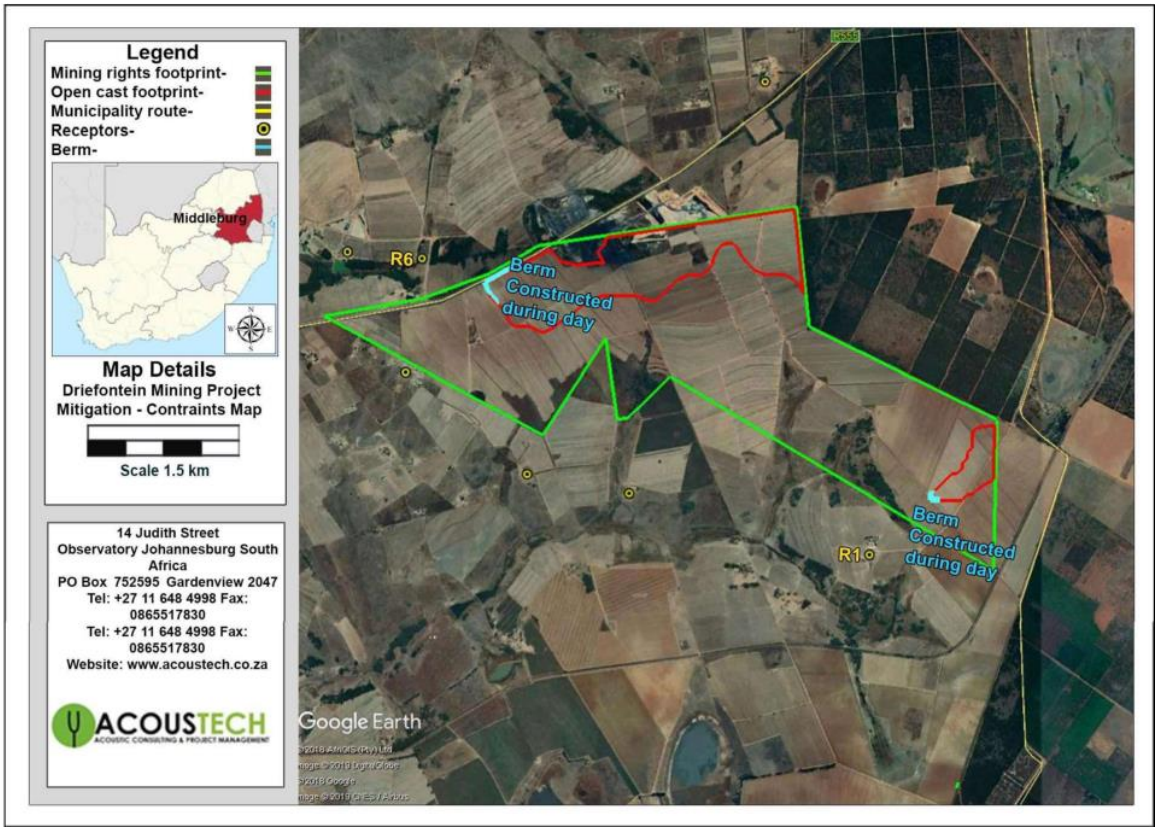

Figure 13: Recommended noise measurement localities

8.1.7 Blast operations monitoring

8.1.7.1 Photographic survey

The option of photographic survey of all structures up to 1500m from the pit areas is recommended. This will give advantage on any negotiations with regards to complaints from neighbours on structural issues due to blasting. This process can however only succeed if done in conjunction with a proper monitoring program. It is expected that ground vibration levels will be significantly less than proposed limits at 1500m, but this process will ensure record of the pre-blasting status of the nearest structures to the pit area. At 1500 m the expected level of ground vibration will be perceptible.

Table 30 lists the structure identified for inspections and Figure 14 and Figure 15 shows extent of the range of 1500 m around the Opencast Pit areas with POIs identified. It must be noted that a point may represent a group of structures found in the vicinity of the point identified.

Table 30: Combined list of structures identified for inspections

Tag	Description	Y	X
1	Mine Activity	-62796.13	2841856.66
10	Buildings/Structures	-61617.94	2841960.16
12	Communication Tower	-63941.67	2840706.28
14	Buildings/Structures	-63211.89	2840365.22
16	Ruins	-62548.04	2841406.55
17	Buildings/Structures	-61684.01	2841613.30
19	Buildings/Structures	-60097.42	2842097.45
20	Buildings/Structures	-60112.21	2842240.37
21	Structures	-60287.11	2842173.36
23	Farm Buildings/Structures	-59947.03	2842710.66
25	Buildings/Structures	-60020.97	2843460.38
83	Farm Buildings/Structures	-65130.43	2845373.08
84	Informal Housing	-65212.59	2845822.86
85	Informal Housing	-65169.74	2845960.21
86	Power Line/Pylon	-67694.08	2843558.23
87	Power Line/Pylon	-67554.74	2843802.15
88	Power Line/Pylon	-67405.51	2844047.35
89	Power Line/Pylon	-67311.63	2844315.88
90	Power Line/Pylon	-67220.63	2844565.18
91	Railway Line	-66918.69	2844891.34
92	Railway Line	-67161.95	2844389.48
93	Railway Line	-67392.28	2843929.67
94	Railway Line	-67702.21	2843427.35
95	Reservoir	-66056.65	2845147.86
98	Informal Housing	-67379.20	2843101.55
99	Informal Housing	-67289.11	2843156.38
108	Railway Line	-66694.19	2845357.00
109	Railway Line	-66488.59	2845785.05
110	Railway Line	-66244.12	2846279.51
129	Power Line/Pylon	-67126.02	2844839.15
130	Power Line/Pylon	-67019.87	2845142.79
131	Power Line/Pylon	-66906.70	2845464.32
132	Power Line/Pylon	-66813.08	2845736.25
133	Cement Dam	-66560.84	2845767.41
134	Power Line/Pylon	-66734.63	2845980.88

Tag	Description	Y	X
135	Power Line/Pylon	-66615.12	2846291.19
152	Hydrocensus Borehole (DRIE-BH1)	-65036.97	2845409.14
153	Hydrocensus Borehole (DRIE-BH2)	-65555.59	2845258.80
154	Hydrocensus Borehole (DRIE-BH3)	-63192.57	2842818.80
158	Hydrocensus Borehole (DRIE Dam 1)	-65362.62	2845150.38
159	Hydrocensus Borehole (DRIE-SPRING 1)	-65061.38	2844013.52
160	Heritage Site (DFN001 – Cemetery)	-65356.34	2843940.89
161	Heritage Site (DFN002 - Grave)	-65193.88	2843978.86
162	Heritage Site (DFN003 - Graves)	-60683.84	2843217.01
163	Heritage Site (DFN004 - Graves)	-59919.31	2842836.85
164	Heritage Site (DFN005 - Graves)	-62652.99	2843567.77
165	Heritage Site (DFN006 - Grave)	-64689.23	2844203.51
166	Heritage Site (DFN007 - Homestead foundations and a Grave)	-65097.21	2844246.13
167	Heritage Site (DFN008 - Graves)	-65114.28	2844517.65
168	Heritage Site (DFN009 - Homestead Foundation or a Grave)	-65190.62	2844641.74
169	Heritage Site (DFN010 - Homestead Foundation or a Grave)	-65364.90	2844919.58
170	Heritage Site (DFN011 - Graves)	-65662.36	2845318.05
171	Heritage Site (DFN012 - Grave)	-64460.26	2844503.38
172	Heritage Site (DFN013 - Graves)	-64386.17	2843570.53

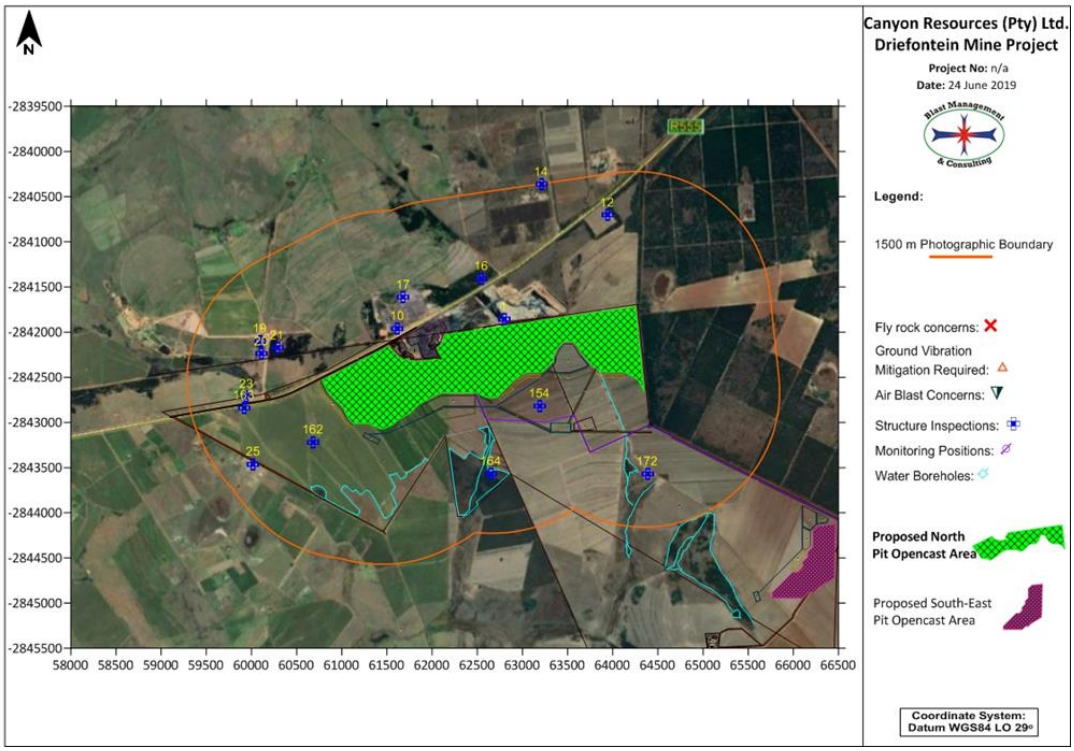

Figure 14: 1500 m area around the North pit area identified for structure inspections

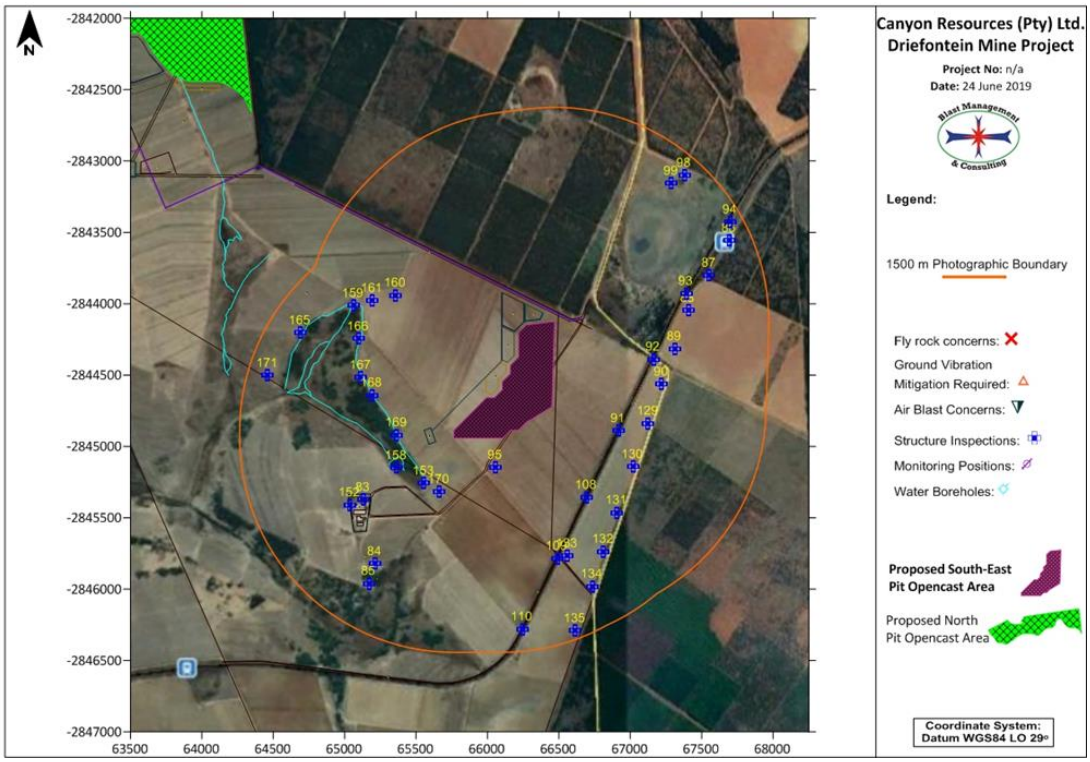

Figure 15: 1500 m area around the South-East pit area identified for structure inspections

8.1.7.2 Monitoring program

The following elements should form part of the monitoring program:

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

Of the above aspects only ground vibration and air blast monitoring require identified locations. Monitoring of ground vibration and air blast is done to ensure that the generated levels of ground vibration and air blast comply with recommendations. Proposed positions were selected to indicate the nearest points of interest at which levels of ground vibration and air blast should be within the accepted norms and standards as proposed in Section 6.1.3.3 above. The monitoring of ground vibration will also qualify the expected ground vibration and air blast levels and assist in mitigating these aspects properly. This will also contribute to proper relationships with the neighbours.

Twelve monitoring positions were identified as possible locations that will need to be considered. Not all points will be required at once but active monitoring and observation of where blasting is done will dictate the requirements for the areas around the pit. Some of these points may be applicable to more than one location to be monitored.

Monitoring positions are indicated in Figure 16 and Table 31 lists the positions with coordinates. These points will need to be re-defined after the first blasts done and the monitoring programme defined.

8.1.7.3 Third party monitoring

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

8.1.7.4 Video monitoring of each blast

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

Table 31: List of possible monitoring positions

Tag	Description	Y	X
	North Pit		
5	R555 Road	-61143.07	2842314.47
10	Buildings/Structures	-61617.94	2841960.16
12	Communication Tower	-63941.67	2840706.28
16	Ruins	-62548.04	2841406.55
17	Buildings/Structures	-61684.01	2841613.30
21	Structures	-60287.11	2842173.36
23	Farm Buildings/Structures	-59947.03	2842710.66
25	Buildings/Structures	-60020.97	2843460.38
	South-East Pit		
83	Farm Buildings/Structures	-65130.43	2845373.08
84	Informal Housing	-65212.59	2845822.86
90	Power Line/Pylon	-67220.63	2844565.18
95	Reservoir	-66056.65	2845147.86

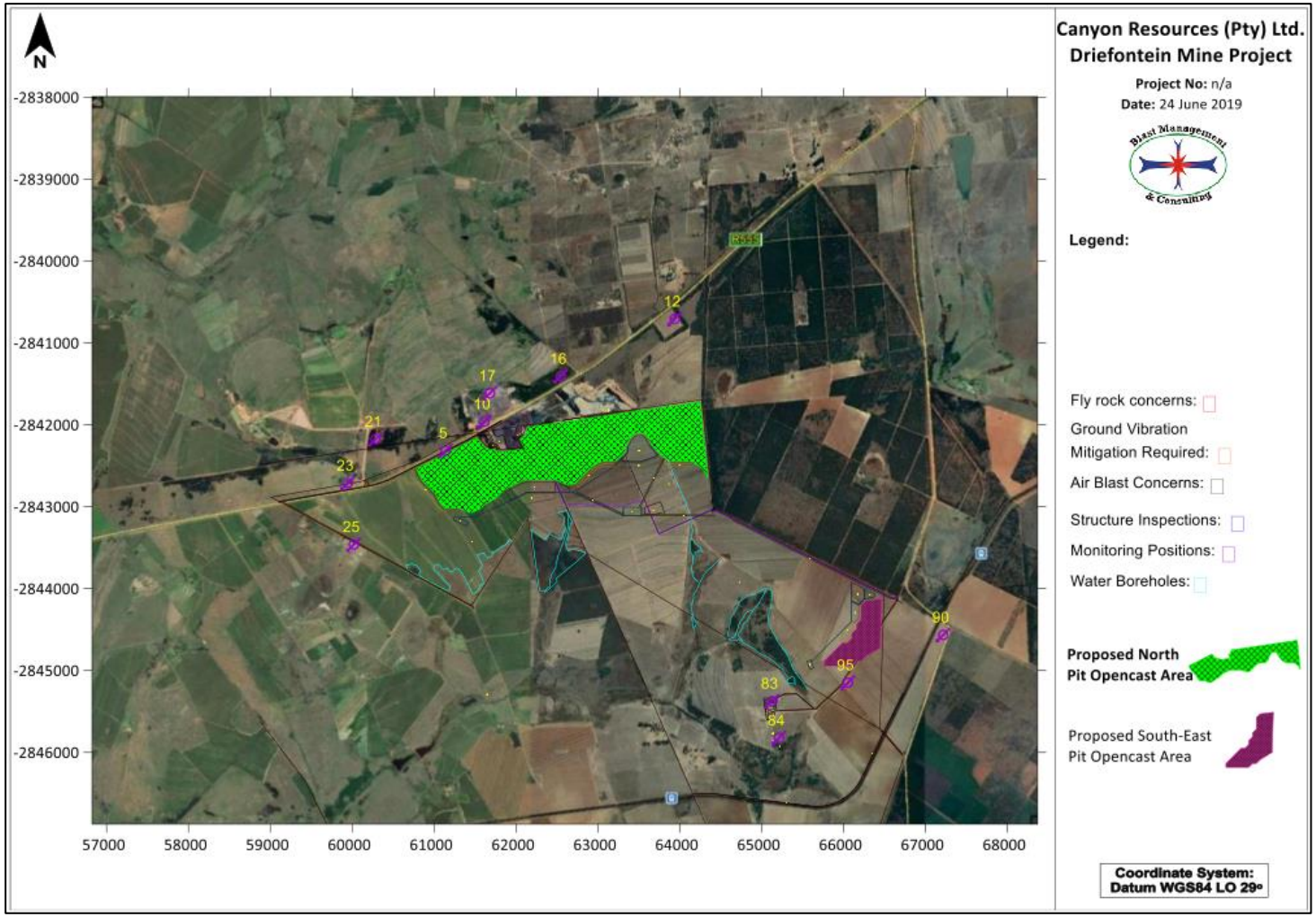

Figure 16: Recommended monitoring positions per pit

8.2 Environmental performance monitoring

The table below presents the main aspects that will be subjected to performance monitoring during all phases of the project. The monitoring requirements, frequencies and responsible parties are also listed.

Table 32: Combined monitoring program

Aspect	Area to be monitored	Impacts Requiring Monitoring	Functional Requirements for Monitoring (refer to detailed description of the monitoring programs above)	Roles and Responsibilities	Monitoring and Reporting Frequency
Groundwater	Refer to Section 8.1.1.6 above for the recommended monitoring borehole positions	Groundwater quality deterioration and change to the water level	The monitoring program involves background analyses, detection monitoring, investigative monitoring, and post-closure monitoring The water results must be compared with the maximum recommended concentrations for domestic use as defined by the SANS 241-1: 2015 target water quality limits	Independent consultant and	Quarterly monitoring and reporting during operational and closure phases.
			The monitoring results must be interpreted by a qualified hydrogeologist and the monitoring network should be audited to ensure compliance with regulations.	Qualified hydrogeologist	Annually
Surface water	Delineated wetlands	Loss of wetland habitat	Monitoring of wetland integrity and water quality	Wetland specialist	Biannual (Wet and Dry season) monitoring and reporting during operational phase
	Tributaries of the Klein Olifants River	Changes to surface water quality, sedimentation and siltation and surface	The water results must be compared with the maximum recommended concentrations for domestic use and livestock	Independent consultant	Monthly sampling and reporting during construction and operation. Any spills require sampling to be done within 24 hours.

Aspect	Area to be monitored	Impacts Requiring Monitoring	Functional Requirements for Monitoring (refer to detailed description of the monitoring programs above)	Roles and Responsibilities	Monitoring and Reporting Frequency
		water flow	watering as defined by the SANS 241-1: 2015 target water quality limits		Quarterly sampling and reporting during decommissioning/rehabilitation and closure.
		Loss of aquatic biota	Biomonitoring should include the latest version of SASS, IHAS, VEGRAI, FRAI and additionally diatoms should be considered as a biomonitoring tool.		Quarterly sampling and reporting during construction phase. Biannual sampling and reporting during the operational phase.
Soils, land use and capability	Around all possible sources of soil contamination such as the coal stockpiles, PCDs, workshop areas and along the haul roads.	Loss of soil quality	Soil quality monitoring	Independent consultant (soil specialist)	Biannual sampling and reporting during the operational phase.
	Topsoil stockpiles	Loss of soil quality	Ongoing evaluation of the nutrient status of the growth medium	Internal SHE manager	Annual sampling and reporting during the operational and decommissioning/rehabilitation and closure phases
		Soil pollution	Soil quality monitoring		
	Areas where spill occurred	Soil pollution	Soil chemical analysis after clean-up effort	Internal SHE manager	As and when required
	Soil stockpiles and	Soil erosion	Measure suspended sediments,	Internal SHE	Monthly during construction and

Aspect	Area to be monitored	Impacts Requiring Monitoring	Functional Requirements for Monitoring (refer to detailed description of the monitoring programs above)	Roles and Responsibilities	Monitoring and Reporting Frequency
	roads		visual observations of stockpiles, road, and areas next to roads	manager	biannually during operation
	Rehabilitated areas	Soil compaction	Visual observations of track locations and bulk density measurements	Internal SHE manager	Quarterly during operational and decommissioning/rehabilitation and closure phases
	Adjoining cultivated lands	Loss of high potential cultivated land and crop production	Compare crop of adjoining lands to land further away through discussions with landowner.	SHE manager	Annually
Flora	Adjacent natural and sensitive areas	Proliferation of alien and invasive vegetation and edge effects	Where alien and invasive species, specifically those listed under NEMBA as Category 1b species, are noted, immediate eradication actions should be undertaken.	SHE Manager	Monthly monitoring and reporting during the construction phase. Biannual monitoring and reporting during the operational phase.
	Rehabilitated areas	Revegetation of disturbed areas	Monitor the relative alien to indigenous plant ratio, the percentage of cover, relative species diversity and erosion over the rehabilitated area.	Independent ecologist	Annual monitoring and reporting during decommissioning, rehabilitation, and closure phases
	Relocation success	Disturbance of floral SCC	Visual inspection		Annually during the growing season for a period of three years
Fauna	Wetland areas	Faunal community composition (structure, function,	Monitoring changes in faunal composition, habitat extent and productivity		Annual monitoring and reporting (wet season)

Aspect	Area to be monitored	Impacts Requiring Monitoring	Functional Requirements for Monitoring (refer to detailed description of the monitoring programs above)	Roles and Responsibilities	Monitoring and Reporting Frequency
		and richness)			
Air quality	Fugitive Dust and PM_{10} (refer to recommended monitoring locations in Section 8.1.5 above).	Decrease in the ambient air quality	Monitoring and reporting as per the National Dust Control Regulations.	Independent consultant (air quality specialist)	Monthly monitoring and reporting during construction and operation
Noise	Receptors 1 and 6	Increase in ambient noise levels	SANS10103: 2008. Compliance with the Noise Control Regulations should be met (no increase of +7dBA from identified Rating).	Independent consultant (noise specialist)	Biannual measuring and reporting during the construction and operational phase.
	Mining right boundary		The boundary of the mining rights area should not be exceeded by 61-dBA 24 hour or similar (controlled zone).		
Blasting operations	Identified POIs (Refer to Section 8.1.7 above)	Damage caused by ground vibrations and air blasts.	Photographic survey of structures	SHE manager	Once off before the first blast
			Third party monitoring to ensure that the generated levels of ground vibration and air blast comply with recommendations.	Independent specialist	As and when required during blasting
		Damage/injuries caused by fly rock	Video of each blast to define if fly rock occurred and from where.	SHE manager	Active monitoring and observation of when blasting is done.

9 Environmental Awareness Plan

The section was compiled using Canyon's environmental policies. Canyon is committed to identify training needs and ensuring that all personnel whose work may create a significant impact upon the environment receive appropriate training. The Environmental Awareness Plan describes the training available and the manner in which environmental training needs are identified and continually reassessed.

9.1 Objectives

The objectives of the plan are to ensure that:

- **Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training.**
- **Procedures are established and maintained to make appropriate employees aware of:**
  - **The importance of conformance with Safety, Health, Environment and Quality (SHEQ) policy and procedures and the requirements of the Environmental Management Systems (EMS).**
  - **The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance.**
  - **Their roles and responsibilities in achieving conformance with environmental policy, procedures, and EMS; and**
  - **The potential consequences of departure from specified operating procedures.**
- **Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and/ or experience.**

9.2 Responsibilities

The responsibilities in terms of environmental awareness training lie with the Canyon Resources (Pty) Ltd.

9.3 Manner in which the applicant intends to inform employees of any environmental risk

Canyon Resources (Pty) Ltd realises that not only employees but any person entering the mine might be a risk to the environmental surroundings. Environmental principles will be communicated effectively to newly appointed employees, employees returning from annual leave, as well as to contractors and visitors upon entering the mining area. Regular refresher sessions will also be conducted would the need arise. These would include employees, contractors, departmental officials, and visitors.

9.3.1 Identification of training needs

The following general and specific training needs will be required at the proposed Driefontein Mine:

Table 33: Training needs

General Training	Environmental awareness training.
	Awareness of the Canyon Resources (Pty) Ltd SHEQ policy;
	Awareness of environmental legislation or any other requirements Canyon Resources (Pty) Ltd subscribes to.
Specific Training	Awareness of significant environmental aspects associated with work activities.
	Awareness of environmentally related operational procedures that need to be followed when conducting work activities.
	Awareness of the potential consequences of not following environmentally related operational procedures; and
	Environmental legislative requirements of work activities.

The training material encompasses information regarding the Canyon Resources (Pty) Ltd SHEQ Policy, charter and visions, the description of environmental impacts, including, but not limited to, air pollution, waste management, water management, land management and energy conservation, the importance of environmental legislation, key roles, and responsibilities in terms of environmental management and the reporting of non-conformances. The Environmental Awareness Plan will operate at two levels:

- Induction and training (In house and on the job), and
- General environmental awareness.

9.3.1.1 Induction and Training

Human Resources development programs will include appropriate training and skills development programmes as required by the workforce in support of operation specific business plans (both mining and non-mining related). Training will be offered in portable skills, being competencies that will enable employees to find jobs elsewhere within the mining industry, or to become self-employed. Basic environmental and pollution control skills will be included in this training.

Table 34: Training to be offered

Type of training	Description
In-house training	In house training seasons will be held with the relevant employees. The training seasons will be determined by the relevant department and will allow for employees to participate in determining what the environmental issues and concerns are with regard to their specific occupation. Education with regards to environmental incident reporting will be detailed at these sessions.
On the job training	On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be ongoing, and all new employees will be provided with the same standard of training as existing employees.

9.3.1.2 General environmental awareness

The successful implementation of the EMPr is dependent on the training and awareness of all personnel. All full-time staff and contractors are required to attend an induction session. Employees are inducted when they start at the mine and when they return from leave. Any contractor who works at the mine for a period of 24 hours or more, is required to undergo induction. Environmental issues and aspects related to the operation will be addressed in induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained, and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session, so that all employees gain a suitable understanding of environmental issues and pollution. The basic content of the proposed Driefontein Coal Mine induction programme for full time employees will include the following aspects:

- Waste Management.
- Pollution control.
- Dust control.
- Water (Surface and ground) control.
- Topsoil management.
- Trespass; and
- Hygiene.

Environmental seminars can be held with management and selected groups of supervisors/foreman and/or employee representatives. This will take the form of an open discussion between the relevant department and these individuals. The seminars will aid in environmental awareness being generated at all levels, as well as assist the relevant department in defining all, and identifying new environmental issues, concerns and pollution sources.

In addition, at the start of each new phase or where a potential for impact exists specific training sessions will be held to discuss the mitigation measures planned for that phase.

- **Sessions will be held when it is identified that specific improvements are required so that the EMPr commitments can be met.**
- **Sessions will be held in response to incidents and or complaints being reported.**

Work procedures will include attention to implementation of the required mitigation measures as stipulated in the EMPr.

10 Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment

Canyon Resources (Pty) Ltd is committed to establishing and maintaining procedures to identify potential emergency situations, to respond to emergencies and to mitigate any resulting safety, health, and environmental risks. In addition, the organisation will review its emergency procedures (particularly after emergency situations) and periodically test such procedures where practicable.

10.1 Environmental Emergency Plan (EEP)

This Environmental Emergency Plan (EEP) describes the procedures Canyon Resources (Pty) Ltd has in place with regards to the preparedness and response to environmental emergencies. The SHEQ policy aims at prevention of emergencies and therefore all possible measures are taken to eliminate or reduce the potential causes of emergencies.

An Emergency is defined in this plan as an unplanned situation or event resulting in involvement of the emergency services, police, fire, paramedic, or the regulatory authorities. Emergencies include accidents and emergency incidents.

10.1.1 Objectives

This SHE Management Procedure describes the planned response to emergency situations. It comprises:

- Identification of potential accident and emergency situations and events.
- Roles and Responsibility.
- Planned response.
- Provision of equipment and facilities.
- Reporting of emergencies; and
- Review of procedures.

10.1.2 Identification of potential environmental emergencies

In the process of identifying the environmental aspects and associated impacts and in formulating the EEP the following factors were taken into consideration:

- All significant environmental aspects identified under emergency conditions.
- Historic emergency events of activities, products, and services on/ off the site.
- Chemicals, oils, and other materials used on site.
- Activities of contractors.
- Concerns of communities and authorities.
- Proximity to sensitive areas such as residential areas, schools, wetlands, rivers etc.
- Availability of local emergency services.
- Availability of trained, on-site personnel for emergency situations; and
- Input, where necessary from Canyon Resources (Pty) Ltd Emergency Services.

Potential emergency situations identified include petrochemical/chemical spillages, hazardous material spillages, radioactive incidents, fires, untreated effluent spillages, explosions, and natural disasters. Emergency plans have been documented for each of these stipulated emergencies, which include responsibilities in emergency situations, corrective and preventative actions and the reporting of such emergencies.

Where practicable, management measures were introduced to reduce the risk of such environmental emergencies occurring.

A site map indicating various aspects related to the potential SHE emergencies must be made available on site. The site map must include the following information:

- Identification of evacuation routes.
- Identification of safety showers and eyewash stations.
- Identification of fire extinguishers.
- Identification of spill containment equipment.
- Effluent drains, storm water channels, sewage treatment and other water systems.
- Site infrastructure such as bulk storage facilities and Major Hazard Installations.
- Prevailing wind directions and neighbouring communities and facilities; and
- Emergency Generators.

10.1.3 Roles and Responsibility

All Canyon Resources (Pty) Ltd employees and contractors working for at the proposed Driefontein Mine are responsible for reporting any accident / emergency to their supervisor immediately, and if required to notify the emergency response teams according to the emergency call out procedure. Canyon Resources (Pty) Ltd is responsible for the annual testing and review of the applicable emergency response procedures. The periodic testing of response unit telephone numbers as well as testing of employee response must be carried out. Canyon must document its emergency preparedness and response activities, resources, and responsibilities, and disclose appropriate information to PACs, relevant government agencies, or other relevant parties. All records of testing must be kept and maintained according to the EMS Records Procedure.

10.1.4 Response to Environmental Emergencies

The response plan for each of the identified potential emergency situations must be reviewed to ensure that:

- Adequate plans, procedures and equipment are in place to respond to emergencies; and
- The environmental impacts associated with these emergencies are mitigated.

10.1.4.1 Reporting emergencies

Telephone hotlines will be available 24 hours for the reporting and subsequent reaction to the emergency. Details will be obtained from callers by the staff operating the hot line, in terms of basic information including type of emergency and appropriate details, time of

call, location, caller identity etc. Call out procedural posters or notices will be displayed across site. Hotline staff notifies response teams.

10.1.4.2 Emergency plan

The Emergency Plan is not intended to be a comprehensive instruction for handling the emergency. This can only be achieved through training and regular practice drills. Actual emergencies are reported and followed up by the SHE Management Procedure for Nonconformity, corrective action, and preventive action procedure. It is to be ensured that relevant government authorities are contacted by the SHE Departments in terms of the occurrence as per legislative requirements. Information relative to a particular emergency is documented in the respective emergency plan including:

- Description of the emergency.
- Reference to relevant material safety data sheets.
- Responsibilities for management of emergencies.
- Contact telephone numbers (on-site & off-site).
- Equipment required (including locations); and
- Site plan where applicable.

10.1.4.3 Emergency response team

Personnel nominated as response team members must receive appropriate training to manage emergencies. All other personnel must be made aware of potential emergencies and trained in evacuation and call out procedures. Where practicable, personnel will participate in regular practice drills to test the effectiveness of the procedures and plans. Emergency plans must be reviewed and tested by practice drill at least annually. The results of drills are reviewed and documented including any amendments to training, changes to procedures, plans or equipment.

10.1.4.4 Provision of Equipment and Facilities

Equipment associated with the identified emergencies must be maintained as follows:

Table 35: Non-conformance reporting procedure

Equipment	Responsibility
Fire extinguishers Fire hydrants Fire hose reels Emergency spill kits First aid boxes	Each working area is responsible for the maintenance of their fire equipment.
Front end loader Excavator	Individual sites maintain vehicles as required.
Emergency equipment	Emergency response team

10.1.4.5 Notifying the relevant government authorities

Emergencies must be reported within 24 hours by telephone or fax to the relevant government authorities. The information reported must include:

- Contact person and contact details.
- Date and time of incident.
- Reference to:
  a) Sections 28 and 30 of the National Environmental Management Act (Act 107 of 1998).
  b) Section 20 of the National Water Act (Act 36 of 1998).
- The nature of the incident.
- The substance involved and an estimation of the quantity released and the possible acute effect on persons and the environment and data needed to assess these effects.
- Initial measures taken to minimise impacts.
- Causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
- Measures taken and to be taken to avoid a recurrence of such incidents.
- A report, including the above-mentioned information, is to be submitted to the relevant competent authorities.

10.1.4.6 Review of Procedures

The emergency procedures must be reviewed after each incident or annually during EMS meetings.

10.2 Reporting procedure

In the event of an Environmental Incident the reporting procedure as presented in the Table 36 below should be followed.

Table 36: Reporting Procedure

Environmental Incident Reporting Structure	Action Required
Person causing or observing the incident	Shall report the incident to an immediate supervisor in the area/section where the environmental incidents observed.
Area manager in whose area of responsibility the incident took place	Shall investigate the incident and record the following information: • How the incident happened. • The reasons the incident happened. • How rehabilitation or clean up needs to take place. • The nature of the impact that occurred. • The type of work, process or equipment involved; and • Recommendations to avoid future such incidents and/or occurrences.

Environmental Incident Reporting Structure	Action Required
	Shall inform the Safety, Health and Environmental Manager (SHE Manager) and the Mine Manager daily of all incidents that were reported in the area/section.
	Shall consult with the relevant department / person for recommendations on actions to be taken or implemented where appropriate (e.g., clean-ups).
	Shall assist the SHE Manager and/or Mine Manager with applicable data to accurately capture the incident into the reporting database.
Area Managers	Shall forward a copy of the incident form to other line managers.
	Shall forward a copy of the incident form to the SHE Manager and the Mine Manager.
	Shall inform the relevant department / person on a weekly basis of the progress by e-mail or by submitting a copy of the incident report. Once a High-Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the SHE Manager and the Mine Manager by telephone or email to ensure immediate response / action.
	Shall forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department / person.
Mine/SHE Manager	Shall complete an incident assessment form to assess what level of incident occurred.
	Shall make recommendations for clean-up and / or appropriate alternate actions.
	Shall enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager.
	Shall enter the incident onto the database to monitor the root causes of incidents.
	Shall include the reported incidents in an appropriate monthly /quarterly report.
	Shall highlight all incidents for discussion at Health, Safety and Environment (HSE) committee meetings.

11 Auditing

An audit of the environmental management actions undertaken is essential to ensure that it is effective in operation, is meeting specified goals, and performs in accordance with relevant regulations and standards. Internal audits must be conducted by the mine and the findings and outcomes of these audits recorded in the EMPr file and used to rectify areas of non-compliance.

In terms of Regulation 34 of the NEMA EIA Regulations, 2014 (as amended), the Applicant must conduct environmental audits to determine compliance with the conditions of the Environmental Authorisation, and the EMPr. The Environmental Audit Report must be prepared by the independent ECO. It is recommended that:

- **Monthly external environmental audit reports are conducted and submitted to the Competent Authority during the construction phase. The Applicant must also submit one post construction audit report upon completion of the construction phase.**
- **One external environmental audit report is conducted and submitted to the Competent Authority on an annual basis during the operational phase. These reports must also include the findings of the internal audits as well as a review of the environmental liability and requirement to update the financial provision.**

12 Amendment of EMPr

Any issue that may arise during the life of the mine and that is not provided for in this EMPr may be addressed as an addendum to this EMPr. An addendum will be submitted to the Applicant for approval prior to the implementation of the provisions contained and communicated to the Authorities.

13 Specific information required by the Competent Authority

All the information requested by the Competent Authority (DMRE) to date has been included in the EIA/EMPr.

14 Declaration of Independence

I Thomas Willem Olivier, declare that:

- *I act as the independent environmental practitioner in this application.*
- *I performed the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the Applicant.*
- *I declare that there are no circumstances that may compromise my objectivity in performing such work.*
- *I have expertise in conducting environmental impact assessments, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.*
- *I complied with the Act, Regulations and all other applicable legislation.*
- *I have not, and will not engage in, conflicting interests in the undertaking of the activity.*
- *The inputs and recommendations from the specialist reports have been included in the EIA/EMPr Report.*
- *The comments and inputs from stakeholders and I&APs have been correctly recorded in the report.*
- *The information provided to interested and affected parties and any responses to comments or inputs made by interested and affected parties are correctly reflected in the report.*
- *I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not*
- *I realise that a false declaration is an offence in terms of regulation 71 of the Regulations and is punishable in terms of section 24F of the Act.*

Report compiled by:	Report reviewed by:
	
Tommy Olivier – Project Manager Reg. EAP (EAPASA) No. 2020/1162	Inus de Wit – Alternate Project Manager Reg. EAP (EAPASA) No. 2019/417

-END-

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