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GOLD ONE AFRICA (PTY) LTD

CLOSURE REPORT FOR THE PROPOSED VENTERSBURG GOLD MINE IN TERMS OF GN982 OF 2014 (AS AMENDED) AND GN1147 OF 2015

OCTOBER 2025

Prepared for:

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DMPR REF. FS 30/5/1/2/2/10036 MR

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ACRONYMS

CPI	Consumer Price Index
DFFE	Department of Forestry, Fisheries and the Environment
DMR/ DMRE/ DMPR	Department of Mineral and Petroleum Resources
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
LOM	Life of Mine
MPRDA	Minerals and Petroleum Resources Development Act (No. 28 of 2002)
NEMA	National Environmental Management Act (No. 107 of 1998)
NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NWA	National Water Act (No. 36 of 1998)
SLP	Social and Labour Plan

1 INTRODUCTION

1.1 Details of the EA holder

Company	Gold One Africa (Pty) Limited
Physical address – head office	Constantia Park, Building 17, Cycad House, Ground Floor, Corner 14th Avenue and Hendrik Potgieter Road, Weltevreden Park, Roodepoort, Johannesburg, 1709, South Africa
Physical address – site	Various portions of the farms Klippan 77, La Rochelle 760, Uitsig 723, Vogelsrand 720, and Whites 747, Free State Province
Postal address	Postnet Suite 002, Private Bag X5, Strubens Valley, 1735
Responsible person	Jon Hericourt
Email address	Jon.Hericourt@gold1.co.za
Competent authority	Department of Mineral and Petroleum Resources
Reference number	FS 30/5/1/2/2/10036 EM
Date of issuance	9 September 2018

1.2 Expertise of the EAP

Prime Resources (Pty) Ltd is a specialist environmental consulting firm providing environmental and related services, which was established in 2003. Prime Resources was founded by Peter Theron (PrEng, SAIMM), the Managing Director and Principal Environmental Consultant of the firm, who has a GDE Environmental Engineering from the University of Witwatersrand and over 30 years of experience in the field of environmental science and engineering.

Name of Environmental Assessment Practitioner (EAP)	Prime Resources (Pty) Ltd
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Professional Affiliations	ECSA, SACNASP, SAIMM, IAIAsa, EAPASA

Prime Resources (Pty) Ltd, established in 2003, is a specialist environmental consulting firm providing environmental and related services. Prime Resources was founded by Peter Theron (PrEng 950329, SAIMM), who has over 40 years of experience in the field of environmental science and engineering.

Gené Main (Pr.Sci.Nat., Environmental Science), the Project Manager and Principal Scientist for the proposed project, has a M.Sc. (Botany) from the University of the Western Cape and 17 years' experience in the field of environmental science. Gené is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA Reg.: 2019/1257).

Louise Jones (EAPASA registered 2019/1367) is a Senior Environmental Scientist with over 10 years of experience in the field of environmental science. Her expertise includes environmental impact assessments and management planning, financial liability assessments associated with mine closure and rehabilitation as well as environmental compliance auditing.

Stephen Tarlton is a Senior Environmental Scientist (Pr.Sci.Nat. registered) with over 10 years of consulting experience. He has expertise in environmental authorisations, monitoring and compliance auditing with experience in several fields including large infrastructure, mining and waste management.

1.2.1 Declaration of independence

Prime Resources is an independent environmental consulting firm with no vested interest in the activities being undertaken at the Ventersburg Mine other than to fulfil the contract for delivery of specialised environmental consulting and auditing services including, among others, those stipulated in the terms of reference. It is hereby declared that the environmental consultants, scientists and engineers under the employ of Prime Resources, insofar as the undertaking of this assignment:

- Act as independent consultants
- Do not have any financial interest in the undertaking of the activity, other than fair remuneration for the work performed
- Have not, and will not engage in, conflicting interests in the undertaking of the activity
- Undertake to disclose, to the Competent Authority, any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document
- Will provide the Competent Authority with access to all information at our disposal, whether such information is favourable to the applicant or not
- Based on information provided to us by the project proponent and in addition to information obtained during the course of this study, have presented the results and conclusion within the associated document to the best of our professional ability
- Reserve the right to modify aspects pertaining to the present investigation should additional information become available through ongoing research and/or further work in this field
- Undertake to have our work peer reviewed on a regular basis.

Compiled by	Reviewed by
Louise Jones Principal Environmental Consultant EAPASA Reg: 2019/1367 Stephen Tarlton Senior Environmental Scientist *Pr. Sci. Nat.: 115011* prime | resources environmental consultants	Gené Main Principal Environmental Consultant EAPASA Reg. No 2019/1257 prime | resources environmental consultants

1.2.2 Disclaimer

Prime Resources has expressed due and diligent care to comprehensively evaluate the activities and operations proposed to be undertaken at the mine. The closure cost estimate is based on measurements for the proposed infrastructure.

2 PROJECT DESCRIPTION

2.1 Background and location

The Gold One Africa (Ltd) Ventersburg Gold Mine is a proposed underground mining operation with an on-site processing plant and supporting infrastructure. The Ventersburg Gold Mine is situated between the towns of Ventersburg and Hennenman, on portions of the farms Klippan 77, La Rochelle 760, Uitsig 723, Vogelsrand 720, and Whites 747 in the Free State Province (Figure 1).

The Ventersburg Gold Mine is anticipated to have a life of mine (LoM) of 17 years. The surface infrastructure will consist mainly of a shaft area and mining infrastructure, processing plant, a waste rock dump (WRD) and tailings storage facility (TSF), including storm water management measures for each of the surface infrastructure components. A water treatment plant will treat excess underground water, which will then be pumped to a discharge point at the Rietspruit (Figure 2).

Gold One Africa has been granted a Mining Right (DMPR Ref. FS 30/5/1/2/2/10036 MR) in terms of the Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA), and received an Integrated Environmental Authorisation (IEA) on 9 January 2018 for activities listed in terms of the National Environmental Management Act, No. 107 of 1998 (NEMA) EIA Regulations (GN982 of 2014) (IEA Ref. FS 30/5/1/2/3/2/1 (10036) EM).

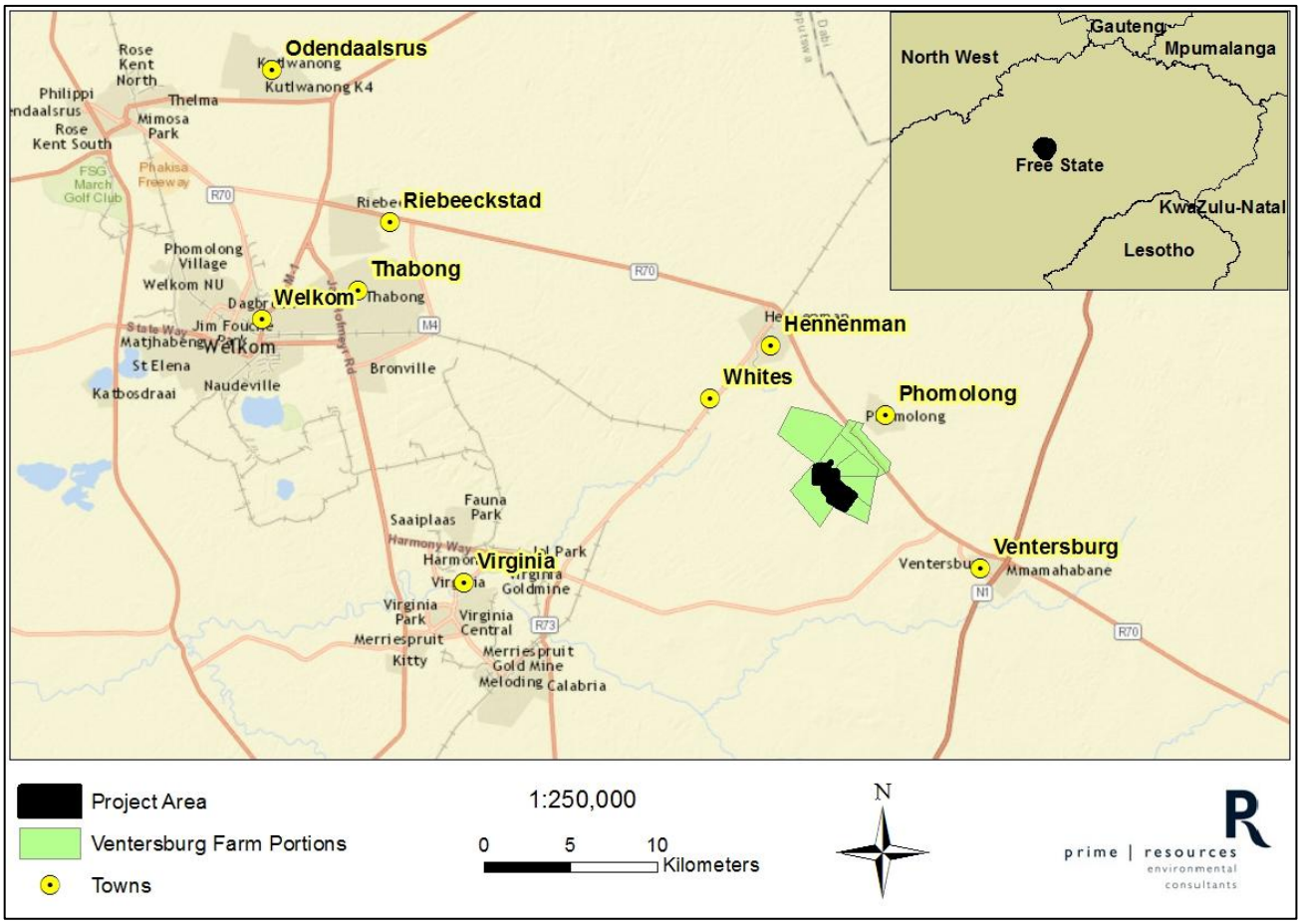

Figure 1. Location of the Ventersburg Gold Mine

2.2 Mining

The Ventersburg Gold Mine is expected to have a 17-year LoM. Full production will be reached in year 9 at 80 000 tonnes of Run of Mine (RoM) ore per month which will be maintained for 7 years. An estimated 30 000 tonnes of waste rock will be generated per month at steady state.

The mine will consist of the main shaft which will be a single twin shaft complex situated at the far east section of the ore body. The RoM ore and the waste rock will be hoisted separately at the main shaft. The ore and/or waste rock will be fed from the shaft headgear bin via a vibrating feeder and conveyed to an ore/waste splitter bin. From the ore/waste splitter chute, ore will be conveyed to the mill feed silo, while waste rock will be conveyed to the WRD.

Prior to plant commissioning ore will be trucked from the shaft headgear bin to the ore stockpile. Once the plant has been commissioned, ore will be reclaimed from the ore stockpile.

In addition, there will be a ventilation shaft, with appropriate support to ensure it remains open for the LoM. The shafts will be located approximately 75 m apart.

2.3 Processing

The process route consists of RoM milling, cycloning, pre-leach thickening, leaching/carbon-in-pulp (CIP) or carbon-in-leach (CIL), elution, carbon regeneration, acid washing of the carbon, smelting and tailings disposal.

2.4 Tailings disposal

The TSF will be equipped with a liner designed as per legislative requirements. The life of the facility is 20 years, and it is designed to have a 70 ha footprint. Its maximum height is planned as 35 m on the western side and 22 m on the eastern side.

2.5 Surface infrastructure

In order to comply with the WUL and avoid impacts to wetlands and aquatic habitats, the surface infrastructure was shifted slightly so that it avoids the regulated area of the surrounding watercourses (Figure 2). The mine perimeter will be fenced with 2 m high fencing. Access onto the mine site will be via the access road (approximately 2 km, 10 m wide) from the R70 provincial road, leading to the main security gate. A parking facility will be constructed at the security office. A gate to the north-west of the site will be locked and manned and may be used as an emergency exit.

The workshops will be of steel construction and a hard-standing foundation. Prefabricated buildings will be used for the clerk's offices, ablutions, and tools and equipment storage.

For general consumables, a main receiving store will be established on surface. The stores complex has two main buildings of steel construction, including the main store and salvage yard building and associated wash bay.

A storage yard is provided to store major components and plant that are not immediately required. This will include the timber yard (5 500 m^2), cable yard (1 800 m^2), cassette loading area (3 000 m^2), and open laydown area (5 500 m^2). Additional area is available for the storage of large spares.

A temporary waste storage facility will be present on site. The on-site facility is bunded so that any spillage that occurs is contained within the bunded area. Domestic and hazardous industrial waste is to be disposed of off-site at an appropriately licensed facility by a qualified contractor.

The fuel storage facility will be sized to supply fuel to the underground workings, surface mine vehicles and six standby generator sets. Bulk fuel will be stored within the stores yard in three rectangular self-bunded steel tanks on concrete pads, each with a capacity of 61.3 kl. The supply to the underground workings will be from a 30 kl tank of a similar design and situated just to the south of the service shaft. A fifth containerised tank with a capacity of 275 kl will be located at the generator sets yard.

No surface explosive magazines are planned. Provision has been made for emulsion storage silos near the shaft.

The office complex will comprise of seven stand-alone prefabricated buildings. A training centre and medical centre will also be constructed.

A core shed will be located to the north-west of the office complex.

Five individual change house blocks are envisaged. The change house complex will be located adjacent to the office complex. They will be prefabricated structures with galvanized steel columns.

A cap lamp room and crush will also be constructed.

Raw effluent from the ablution facilities will flow to the sewage treatment plant. Effluent will be treated and pumped to the transfer water dam. Treated humus will be drawn out of the humus tank (once per year) and be transported (by bowser) to the nearest municipal sewage treatment works for disposal, by arrangement.

Approximately 350 000 tonnes of topsoil will need to be stockpiled for rehabilitation. A footprint of 20 ha is provided for this purpose. The average height of the stockpile will be 4 m.

2.6 Services

Bulk power supply will be supplied by Eskom. Diesel standby power in the form of six 1 500 kVA diesel generators is provided for. The generators are housed in containers. The generators will provide sufficient power for the fans and the main winder during Eskom power outages.

Initial construction will require boreholes to supply approximately 1 Ml per day. Clarified / settled water from underground will be pumped out and stored in a transfer water dam, from where water will be pumped to the process water dam to accommodate the 50 % plant make-up water required. Excess water (approximately 6 Ml per day) will be treated at an on-site water treatment facility to discharge standards, to be stipulated by the DWS, and discharged into the Rietspruit. Treatment of the steady state excess water of will result in brine being produced; the brine and/or salts will be disposed of at a licensed hazardous waste disposal facility.

A Pollution Control Dam (PCD) will be constructed to contain stormwater runoff from the dirty water catchment. The PCD will be equipped to pump water into the transfer water dam, if necessary, or the water will be evaporated. At the processing plant, a process water dam and a second PCD will be constructed. The TSF and WRD will both be equipped with a RWD.

Water from clean terraces will be diverted around the dirty water areas by means of berms and diversion drains and allowed to drain away into natural watercourses outside of the mine site.

2.7 Decommissioning and rehabilitation

A period of one year is assumed to account for decommissioning and three years for full rehabilitation. All surface infrastructure will be removed apart from the TSF, WRD and residual pollution control facilities. The area where the proposed surface infrastructure is to be removed will be rehabilitated to be able to support a suitable land use based on the land capability and planning objectives for the area i.e., grazing land.

2.8 Mine plan / schedule

Table 1. Ventersburg Gold Mine planned schedule (years 1 – 18) for approved operations

Main activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Construction																				
Underground mining																				
WRD																				
TSF																				
Processing Plant																				
Decommissioning																				
Rehabilitation																				

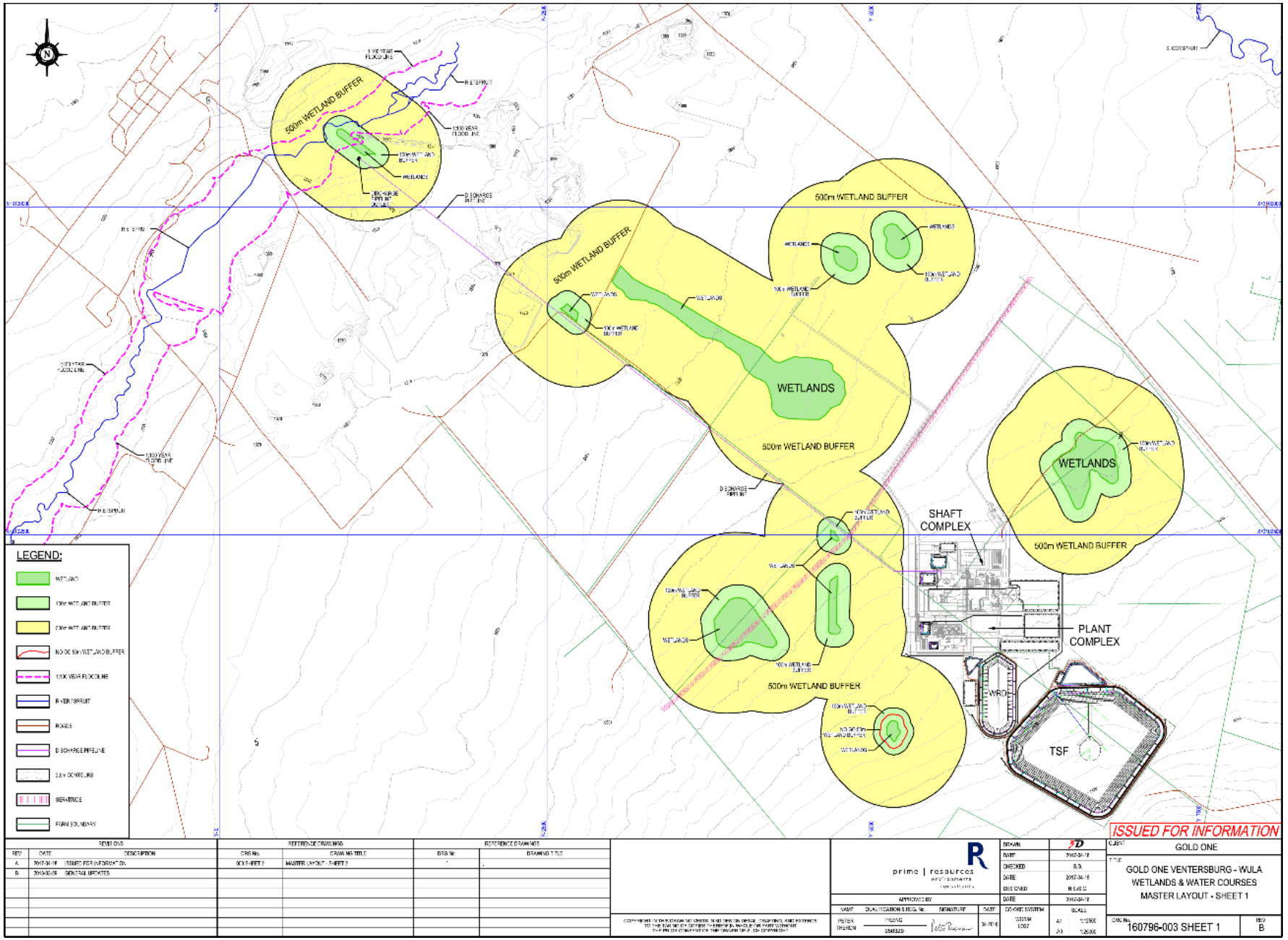

Figure 2. Surface infrastructure layout showing regulated area of wetlands (500m) (revised, as per final 2019 WULA submission)

3 SCOPE

As the project has not commenced, this Closure Report, incorporates:

- The original Final Rehabilitation, Decommissioning and Closure (FRDC) Plan with an inflationary-adjusted financial provision calculation
- Annual Rehabilitation Plan (ARP) reflecting that the project has not commenced and no environmental liabilities have yet been realised
- As no additional environmental risk has been incurred since the EA was granted, the original Environmental Risk Assessment (ERA) has been incorporated into this report.

This report is to be read in conjunction with the Environmental Impact Assessment Report (EIAR), the Environmental Management Programme (EMPr), as well as the latest Environmental Audit Report.

Specialist studies were reviewed to identify the pre-expansion environmental and social context, closure commitments, potential risks pertaining to closure, and the recommendations relating to closure. The following studies were utilised to characterize the baseline environment and identify the potential risks pertaining to closure:

- Air quality (Digby Wells & Associates, 2013; Prime Resources, 2017)
- Hydrogeology (Groundwater Square, 2012)
- Hydrology (Digby Wells & Associates, 2013)
- Socio-economic (Digby Wells & Associates, 2013; Turnscapes, 2017)
- Soil and land capability (Digby Wells & Associates, 2013; and Prime Resources, 2017)
- Radiation (PSI Risk Consultants, 2013 and 2017)
- Terrestrial and aquatic ecology (Digby Wells & Associates, 2013; Natural Scientific Services, 2017)
- Visual aesthetics (Digby Wells & Associates, 2013)
- Wetlands (Digby Wells & Associates, 2013; Natural Scientific Services, 2017).

4 LEGAL FRAMEWORK

This section details the applicable legislative provisions regarding mine closure.

4.1 Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA)

The MPRDA is the key legislation governing mining activities within South Africa. The MPRDA details the requirements and processes which need to be followed and adhered to by mining companies. The mining industry is regulated at a national level by the DMPR which, through its regional offices, implements and administers the MPRDA. In respect of environmental matters, the Department of Forestry, Fisheries and the Environment (DFFE) is responsible for drafting all relevant legislation and regulations governing mining and environmental issues. In 2014, the One Environmental System was implemented, which resulted in a collaborative governance approach using both the MPRDA and NEMA. The DMPR is responsible for implementing these laws or regulations insofar as the laws/ regulations pertain to the mining sector.

Sections 41 to 47 of the MPRDA addressed legislative closure requirements. Section 41 stipulated that the holder of any prospecting right, mining right or mining permit must include the prescribed financial provision in the EMPr for the rehabilitation or management of negative environmental impacts. Should the license holder be unable to fulfil the rehabilitation obligations, the Minister of Mineral Resources may then employ the funds of the financial provision for the said rehabilitation. Section 41(3) required that the financial provision be assessed annually to the satisfaction of the Minister. Sections 41 and 42 have since been repealed and this is addressed under NEMA.

4.2 National Environmental Management Act (No. 107 of 1998) (NEMA), National Environmental Laws Amendment Act (No. 2 of 2022) (NEMLAA) and the EIA Regulations (2014)

NEMA is enabling legislation intended to provide a framework for integrating environmental management into all developmental activities to promote co-operative environmental governance with regard to decision making by state organs on matters affecting the environment. The NEMA now regulates mine rehabilitation, closure cost assessment and closure planning.

Section 24P of NEMA (substituted by NEMLAA in 2023) addresses the financial provision (FP) for remediation of environmental damage and states that the holder of an EA (such as the Gold One Africa) must provide FP for progressive rehabilitation, mitigation, decommissioning, closure and post closure activities, including the pumping and treatment of extraneous and polluted water, where relevant, to ensure the mitigation and rehabilitation of adverse environmental impacts, including latent environmental impacts. A holder of an EA must annually undertake, as prescribed, the mitigation, remediation and rehabilitation measures.

FP, defined under NEMA (*substituted by* NEMLAA in 2023), is *the amount which is to be provided by a holder, holder of an old order right or applicant, guaranteeing the availability of funds to fulfil the obligation to undertake progressive rehabilitation, decommissioning, closure and post closure activities including the pumping and treatment of polluted or extraneous water to ensure that the State does not become liable for those costs which should be covered by a holder, holder of an old order right or applicant.*

Section 24PA of NEMA (*inserted by* NEMLAA in 2023) deals with FP for mining and states that a holder of an EA for a mining activity, holder or holder of an old order right must maintain and retain a FP until a closure certificate is issued by the Minister responsible for mineral resources in terms of the MPRDA, review and adjust the environmental liability, as prescribed; at the intervals as prescribed, subject the FP and the basis

of the calculations to an independent audit; at the intervals as prescribed, submit to the Minister responsible for mineral resources an audit report; publish, at the intervals as prescribed, the review decision in a provincial newspaper as well as a newspaper distributed within the municipal area within which the mining operation is located, and indicate where the review can be obtained; and annually undertake the mitigation and rehabilitation measures, as prescribed. The FP provided in respect of latent environmental impacts or residual environmental impacts, including the pumping and treatment of extraneous and polluted water, must be transferred to the Minister responsible for mineral resources upon the issuing of a closure certificate, unless otherwise prescribed. Where the FP vehicle used for the FP in respect of latent environmental impacts or residual environmental impacts, including the pumping and treatment of extraneous and polluted water, is insurance, the Minister responsible for mineral resources must access the funds on issuing the closure certificate.

Section 24R of NEMA (*substituted by* NEMLAA in 2023) states that every holder, holder of an EA for a mining activity, holder of an old order right and owner of works remain responsible for any environmental liability, pollution or ecological degradation, the pumping and treatment of polluted or extraneous water, the management and sustainable closure thereof notwithstanding the issuing of a closure certificate by the Minister responsible for mineral resources in terms of the MPRDA, to the holder or owner concerned and that every holder, holder of an EA for a mining activity, holder of an old order right or owner of works must plan, manage and implement such procedures and requirements in respect of the closure of a mine as may be prescribed.

Audit, defined under NEMA (inserted by NEMLAA in 2023), when used in sections 24P and 24PA, is a review of the scientific and engineering acceptability of the measures and the adequacy of related costs associated with FP, as prescribed.

Appendix 5 of the EIA Regulations (GN982 of 2014 as amended) provides the prescribed content to be included in the closure plan which is required where the application for an EA relates to the closure of a facility.

4.2.1 Financial Provisioning Regulations (GN1147 of 2015)

The NEMA Financial Provisioning Regulations (GN1147 of 2015 *as amended*), published in accordance with NEMA, officially came into effect on 20 November 2015, with amendments, GN1314 in October 2016, GN452 in April 2018, GN991 in September 2018, GN24 in January 2020, GN495 in June 2021, GN2087 in May 2022, GN3841 in September 2023, and GN4296 in February 2024.

An applicant or holder of a right or permit must determine and make FP to guarantee the availability of sufficient funds to undertake rehabilitation and remediation of the adverse environmental impacts of prospecting, exploration, mining or production operations, as contemplated in the Act and to the satisfaction of the Minister responsible for Mineral Resources. In accordance with Section 6 and Section 11 of GN1147 the FP must be determined through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required, and the following three reports must be compiled:

- Annual Rehabilitation Plan (ARP)
- Final Rehabilitation, Decommissioning and Closure Plan (FRDC Plan)
- Environmental Risk Assessment (ERA) Report.

As per GN1147, the objectives of the ARP, FRDC and ERA Report are described in Table 2.

Table 2. Report objectives

ARP	FRDC Plan	ERA Report
• Review concurrent rehabilitation and remediation activities already implemented • Establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the progressive achievement of the closure objective and post-mining sustainable end state as identified in the FRDC plan; • Establish a plan, schedule and budget for rehabilitation for the forthcoming 12 months based on the calculated costs • Identify gaps in knowledge and research to be undertaken to address shortcomings experienced in the preceding 12 months of rehabilitation • Provide an overview of the monitoring results and effect of rehabilitation • Highlight any risks emerging from monitoring; and • Identify knowledge gaps which could have an impact on achieving the end state and the intervention, including research interventions to address the gaps.	• Determine, review and revise as required, a sustainable end state for the mining operation, which includes a sustainable and achievable end state of the land, as well as sustainable post-closure management and monitoring measures • Ensure early and regular consultation throughout the Life of Mine (LoM) on closure objectives and the sustainable end state objectives • Predict and model the mining activities, expected environmental impacts, the mineral extraction schedule and by applying and explaining a risk-based approach and hierarchy linked to closure activities throughout the LoM • Determine, review and revise the rehabilitation and remediation activities related to the sustainable end state of the environment at closure and post-closure • Determine an overall cost for implementing the avoidance, management and rehabilitation activities • Determine the annual budget and schedule for the implementation of the avoidance, management and rehabilitation activities • Audit and report on the implementation of the plan • Identity knowledge gaps and propose actions to actively address the identified gaps through among others, applicable research.	• Ensure the timeous prediction and quantification of environmental risk associated with the operations • Ensure timeous risk reduction through appropriate interventions • Identify the potential residual and latent environmental risks which will manifest post closure • Detail the approach to manage post-closure risks • Quantify the potential risks and liabilities associated with the management of the risks based on market-related costs • Calculate a risk threshold and timeframe in which to reach the risk threshold • Outline and cost the post-closure monitoring, auditing and reporting requirements.

4.3 National Water Act (No. 36 of 1998) (NWA)

The NWA regulates all matters relating to inland water resources. It operates as a management instrument with the lead authority being the Department of Water and Sanitation (DWS). This Act provides mechanisms for the prevention of the pollution of water resources to support the management of water as a renewable resource. Section 21 of the NWA lists water uses for which authorisation is required from the DWS.

Section 19 (Prevention and remedying effects of pollution)

Requires an owner of land, a person in control of land or a person who occupies or used the land on which any activity or process is or was performed or undertaken, or any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, to take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.

4.3.1 Regulations on use of water for mining and related activities aimed at the protection of water resources (GN704 of 1999)

Any person in control of an existing mine must notify the Department in writing 14 days before the temporary or permanent cessation of the operation of the mine. Regulations applicable to closure include:

- Regulation 4 (Restrictions on locality regarding infrastructure)
- Regulation 5 (Restrictions on use of material)

- Regulation 6 (Capacity requirements of clean and dirty water systems)
- Regulation 7 (Protection of water resources)
    - Prevent water containing waste or any substance which causes or is likely to cause pollution of a water resource from entering any water resource and must retain or collect such substance or water for use, re-use, evaporation or for purification and disposal in terms of the Act.
    - Design, modify, locate, construct and maintain all water systems, including residue deposits, in any area so as to prevent the pollution of any water resource through the operation or use thereof and to restrict the possibility of damage to the riparian or in-stream habitat through erosion or sedimentation, or the disturbance of vegetation, or the alteration of flow characteristics.
    - Cause effective measures to minimise the flow of any surface water or floodwater into mine workings, opencast workings, other workings or subterranean caverns, through cracked or fissured formations, subsided ground, sinkholes, outcrop excavations, adits, entrances or any other openings.
    - Design, modify, construct, maintain and use any dam or any residue deposit or stockpile used for the disposal or storage of mineral tailings, slimes, ash or other hydraulic transported substances, so that the water or waste therein, or falling therein, will not result in the failure thereof or impair the stability thereof.
    - Prevent the erosion or leaching of materials from any residue deposit or stockpile from any area and contain material or substances so eroded or leached in such area by providing suitable barrier dams, evaporation dams or any other effective measures to prevent this material or substance from entering and polluting any water resources.
    - Ensure that water used in any process at a mine or activity is recycled as far as practicable, and any facility, sump, pumping installation, catchment dam or other impoundment used for recycling water, is of adequate design and capacity to prevent the spillage, seepage or release of water containing waste at any time.
    - At all times keep any water system free from any matter or obstruction which may affect the efficiency thereof.
    - Cause all domestic waste, including wash-water, which cannot be disposed of in a municipal sewage system, to be disposed of in terms of an authorisation under the Act.
- Regulation 9 (Temporary or permanent cessation of a mine or activity)
    - Any person in control of a mine must at temporary or permanent cessation of mining operations, ensure that all pollution control measures have been designed, modified, constructed and maintained so as to comply with GN704.
    - Any person in control of a mine or activity must ensure that the in-stream and riparian habitat of any water resource, which may be affected or altered by the mine or activity, is remedied so as to comply with GN704.

4.4 National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)

The NEM:WA regulates waste management in order to protect public and environmental health by providing various waste management measures for the prevention of pollution and ecological degradation and to provide defining requirements for the licensing and control of waste management activities. It also describes measures related to the management of contaminated land, waste handling and transport, describes the general duty of care regarding waste management activities, establishes powers for compliance and

enforcement and lays the foundation for waste information systems. GN921 of 2013 provides definitions for activities which require a Waste Management Licence (WML) and identifies the relevant EAs which are further required for these activities.

Section 17 (Reduction, re-use, recycling, recovery, treatment and disposal of waste)

Unless otherwise provided for in this Act, any person who undertakes an activity involving the reduction, re-use, recycling or recovery of waste must, before undertaking that activity, ensure that the reduction, re-use, recycling or recovery of the waste:

- Uses fewer natural resources than the disposal of such waste; and
- To the extent that it is possible, is less harmful to the environment than the disposal of such waste.

Section 18 (Extended producer responsibility)

The Minister may identify a product (or class of products) in respect of which extended producer responsibility applies and specify extended producer responsibility measures that must be taken in respect of that product or class.

4.5 National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)

NEM:AQA places the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which licensing is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards for the listed activities.

Ambient air quality standards (GN1210 of 2009) were determined based on international best practice for PM_{10} (particulates with an aerodynamic diameter of 10 micron), dust fall, sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), carbon monoxide (CO), lead (Pb), benzene and recently $PM_{2.5.}$ The $PM_{2.5}$ standards were published in GN486 of 2012.

Section 32 (Control of dust)

The Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances; steps that must be taken to prevent nuisance by dust; or other measures aimed at the control of dust.

Section 33 (Rehabilitation when mining operations cease)

If it is determined that a mine is likely to cease operations within a period of five years, the owner must notify the Minister in writing of the likely cessation and of any plans in place or in contemplation for the rehabilitation of the area where the mining operations were conducted after mining operations have stopped and the prevention of pollution of the atmosphere by dust after those operations have stopped.

National Dust Control Regulations (GN827 of 2013)

Prescribes general measures for the control of dust in all areas, including residential and light commercial areas.

4.6 National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)

NEM:BA provides for the management and conservation of South Africa's biodiversity within the framework of NEMA. This includes, among others, the protection of species and ecosystems.

Section 75 (Control and eradication of listed invasive species)

- Control and eradication of a listed invasive species must be carried out by means of methods that are appropriate for the species concerned and the environment in which it occurs.
- Any action taken to control and eradicate a listed invasive species must be executed with caution and in a manner that may cause the least possible harm to biodiversity and damage to the environment.
- The methods employed to control and eradicate a listed invasive species must also be directed at the offspring, propagating material and re-growth of such invasive species in order to prevent such species from producing offspring, forming seed, regenerating or re-establishing itself in any manner.

GN1020 of 2020 (Alien and Invasive Species Regulations)

- Category 1a: Invasive species that require compulsory control.
- Category 1b: Invasive species that require control by means of an invasive species management programme.
- Category 2: Commercially used plants that may be grown in demarcated areas, if there is a permit and that steps are taken to prevent their spread.
- Category 3: Ornamentally used plants that may no longer be planted.

4.7 Conservation of Agricultural Resources Act (No. 43 of 1983) (CARA)

Provides for the conservation of the natural agricultural resources through the maintenance of the production potential of land, through combating and prevention of erosion and weakening or destruction of the water sources, and through the protection of the vegetation and the combating of weeds and invader plants.

GN1048 of 2001 (CARA Regulations)

Regulations applicable to closure include:

- Regulation 13 (Restoration and reclamation of eroded land)
- Regulation 14 (Restoration and reclamation of disturbed or denuded land)
- Regulation 15 (Declaration of weeds and invader plants).

4.8 National Heritage Resources Act (No. 25 of 1999) (NHRA)

The NHRA serves to protect and manage South Africa's heritage and cultural resources, which include places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending to undertake any form of development which involves the NHRA listed activities listed must, at the earliest stage of initiation, notify the South African Heritage Resources Association (SAHRA).

4.9 Mine Health and Safety Act (No. 29 of 1996) (MHSA)

The MHSA provides for protection of the health and safety of staff and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and

safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development; to regulate employers' and staff duties to identify hazards and eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations relating to mining health and safety.

Section 2 (Employer to ensure safety)

The owner of a mine not being worked, but in respect of which a closure certificate in terms of the Minerals Act has not been issued, must take reasonable steps to continuously prevent injuries, ill-health, loss of life or damage of any kind from occurring at or because of the mine.

This Closure Report has been prepared in accordance with the requirements of the MPRDA and GN527 and Appendices 3, 4 and 5 of GN1147 as follows (Table 3).

Table 3. Content of the Closure Report

MPRDA and GN527 of 2004	GN1147 of 2015			[Relevant section of this document]
	ARP (App 3)	FRDC Plan (App 4)	ERA Report (App 5)	
Regulation 62. Contents of a closure plan A closure plan contemplated in section 43(3)(d) of the Act, forms part of the environmental management programme or environmental management plan, as the case may be, and must include -	3. The annual rehabilitation plan will be relevant for a period of 1 year, after which the plan will be updated by the holder of a right or permit to reflect progress relating to rehabilitation and remediation activities in the preceding 12 months and to establish a plan, schedule and budget for the forthcoming 12 months. The annual rehabilitation plan must contain information that defines concurrent rehabilitation and remediation activities for the forthcoming 12 months and how these relate to the operations' closure vision, as detailed in the final rehabilitation, decommissioning and mine closure plan.	3. The final rehabilitation, decommissioning and mine closure plan must be measurable and auditable, must take into consideration the proposed post-mining end use of the affected area and must contain information that is necessary for the definition of the closure vision, objectives and design and relinquishment criteria, indicating what infrastructure and activities will ultimately be decommissioned, closed, removed and remediated and the risk drivers determining actions, indicating how the closure actions will be implemented to achieve closure relinquishment criteria and indicating monitoring, auditing and reporting requirements.	3. The environmental risk assessment report must contain information that is necessary to determine the potential financial liability associated with the management of latent environmental liabilities post closure, keeping in mind the proposed post-mining end use, once the initial relinquishment criteria have been achieved	N/A
	(3)(a) Details of the- i. person or persons that prepared the plan ii. professional registrations and experience of the person or persons iii. timeframes of implementation of the current, and review of the previous rehabilitation activities	(3)(a) Details of the- i. person or persons that prepared the plan ii. professional registrations and experience of the preparers	(3)(a) Details of the- i. person or persons that prepared the plan ii. professional registrations and experience of the preparers	[0]
(c) a summary of the regulatory requirements and conditions for closure negotiated and documented in the EA, as the case may be		(3)(d) Design principles including— i. legal and governance framework and interpretation of these requirements for the closure design principles		[4]
(b) a plan contemplated in regulation 2(2), showing the land or area under closure;	(3)(e) iii. a site plan indicating at least the total area disturbed, area available for rehabilitation and remediation and the area to be rehabilitated or remediated per aspect or activity;	(3)(b) The context of the project including— i. material information and issues that have guided the development of the plan iv. the mine plan and schedule for the full approved operations, and must include - (aa) appropriate description of the mine plan (bb) drawings and figures to indicate how the mine develops (cc) what areas are disturbed (dd) how infrastructure and structures (including ponds, residue stockpiles etc.) develops during the life of the mine		[2]
(a) a description of the closure objectives and how these relate to the prospecting or mine operation and its environmental and social setting;	(3)(b) the pertinent environmental and project context relating directly to the planned annual rehabilitation and remediation activity;	(3)(b)(ii) an overview of - (aa) the environmental context, including but not limited to air quality, quantity and quality of surface and groundwater, land, soils and biodiversity; and (bb) the social context that may influence closure activities and post-mining land use or be influenced by closure activities and post-mining land use;		[5]
(j) a record of interested and affected persons consulted;	1. The annual rehabilitation plan will form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing.	1. The final rehabilitation, decommissioning and mine closure plan will form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing. (3)(b) iv. stakeholder issues and comments that have informed the plan	1. The environmental risk assessment report will form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing.	[6]
(a) a description of the closure objectives and how these relate to the prospecting or mine operation and its environmental and social setting Regulation 61 Closure objectives (a) Identify the key objectives for mine closure to guide the project design, development and management of environmental impacts in accordance with the NEMA and the EIA Regulations, 2014 (b) Provide broad future land use objective(s) for the site; and (c) Provide proposed closure costs in accordance with the NEMA and the FP Regulations, 2015.	must indicate what closure objectives and criteria are being achieved through the implementation of the plan, must be measurable and auditable	(3)(d) Design principles, including- ii. closure vision, objectives and targets, which objectives and targets must reflect the local environmental and socio-economic context and reflect regulatory and corporate requirements and stakeholder expectations		[7]
(i) a sketch plan drawn on an appropriate scale describing the final and future land use proposal and arrangements for the site;		(3)(e) Proposed final land use— i. descriptions of appropriate and feasible final post-mining land use for the overall project and per infrastructure or activity and a description of the methodology used to identify final post-mining land use, including the requirements of the operations stakeholders ii. a map of proposed final post-mining land use		[7.1]

MPRDA and GN527 of 2004	GN1147 of 2015			[Relevant section of this document]
	ARP (App 3)	FRDC Plan (App 4)	ERA Report (App 5)	
(d) a summary of the results of the environmental risk report and details of identified residual and latent impacts, in accordance with the National Environmental Management Act, 1998 and the Environmental Impact Assessment Regulations, 2014;	(3)(c) results of monitoring of risks identified in the final rehabilitation, decommissioning and mine closure plan with a view to informing rehabilitation and remediation activities;	(3)(c) Findings of an environmental risk assessment leading to the most appropriate closure strategy including— i. description of the risk assessment methodology including risk identification and quantification. This to be undertaken for all areas of infrastructure or activity or aspects for which an operation has a responsibility to mitigate an impact or risk at closure ii. identification of indicators that are most sensitive to potential risks and the monitoring of such risks with a view to informing rehabilitation and remediation activities	(3)(b) details of the assessment process used to identify and quantify the post closure, residual and possible latent risks, including - i. description of the risk assessment methodology inclusive of risk identification and quantification ii. substantiation why each risk will occur post closure, including why the risk was not or could not be mitigated during concurrent rehabilitation and remediation or during the implementation of the final rehabilitation, decommissioning and mine closure plan iii. a detailed description of the drivers that could result in the manifestation of the risks, to be presented within the context of closure actions already having been implemented during the execution of concurrent rehabilitation or during the implementation of the final rehabilitation, decommissioning and closure plan iv. a description of the expected timeframe in which the risk is likely to manifest, typically as expected years after closure, and the duration of the impact, including motivation to support these timeframes v. a detailed description of the triggers which can be used to identify that the risk is imminent or has manifest, how this will be measured and any cost implications thereof vi. results and findings of the risk assessment vii. an explanation of changes to the risk assessment results as applicable in annual updates to the plan;	[8]
(f) a description of the methods to decommission each prospecting or mining component and the mitigation or management strategy proposed to avoid, minimize [sic] and manage residual or latent impacts;		(3)(f) Closure actions— ii. development and maintenance of a list and assessment of threats and opportunities and any uncertainties associated with the preferred closure option, which list will be used to identify and define any additional work that is needed to reduce the level of uncertainty		[9]
		(3)(c) iii. an identification of conceptual closure strategies to avoid, manage and mitigate the impacts and risks (3)(d) Design principles including— iii. a description and evaluation of alternative closure and post closure options where these exist that are practicable within the socioeconomic and environmental opportunities and constraints in which the operation is located vii. detailed description of the assumptions made to develop closure actions in the absence of detailed knowledge on site conditions, potential impacts, material availability, stakeholder requirements and other factors for which information is lacking (3)(f) Closure actions— i. the development and documenting of a description of specific technical solutions related to infrastructure and facilities for the preferred closure option or options, which must include all areas, infrastructure, activities and aspects both within the mine lease area and off of the mine lease area associated with mining for which the mine has the responsibility to implement closure actions;		
		(3)(c) iv. a reassessment of the risks to determine whether, after the implementation of the closure strategy, the residual risk has been avoided and / or how it has resulted in avoidance, rehabilitation and management of impacts and whether this is acceptable to the mining operation and stakeholders		[8]
		(3)(h) an indication of the organisational capacity that will be put in place to implement the plan, including- i. organisational structure as it pertains to the plan ii. responsibilities		[10]

MPRDA and GN527 of 2004	GN1147 of 2015			[Relevant section of this document]
	ARP (App 3)	FRDC Plan (App 4)	ERA Report (App 5)	
		iii. training and capacity building that may be required to build closure competence		
(g) details of any long-term management and maintenance expected;		(3)(d) design principles, including- v. definition and motivation of the closure and post closure period taking cognisance of the probable need to implement post closure monitoring and maintenance for a period sufficient to demonstrate that relinquishment criteria have been achieved (3)(g) Schedule of actions for final rehabilitation, decommissioning and closure which will ensure avoidance, rehabilitation, management of impacts including pumping and treatment of extraneous water— i. linked to the mine works programme, if greenfields, or to the current mine plan, if brownfields ii. including assumptions and schedule drivers iii. including a spatial map or schedule, showing planned spatial progression throughout operations;	(3)(c) Management activities, including - i. monitoring of results and findings, which informs that adaptive or corrective management and/or risk reduction activities ii. an assessment of alternatives to mitigate or manage the impacts once the risk has become manifested, which must be focussed on practicality as well as cost of the implementation iii. motivation why the selected alternative is the appropriate approach to mitigating the impact iv. a detailed description of how the alternative will be implemented;	[7.2] and [7.3]
		(3)(l) Monitoring, auditing and reporting requirements which relate to the risk assessment, legal requirements and knowledge gaps as a minimum and must include— i. a schedule outlining internal, external and legislated audits of the plan for the year, including— (aa) the person responsible for undertaking the audit(s) (bb) the planned date of audit and frequency of audit (cc) an explanation of the approach that will be taken to address and close out audit results and schedule ii. a schedule of reporting requirements providing an outline of internal and external reporting, including disclosure of updates of the plan to stakeholders iii. a monitoring plan which outlines (aa) parameters to be monitored, frequency of monitoring and period of monitoring (bb) an explanation of the approach that will be taken to analyse monitoring results and how these results will be used to inform adaptive or corrective management and/or risk reduction activities	(3)(e) Monitoring, auditing and reporting requirements, which must include requirements prior to the manifestation of the risk and impacts as well as those once the impacts resulting from the manifestation of the risk are realised, inclusive of the approach that will be taken to analyse monitoring results and how these results will be used to inform adaptive or corrective management and/or risk reduction activities.	[11]
		(3)(j) Relinquishment criteria for each activity or infrastructure in relation to environmental aspects with auditable indicators		[11.4]
	(3)(d) an identification of shortcomings experienced in the preceding 12 months;			[12.2]
	(3)(e) details of the planned annual rehabilitation and remediation activities or measures for the forthcoming 12 months, including those which will address the shortcomings contemplated in (d) above or which were identified from monitoring in the preceding 12 months, and including— i. if no areas are available for annual rehabilitation and remediation concurrent with mining, an indication to that effect and motivation why no annual rehabilitation or remediation can be undertaken ii. where areas are available for annual rehabilitation and remediation concurrent with mining, annual rehabilitation and remediation activities related to previous disturbance or expected planned impacts and disturbance, as per the mine works programme, in the period under consideration, which should be tabulated and must indicate, but not necessarily be limited to, (aa) nature or type of activity and associated infrastructure (bb) planned remaining life of the activity under consideration (cc) area already disturbed or planned to be disturbed in the period of review (dd) percentage of the already disturbed or planned to be disturbed area available for concurrent rehabilitation and remediation activities (ee) percentage of the already disturbed or planned to be disturbed area available as per (d) and on which concurrent rehabilitation and remediation can be undertaken (ff) notes to indicate why total available or planned to be available area differs from area already disturbed or planned to be disturbed (gg) notes to indicate why concurrent rehabilitation will not be undertaken on the full available or planned to be available area (hh) details of rehabilitation activity planned on this area for the period of review			[12.3]

MPRDA and GN527 of 2004	GN1147 of 2015			[Relevant section of this document]
	ARP (App 3)	FRDC Plan (App 4)	ERA Report (App 5)	
	(ii) the pertinent closure objectives and performance targets that will be addressed in the forthcoming year, which objectives and targets are aligned to the final rehabilitation, decommissioning and mine closure plan (jj) description of the relevant closure design criteria adopted in the annual rehabilitation and remediation activities and the expected final land use once all rehabilitation and remediation activities are complete for the activity or aspect;			
(e) a summary of the results of progressive rehabilitation undertaken in accordance with the National Environmental Management Act, 1998 and the Environmental Impact Assessment Regulations, 2014;	(3)(f) a review of the previous year's annual rehabilitation and remediation activities, indicating a comparison between activities planned in the previous year's annual rehabilitation and remediation plan and actual rehabilitation and remediation implemented, which should be tabulated and as a minimum contain— i. area planned to be rehabilitated and remediated during the plan under review ii. actual area rehabilitation or remediated; and iii. if the variance between planned and actual exceeds 15%, motivation indicating reasons for the inability to rehabilitate or remediate the full area; and			[12.2]
(h) details of a proposed closure cost and FP for monitoring, maintenance and post closure management; in accordance with the National Environmental Management Act, 1998 and the FP Regulations, 2015.	(3)(g) costing	(3)(k) Closure cost estimation procedure, which ensures that identified rehabilitation, decommissioning, closure and post closure costs, whether on-going or once-off, are realistically estimated and incorporated into the estimate	(3)(d) Costing, calculated using the current value of money and no discounting or net present value calculations included in the determination of the quantum of the liability	[13]
		(3)(d) design principles, including- vi. details associated with any on-going research on closure options		[14]
		(3)(i) An indication of gaps in the plan, including an auditable action plan and schedule to address the gaps		[14]
		(3)(c) v. explanation of changes to the risk assessment results as applicable in annual updates to the plan		NA
		(3)(m) Motivations for any amendments made to the final rehabilitation, decommissioning and mine closure plan, given the monitoring results in the previous auditing period and the identification of gaps		NA
(k) technical appendices				NA

5 ENVIRONMENTAL AND SOCIAL CONTEXT

This section details the pre-mining and current environmental and social contexts that may influence closure activities.

5.1 Aesthetic quality

The topography of the study area and surrounding region is fairly flat. The project area is located within an area that has largely been transformed from grassland to maize agriculture. Remnants of old mining activities are present to the north-west of the project area. The current cultural landscape can be described as a small-town farming community with a moderate scenic quality.

Closure recommendations

- Closure and rehabilitation should allow for the area to be restored to a landscape considered visually acceptable.
- Ensure all unnecessary infrastructure is removed during decommissioning.
- Spread soil over areas to be rehabilitated. The topography of the project site should be rehabilitated to match a condition similar to the pre-mining state. The area where the surface infrastructure is to be removed will be returned to grazing land.
- The TSF should be vegetated to blend into the natural environment.
- Environmental monitoring should be conducted post-closure to ensure that a rehabilitated area as close as possible to pre-mining state is reached and that the visual impacts of the mine are as minor as possible.

5.2 Air quality

Baseline dustfall rates close to or within the residential areas of Hennenman and Phomolong exceed the residential limit (600 mg/m^2/day), particularly during October. It is thought that these elevated rates are due to agricultural activities (ploughing) in the vicinity coinciding with the occurrence of high wind speeds.

The dustfall rates far west of the proposed surface infrastructure (±5 km away) were elevated for all three sampling months (>1 300 mg/m^2/day). Dustfall rates in the vicinity (within a 2 km radius) of the proposed surface infrastructure vary. The sites to the east and west of the proposed surface infrastructure recorded elevated rates (>1 190 mg/m^2/day) for all three months. The site south of the proposed surface infrastructure area recorded elevated rates (2 580 mg/m^2/day) during October, but acceptable rates (<600 mg/m^2/day, in the residential band) for November and December. The site south-west of the proposed infrastructure recorded more acceptable dustfall rates for all months (<700 mg/m^2/day).

Closure recommendations

- Gold One Africa must notify the Minister five years prior to mine closure of the planned closure and provide a closure and rehabilitation plan for the prevention of pollution of the atmosphere by dust after operations have ceased.
- The area must be fully rehabilitated and vegetation must be self-sustaining to prevent bare areas which are susceptible to wind erosion.

5.3 Terrestrial ecology

The project area falls within the Central Free State Grassland and the Vaal-Vet Sandy Grassland vegetation types which are listed as Vulnerable and Endangered ecosystems respectively in terms of Section 52 of the NEMBA. However, according to the terrestrial ecology survey conducted in 2013, there are no longer any natural areas of the Vaal-Vet Sandy Ecosystem remaining within the project area as the entire area has been cultivated. The area where the proposed TSF is to be located falls within the Central Free State Grassland, and although disturbed, can be considered as semi-natural vegetation.

Vegetation communities in the semi-natural terrestrial grasslands comprised of *Acacia* Thornveld, *Searsia lancea* Bushclump, *Eragrostis* Disturbed Grassland, *Themeda - Aristida* Sandy Red Soils, *Themeda* Dominated Grassland, some areas showing past tillage, *Themeda- Eragrostis* Clay Rich Soils and the transformed areas where *Asparagus* Dominated. Four broad habitat types, as applicable to fauna, were identified in the area namely Thornveld, Disturbed Thornveld, Wetlands/Dams and Croplands.

One Provincially protected species was identified within the study area (but outside of the infrastructure footprint) namely a *Nerine* species. All indigenous species of true ferns excluding *Pteridium aquilinum* (bracken) and are considered to have conservation significance. The main fern species found within the study area (including the infrastructural area) was a *Riccia* species. There were numerous fungi species recorded within the field investigations which are of importance in terms of medicinal use. *Termitomyces microcarpus* and *Scleroderma flavidum* have medicinal uses.

Alien invasive species were identified on site but mainly within disturbed areas where soils have been exposed or where anthropogenic activities occur. Over 18 species were recorded with 3 species listed as Category 1b invasives requiring control through an invasive species management programme. The Category 1 species *Cirsium vulgare* (Scottish Thistle) was located within the moist environments along the wetlands and moist grasslands. The Category 1 *Tamarix chinensis* (Salt Cedar) was located within the old excavations of the Lime Quarry and *Xanthium spinosum* (Spiny Cocklebur) (Category 1) was recorded along the edges of disturbed areas such as the crop fields and wet areas.

According to the Free State Biodiversity Plan (2015), the site is not listed as a CBA or ESA. However, a portion of the proposed pipeline route and the area where the proposed discharge point is to be located are located within a CBA.

The project area is classified as degraded (cultivated areas) or other (remaining natural areas). Maize farming is the current and major land use, with grazing of natural areas being the secondary land use. The area where the TSF is to be located, although heavily grazed, could still be represented by isolated pockets of natural areas and indigenous vegetation, with variations of species composition due to current and historical impacts of grazing. The area has long been transformed to a large extent (58%) by large-scale cultivation practices. Additional existing impacts include historical lime quarrying in an area traversed by a portion of the pipeline and the harvesting natural resources is also expected due to the proximity of the site to informal settlements.

The area has been classified as having a low to moderately high sensitivity. A rating of Moderate sensitivity was assigned to Thornveld associated with the pipeline route (for red-listed rodents, large terrestrial birds, raptors and bullfrogs). Moderate–Low and Very Low importance ratings were, respectively, ascribed to Disturbed Thornveld (for a similar species assemblage in suboptimal thronged) and Croplands (for coursers and small carnivores). Evidently, despite being largely transformed, the site maintains, at least, some capacity to support conservation important fauna.

Closure recommendations

- A Rehabilitation Plan should be compiled as part of the Biodiversity Management Plan
- The use of herbicides is not recommended and all alien plant species should be removed mechanically
- Ensure that areas cleared for the construction of the pipeline and flow diffusing infrastructure are stabilised after construction to prevent erosion
- Remove all pipeline infrastructure
- If a service road was created, till it with a rotovator to loosen the soil surface
- Remove any culverts, gabions, concrete slabs or flow attenuation structures that were constructed
- Landscape and revegetate using locally indigenous wetland seed mixes and whole plant transplanting for source material along Rietspruit
- Effectively rehabilitate contaminated areas with advice from an appropriate specialist
- Ensure that all waste (including building rubble, general and domestic waste, fuel, explosives) is removed
- Alien invasive vegetation eradication and monitoring must continue
- The recovery of vegetation must be monitored
- Rehabilitation of the TSF:
    - Rehabilitate the TSF, stockpiles and other disturbed areas as soon as possible
    - Obtain guidance from gold tailings rehabilitation specialists before commencing
    - The proper establishment of vegetative cover depends mainly on the selection of plant species that will grow, spread and thrive under the hostile conditions provided by the nature of dump material. The revegetation of tailings dams requires some preparatory measures prior to vegetating. Preparatory measures should look at altering these conditions through potential liming and leaching
    - Effective windbreaks will need to be set up; this is to prevent vegetation being buried by sand on the slopes
    - Tailings materials will need to be turned into a medium favourable for plant growth by addressing the chemical, physical and biological deficiencies of the media
    - Re-vegetate using stockpiled soil (if available) and locally indigenous flora. Annuals and legumes must be included in the seed mixture to produce plant debris after a short time. This will improve the organic matter content
    - Avoid rock cladding as this could cause erosion and slumping. (Rock cladding is normally limited to TSFs with slopes of more than 50°)
    - Monitoring through an effective tool such as the Landscape Function Analysis.

5.4 Aquatic ecology

The river system is classified as a perennial system which is in a largely modified state due to local land uses and anthropogenic activities. The Rietspruit system is also considered to be critically endangered. The aquatic ecology study area comprised of four sampling sites including the reach of the Rietspruit and a local dam on the river.

The present ecological status category for the system is described as largely modified (Class D). The attainable ecological management class for the system is a Class C (moderately modified).

The quality of water (*in situ*) within the Rietspruit system is in a modified condition. This is as a result of anthropogenic activities with particular reference to the discharge of treated sewage water into the system.

The ecological status of the Rietspruit system was determined to be in a seriously modified state. This is an indication that the loss of natural habitat, biota and basic ecosystem functions is extensive.

5.5 Groundwater

There are three aquifers associated with the project area:

- Aquifer 1: 0 – 50 m, upper Karoo aquifer, good-quality water utilised extensively by landowners
- Aquifer 2: 50 – 80 m, lower Karoo aquifer
- Aquifer 3: >80 m, Wits aquifer, generally poor-quality water

The Karoo aquifers are separated from the gold-bearing reefs by thick impermeable strata. During mining, no measurable dewatering impact is observed in the shallow Karoo aquifers. Whilst the groundwater quality of the Wits aquifers and deepest Karoo aquifers is expected to be of poor quality, the un-impacted shallow Karoo aquifers are of good quality when compared to drinking water standards. Groundwater levels in the Karoo aquifers vary between 0 m (e.g., around rivers and pans) and 30 m deep (in the higher lying regions), with an average depth of 10 m. Borehole depths ranged between 15 m and 100 m deep (typically between 35 m and 40 m deep). Water-strikes in the shallow zone aquifer range between 18 m and 42 m below surface.

5.5.1 Water quality – Karoo aquifers

All elemental concentrations in groundwater samples collected from the hydrogeological drilling and hydrocensus, fall within the indicated background quality range.

The background groundwater quality marginally exceeds the South African National Standards (SANS-241) for Domestic Use (2006) for NO_3. Elevated values in terms of EC, TDS, Na, Cl and SO_4 compared to the SANS-241 were observed in a few boreholes. No evidence could be found of surface activities which could impact the groundwater quality in the vicinity of these boreholes. The Cl concentration in one borehole exceeds the class one guideline concentration. It is expected that agricultural activities had a marginal influence on the natural background groundwater quality. The dominant anions and cations in the shallow Karoo aquifer are Alkalinity and Mg.

Compared to the shallow Karoo aquifers, the water quality of the deeper Karoo aquifer (i.e. immediately above the Wits) reflected much higher salt concentrations. These elemental concentrations exceed the indicated SANS-241 drinking water standards in almost all instances. The dominant anions and cations in the deeper Karoo aquifer are Na and Cl.

5.5.2 Water quality – Wits aquifer

Dedicated boreholes were drilled for water sampling in the Wits aquifer. The water quality concentrations recorded were as follows: EC ranged between 58 and 762 mS/m; Ca ranged between 13 and 112 mg/ℓ; Na ranged between 34 and 1936 mg/ℓ; Cl ranged between 11 and 2797 mg/ℓ; and SO_4 ranged between 1 and 129 mg/ℓ. These elemental concentrations exceed the indicated SANS-241 drinking water standards in almost all instances.

Closure recommendations

- To prevent the post-closure impacts resulting from decant, a groundwater model indicating areas for post-closure decant must be developed and updated during the LoM.
- The impact of decant can be mitigated by sealing the shaft system. The shafts must be sealed during decommissioning to ensure that lower quality water from the Wits Quartzites aquifer does not mix with water from the shallow Karoo aquifer.

- Although numerical groundwater models will be updated/ calibrated during the LoM, it is important that the design criteria for any mitigation measures be determined through numerical groundwater flow and transport modelling, at least two years prior to mine closure.
- Towards the end of the LoM, a groundwater study should be performed to determine whether the vertical shaft system should be sealed above the Wits quartzites. The purpose of the study should be to determine if such a seal is required to prevent the formation of a groundwater mixing zone (i.e. mixing of uncontaminated Karoo water and highly saline water from the Wits quartzites).
- Should further groundwater modelling investigations show that decant cannot be prevented, the decant points must be fitted with post-closure decant control dams/ passive treatment systems at expected decant points that can treat decant prior to discharge to the environment. Decant must be treated to the qualities stipulated by the DWS prior to discharge and must be discharged to the environment in a manner that prevents flooding.
- Groundwater monitoring must be conducted for two years post-closure to ensure that the groundwater levels within the Karoo aquifer are not being impacted.
- If salts are identified on the footprint areas, the expertise of a soil scientist should be called upon to assess the impact and decide on the need (and appropriate clean-up techniques/technologies) to rehabilitate the footprint areas prior to placement of topsoil.
- Soil capping of the TSF and WRD is recommended as it will result in less water and oxygen infiltration and subsequently less pyrite oxidation.

5.6 Soil, land use and land capability

A variety of soil types were identified for the project area. The soils can be grouped into two groups, namely heavy clay soils occupying areas dominated by grazing (i.e., Valsrivier) and sandy yellow soils occupying areas dominated by arable agriculture (i.e., Avalon, Clovelly and Westleigh soils respectively).

The topography and parent material within the project area do not differ substantially, with the result that the soils are fairly homogeneous throughout the area. The soils are mostly sandy, with poor structure. The arable soil has been cultivated for a long period of time, and the soil fertility is good due to amelioration using fertilisers.

The uncultivated clayey topsoil contains higher Carbon (C) content than the cultivated sandy counterparts, as C is mineralised by cultivation. The clayey uncultivated soils have higher Cation Exchange Capacity (CEC) than the cultivated sandy red soils in the project area. A low CEC reflects low soil clay and organic matter content, because CEC is a property of both clay and organic material. A low CEC also reflects the type of clay mineral present in the soil matrix. Low CEC is associated mainly with kaolinitic silicate clay minerals, which are generally considered as low activity clays. Low activity and CEC also imply a low natural fertility status because lower concentrations of nutrients can potentially be adsorbed by the soil matrix.

Presently, the area earmarked for the proposed surface infrastructure is used for agriculture - mixed arable and grazing. The cultivated lands are classified as arable Class II (Avalon and Westleigh soil forms) and Class III (Westleigh soil form). The grazing land is classified as Class V (Valsrivier soil form).

Class II has some limitations that reduce the choice of plants or require moderate conservation practices. Land in Class III has severe limitations that reduce the choice of plants or require special conservation practices, or both. Land in Class V has little or no erosion hazard but has other properties that limit its use largely to pasture, range, woodland or wildlife food and cover. Limitations restrict the kind of plants that can be grown and prevent normal tillage of cultivated crops.

Closure recommendations

- Stockpiled soil should be used to rehabilitate disturbed sites. The utilisable soil removed during the construction phase, must be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the approved post development end land use, and will attain a free draining surface profile. A minimum layer of 30 cm of topsoil should be replaced over the project area to return the area to a grazing post mining land use.
- Soil contaminated with hydrocarbons must be moved to an allocated area where it will be rehabilitated and soil that cannot be rehabilitated must be disposed of at an appropriate landfill facility.
- The fertility remediation requirements need to be verified at the time of rehabilitation and informed by the results of sampling. Input from a soil specialist should be obtained regarding fertility remediation requirements, which should be adhered to prior to re-vegetation. The chemical soil composition should be ameliorated to closely match the baseline values as far as possible, particularly for pH and EC.
- Rehabilitated areas should be cordoned off to limit equipment, human and animal movement on the rehabilitated areas.
- All areas susceptible to erosion must be monitored.
- Re-vegetation must be carried out and must include the implementation of soil saver and hydro seeding on the TSF.
- Monitor the recovery of vegetation annually for a period of two years following rehabilitation.

5.7 Socio-economic

The project area lies within the Lejweleputswa District Municipality (LDM) which is one of the 5 districts of Free State province.

Mining plays an important role in the region, with mining and quarrying being the dominant employment category (approximately 43 %) in the LDM and the Matjhabeng Local Municipality (MLM). Other employment categories in the region include finance, insurance, real estate and business services; community, social and personal services; wholesale and retail trade; catering and accommodation; and general government.

The population of the MLM is approximately 428 000, with 123 195 households (Community Survey, 2016 and StatsSA, 2011). The majority of the households (97.7 %) are located in urban settlements. The MLM consists of 36 wards. The municipality does not contain any tribal areas. The major towns are Allanridge, Hennenman, Odendaalsrus, Ventersburg, Virginia and Welkom. A total of 99 650 people are employed, 13 290 are discouraged work-seekers and 58 524 people are unemployed, making the unemployment rate in MLM stand at 37 %.

5.7.1 Local context

The Ventersburg Gold Mine is located within in Ward 3 of MLM near Phomolong, Hennenman, Mmamahabane and Ventersburg. Phomolong is located in Ward 2, while Mmamahabane and Ventersburg are located in Ward 1. The Phomolong, Hennenman, Mmamahabane and Ventersburg areas are largely urban.

5.7.2 Proposed surface infrastructure footprint

Most of the proposed surface infrastructure is located on a commercial agricultural and livestock farm. The farm is owned by the Vogel family, which is currently the fifth generation to farm on this land. The farm is primarily used to cultivate maize and breed cattle for commercial purposes.

Farming activities provide employment for 20 to 30 individuals, although this number varies, depending on the season. Each of these employees has several dependents, which substantially increases the number of

people dependent on the incomes earned by the farmworkers. Several families of farmworkers reside in dwellings on the farms. The inhabitants of these dwellings do not own the property but have a longstanding housing arrangement with the landowner. There are eight farmworker dwellings, most of which have access to electricity, pit latrines, and water pumped from a borehole.

5.8 Surface water

The project area is located within the C42J quaternary catchment, in the Middle Vaal Water Management Area (WMA). There are several perennial streams bordering the project site in the northern and the southern parts. The northern part of the project area is drained by the Rietspruit, a perennial stream flowing along the northern part of the project site in a south westerly direction through the Whites Dam. The Rietspruit flows approximately 1.5 km to the north of the proposed surface infrastructure area.

There are no rivers or streams within the footprint of the proposed surface infrastructure or in proximity thereto. However, there is evidence of a drainage line in proximity to the proposed TSF location. Drainage lines cannot be classified as watercourses in terms of floodline analysis due to the fact they have been heavily modified by the cultivation of maize fields downstream. A flood line analysis was therefore not conducted as the outcome would be inaccurate showing unnaturally wide flood lines where the water would flow at a depth of 1 or 2 mm.

The pre-mining water quality of the Rietspruit can be classified as Class II for the sampling point SW01 and Class I for sampling point SW02 which is suitable for drinking water. The quality of the water at the sampled sites is therefore acceptable for the predominant land and water use in the catchment.

Closure recommendations

- The decommissioning contractors hired must be experienced and accredited for the decommissioning and disposal of different materials at disposal facilities. The company should be able to provide final safe disposal certificates to the mine.
- Areas where there has been a leakage of hazardous and hydrocarbon containing materials must be cleaned up and the decommissioning process must include cleaning of the soil ensuring that there are no contaminants left behind. In-situ treatment products are also available on the market.
- The demolishing of the isolation berms will result in the runoff reporting to the catchment. Contouring of the surface must be implemented to ensure that the site is free draining and that no damming of surface water will occur.
- The TSF must be successfully rehabilitated and pollution control facilities left in place post-closure.
- Monitoring of surface water resources for at least three years post-closure must be implemented to ensure that there is early detection of impacts that can trigger implementation of mitigation measures.

5.9 Radiation

The natural background readings measured along the unpaved road from the main farm entrance to the core shed are approximately 130 cps. This is typical of soils in the area not impacted by any mining activity. Elevated levels can be measured on the paved R70, which suggests that waste rock from existing mines in the area was used as aggregate for its construction.

An extensive baseline survey to determine the existing background radiation levels has not yet been conducted. This will be required prior to construction as part of a submission for a Certificate of Registration in terms of the National Nuclear Regulator Act No. 47 of 1999 before mining can commence.

Radiation levels on material collected during the exploration phase provide an indication of the extent of radiological hazards during mining and following mine closure. Core samples stored in a shed at the site were surveyed for gamma radiation. Two core samples representative of the reef to be mined in future showed fairly high radiation associated with it. The background radiation measured in the shed (at a distance of a few meters away from the core samples) is approximately 400 cps (counts per second). This background reading can be compared with the highest reading of 3385 cps measured on small sections of core samples. Bulk volumes of the ore during mining may present significantly elevated radiation levels and potentially high levels of radon in the underground working environment.

Closure recommendations

The TSF and RWD must be fenced to prevent public access.

The baseline study will be used as reference values for closure and rehabilitation and be required for NNR regulatory purposes. The mine design must ensure compliance with the radiation dose constraint long after closure of the mine. To achieve this objective, the design bases of the TSF and WRD require consideration of some basic principles, e.g.:

- Dispersion and stabilization control to ensure confinement and long-term stability of stockpiles and TSF
- Erosion control to minimize surface water and soil contamination to ensure long term integrity
- Control radiation and release of radioactive dust and radon to reduce the dose to the population
- Implement closure options minimizing institutional control and maintenance; and
- Use of passive barriers to confine release of contaminants to the environment.

5.10 Wetlands

In 2012, wetland areas were identified, delineated and described according to their respective hydro-geomorphic units. A total of four hydro-geomorphic (HGM) types of natural wetland systems occur within the project area. The HGM units are located further than 70 m from the boundary of the proposed surface infrastructure. The four HGM units identified for the project area include:

- Non-perennial pans
- Hillslope seepage wetlands connected to a watercourse
- Valley bottom without a channel
- Valley bottom wetlands with a channel.

The assessment of the ecosystem services supplied by all four wetland type HGM units determined that the majority of the services provided by the systems were of an intermediate importance including services such as maintenance of biodiversity; erosion control; toxicant and nitrate removal; phosphate and sediment trapping; and flood attenuation. The hillslope seepage wetland connected to a watercourse was found to be the wetland unit to provide services predominantly of a moderately high importance and these are associated with the maintenance of biodiversity and the enhancement of water quality.

The Present Ecological State (PES) of the wetland units varied from the moderately modified (PES Category C) hillslope seepage and non-perennial pans to critically modified (PES Category F) valley bottom without a channel wetland. Modification to the systems is as a result of land uses which have encroached into the wetland areas, altering the hydrology of the system as well causing a loss to suitable habitat for biodiversity. Some of the impacts identified within the project area include damming, overgrazing, encroachment of croplands into wetland areas and drainage of pans. The extent of some of the impacts has led to a total loss

of biodiversity in the valley bottom without a channel wetland area and a change in hydrological regime as a result of head-cut erosion.

In 2017, the wetland areas in proximity to the pipeline route and discharge point were identified. Naturally the gently undulating landscape within the surrounding area would have been comprised of a matrix of pans and seeps draining in a north-westerly direction towards the Rietspruit. However, extensive crop cultivation has long dominated land use practices in the region, with most wetlands having been partially or completely transformed by tillage and drainage practices. Three wetland HGM units were identified along the proposed pipeline route namely Rietspruit Floodplain (HGM Unit 1), Seasonal Depression (HGM Unit 2) and Hillslope Seep (HGM unit 3). The Floodplain is located approximately 40 m from the discharge point and the Hillslope Seep is located approximately 50-60 m from the mine infrastructure.

Closure recommendations

- Remove all pipeline infrastructure and any culverts, gabions, concrete slabs or flow attenuation structures that were constructed.
- Till service road with a rotovator to loosen the soil surface.
- Landscape and re-vegetate using locally indigenous wetland seed mixes and whole plant transplanting for source material along the Rietspruit.
- During the initial biannual monitoring survey during decommissioning, the specialist must provide recommendations on where disturbed wetland areas must be rehabilitated and the procedure to be followed.
- During the final biannual monitoring survey at completion of decommissioning, the specialist must sign off that all affected wetland areas have been adequately rehabilitated.
- Monitor progress of rehabilitation on a quarterly basis for three years post-closure.

6 CLOSURE-RELATED ISSUES

Public participation was conducted as part of the EIA process. The EIAR and EMPr, and the Closure Plan were available during the EIA phase, for comment during the period 2 June 2017 to 4 July 2017. The stakeholder issues and comments as related to closure and raised during the public participation process, are detailed in Table 4.

Table 4. Closure related issues raised during public participation

Infrastructure area	Issues raised	Where addressed in this plan
Ventersburg Gold Mine as a whole	Impact on adjacent farm owners	The proposed mine will have a negative visual impact on the receiving environment within a 10 km radius and will contribute to permanently altering the current sense of place to one of mixed mining and maize farming as the WRD and TSF are to be remain on site post-closure.
Underground mining	• Impact on groundwater levels • Dewatering and treatment post-closure • Decant and flooding post-closure • Water treatment facility post-closure	• Limited dewatering of the surrounding Karoo aquifer may occur within a 200 m radius of the shafts (restricted to the RE of the farm Vogelsrand 720). No boreholes were identified in this area, and therefore no groundwater users will be impacted by the localised reduction in groundwater levels. During construction and operation, high-yielding fissures, faults and dykes will be sealed to reduce inflow. Groundwater monitoring will be conducted throughout the LoM and for two years post-closure to ensure that the groundwater levels within the Karoo aquifer are not being impacted. • No dewatering and treatment of groundwater will take place post-closure as it will not be required. The water treatment plant will therefore be removed from site. The shafts will be sealed to ensure that lower quality water from the Wits Quartzites aquifer does not mix with water from the shallow Karoo aquifer. • It is unlikely that decant will occur, however groundwater modelling will be conducted during operations to confirm this. The commitment to install decant control dams and passive treatment systems at expected decant points, should investigations show that it is likely that decant will occur, is included in this Closure Plan. Commitments to ensure that decant is treated to qualities stipulated by DWS prior to discharge (and discharged to the environment in a manner that prevents flooding) are also included in this Closure Plan.
Rehabilitated surface infrastructure area and the TSF	Health impacts of dust and radiation post-closure	Dust and fine particulates from the TSF if planned rehabilitation (vegetation) is unsuccessful. However, if planned rehabilitation is successful then no significant impacts on air quality or potential associated health impacts are expected. The commitment to successfully rehabilitate the surface infrastructure area and the TSF has been included in this Closure Plan to prevent health impacts related to dust and radiation.
Ventersburg Gold Mine as a whole	Impacts on the local economy post-closure	A community strategy will be put in place towards supplementing and supporting the commitments made in the SLP including the LED commitments and the bursary commitments during the LoM. The aim of the strategy is to ensure sustainable job creation, entrepreneurship, and self–reliance on the part of the beneficiaries to mitigate the impacts of mine closure.

6.1 Future public engagement

Meetings should be held with the landowner and authorities to determine whether the planned end land use is acceptable.

A stakeholder engagement plan (including a grievance mechanism), to provide a defined process for two-way communication between the community and the Mine must be compiled. The grievance mechanism must prescribe methods for community members to raise complaints (anonymously if they so choose). Complaints must be responded to and addressed effectively. Response methods and timeframes must be specified in the grievance mechanism. Interested and Affected Parties must be notified of the stakeholder engagement plan and grievance mechanism.

7 CLOSURE VISION AND OBJECTIVES

The main objective will be to return the area to an acceptable end land use in line with planning objectives (i.e., grazing land). The extent to which the closure objectives are aligned with the baseline environment is provided in Table 5. The overarching environmental objectives include:

- All surface infrastructure must be removed, apart from infrastructure determined to be required for residual pollution control at the TSF and WRD which is to remain in situ (must meet the requirements of GN704 of 1999)
- The rehabilitated landform must be free draining and adhere to applicable best practice in terms of water management for mine closure (currently the 2006 DWA Best Practice Guideline)
- Runoff and seepage from rehabilitated areas must not exceed applicable standards
- Dust generated from the WRD, TSF and denuded areas, prior to vegetation establishment, must adhere to applicable limits (currently the National Dust Control Regulations, GN827 of 2013)
- The soil must be considered uncontaminated according to applicable legislation (currently Part 8 of Chapter 4 of the National Environmental Management: Waste Act, No. 59 of 2008 {NEMWA})
- Vegetation across the rehabilitated footprint must be established, self-sustaining and suitable for grazing
- Successfully rehabilitate the surface infrastructure area and the TSF
- Develop a landscape that is aesthetically acceptable (i.e., as inconspicuous as possible in relation to the existing landscape)
- Ensure that the land is acceptable for the end land use in line with the recommended land use (i.e., grazing land) and as agreed with the Competent Authority
- The rehabilitated areas must ultimately be rendered safe for the nearby communities and animals (i.e., the area is stable and that shafts are sealed effectively), for the foreseeable future in compliance with relevant standards (currently the Occupational Health and Safety Act No. 85 of 1993 and relevant Regulations)
- Ensure adherence to local, provincial and national regulatory requirements

Table 5. Alignment of the closure objectives with the baseline environment

Closure objectives	Extent to which aligned to baseline environment
Developing a landform that is free draining, with established, self-sustaining vegetation	• The topography will be reshaped to ensure that the area is free draining to represent the baseline state • Vegetation rehabilitation and monitoring will be conducted to ensure that vegetation is self-sustaining
Developing a landscape that is aesthetically acceptable in relation to the existing landscape	• Shafts will be sealed • Landform will be stabilised • All infrastructure will be removed • All waste will be removed • Surface infrastructure area, TSF and WRD will be re-vegetated and successfully rehabilitated
Ensuring that the land is acceptable for the end land use in line with planning objectives (i.e., grazing)	• Disturbed areas will be rehabilitated to suit grazing land use • Disturbed areas will be rehabilitated to grazing potential
Ensuring community safety	• Shafts will be sealed • Landform will be stabilised • All infrastructure (apart from the TSF, WRD and residual pollution control facilities) will be removed • All waste will be removed

7.1 Sustainable end state / final land use

The TSF and WRD are to remain in place at closure. Infrastructure for residual pollution control will remain post-closure. The final end land use for the disturbed areas where the remainder of the infrastructure is to

be removed is the pre-mining land use i.e., low intensity grazing where appropriate based on the pre-mining soil potential. Refer to Figure 3 for the final land use map.

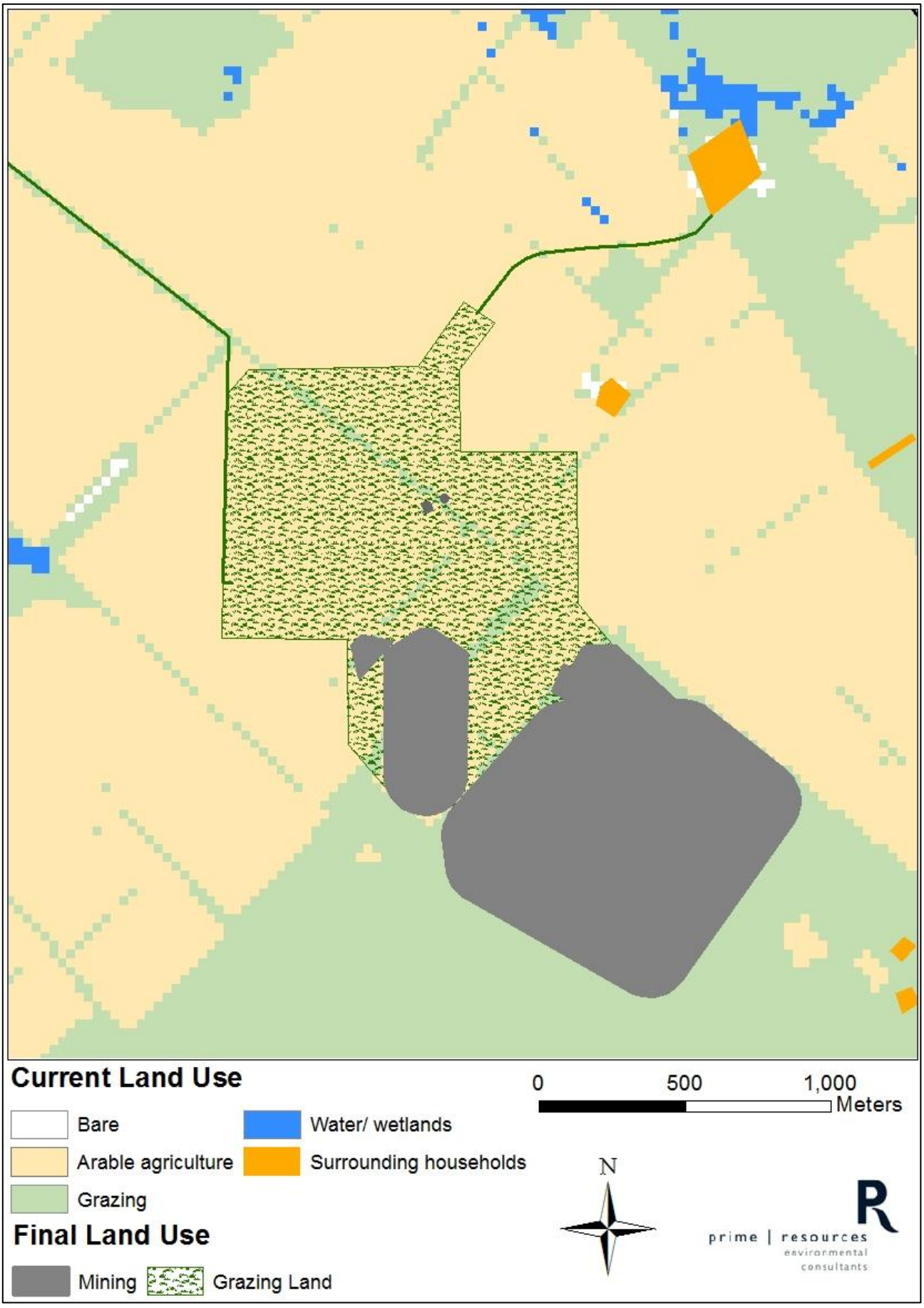

Figure 3. Final land use for the Ventersburg Gold Mine

7.2 Closure alternatives

There are no closure alternatives. All surface infrastructure, apart from the TSF, WRD and infrastructure determined to be required for residual pollution control, is to be removed from the Ventersburg Gold Mine.

7.3 Implementation schedule for closure and rehabilitation

The mining activities will cease in year 17, after which decommissioning and rehabilitation will be undertaken. A closure period of one year is assumed to account for decommissioning and 3 years for full rehabilitation.

Rehabilitation action	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 - 21
Terrace and vegetate side-slopes of TSF																			
Underground mining activities cease																			
Topsoil inventory																			
Preliminary soil fertility monitoring																			
Removal of surplus hazardous material and all waste from the operational phase																			
Assessment of structural integrity / stability of underground supports																			
Removal of all material from the underground workings																			
Sealing of shaft excavations																			
Demolition of surface infrastructure not remaining post-closure (water management infrastructure to be decommissioned last)																			
Removal of all salvageable material and demolition waste																			
Polluted water in pollution control dams, water storage facilities processed																			
Water management infrastructure to be decommissioned																			
Contaminated land assessment and remediation																			
Rehabilitation of disturbed footprint, TSF and WRD																			
Assessment of structural integrity / stability (TSF, WRD and infrastructure to remain *in situ* for residual pollution control)																			
Vegetation establishment																			
Rehabilitation and post closure monitoring																			
Submit application for closure certificate																			

8 ENVIRONMENTAL RISK ASSESSMENT

8.1 Risk identification and closure strategies

The potential risks relating to the closure and rehabilitation activities at the Ventersburg Gold Mine are detailed in Table 6, per environmental attribute. The relevant closure actions to achieve the closure strategies are detailed in Section 9.

Table 6. Closure risks and closure strategies

Closure risk	Closure strategy
Aesthetic quality	
The WRD and TSF will remain permanent features of the landscape upon closure and will alter the landscape character of the surrounding area.	To rehabilitate the area to have a minimal visual impact: the visual impact of the WRD must be minimised by improving the colour of the WRD, establishing vegetation on the crests and minor landscaping of the upper surface and side slopes; the TSF is to be terraced and vegetated throughout the LoM thereby reducing the amount of rehabilitation required at closure. The remaining bare areas of the TSF are to be vegetated at closure.
Air quality	
Dust may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation. Fine particulates may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation which may result in health impacts at sensitive receptors. Wind erosion across the TSF is expected to be the most significant source of particulate emissions post-closure if planned rehabilitation is unsuccessful.	The WRD as well as the TSF, which are to remain in situ post-closure, are to be rehabilitated in such a way as to withstand long-term wind erosion. This can be achieved through re-vegetation of the crest and side slopes. All the areas disturbed by mining must also be successfully rehabilitated (i.e. re-vegetated with self-sustaining indigenous vegetation).
Biodiversity – Terrestrial ecology	
The TSF and WRD could result in environmental contamination (specifically groundwater through seepage and air quality as a result of dust). Environmental contamination could have a far-reaching impact on habitats and fauna.	TSF and WRD will be lined as per legislative requirements and will be adequately rehabilitated (capping and vegetation of the WRD and TSF).
Unsuccessful vegetation rehabilitation and growth of alien invasive species.	Successful rehabilitation using indigenous species and eradicating alien invasive species. Vegetation rehabilitation must be monitored seasonally over at least 2 growing seasons (2 years) by a qualified ecologist / botanist to ensure optimal species diversity within the rehabilitated areas and to ensure that the rehabilitated areas are self-sustaining. The removal of any alien invasive plant species must be conducted as per the instructions of the botanist (mechanical removal methods are preferred) for two years post-closure.
Groundwater	
Mixing of groundwater from shallow and deep aquifers may result in a decrease in groundwater qualities. Decant may have a negative impact on surface water resources.	Seal the shaft above the Wits quartzites, unless determined otherwise. Towards the end of the LoM, a groundwater study should be performed to determine whether the vertical shaft system should be sealed above the Wits quartzites. The purpose of the study should be to determine if such a seal is required to prevent the formation of a groundwater mixing zone (i.e. mixing of uncontaminated Karoo water and highly saline water from the Wits quartzites). Should further groundwater modelling investigations show that decant will not be able to be prevented, the decant points must be fitted with post-closure decant control dams/ passive treatment systems at expected decant points that can treat decant prior to discharge to the environment. Decant must be treated to qualities stipulated by DWS prior to discharge and must be discharged to the environment in a manner that prevents flooding. Groundwater levels and quality to be monitored for at least 2 years post closure.
The TSF and WRD are to remain in situ post-closure and may result in groundwater contamination through seepage of contaminated runoff.	If salts are identified on the footprint areas, the expertise of a soil scientist should be called upon to assess the impact and decide on the need (and appropriate clean-up techniques/technologies) to rehabilitate the footprint areas prior to placement of topsoil. Soil cap the TSF and WRD as it will result in less water and oxygen infiltration and subsequently less pyrite oxidation.

Closure risk	Closure strategy
	Calcitic lime could be added in the final 5 m - 20 m of the tailings to prevent acidification. An excess of lime could be added to the tailings in the processing plant. Ensure that all contaminated water arising at the TSF and WRD is contained.
Radiation	
The release rate of radon from a dry TSF is higher than that of an operational TSF which will have a large surface area covered by water. The likelihood for increased dust also becomes greater after closure. The TSF will remain radioactive far into the future and the radiological hazard in terms of public safety and environmental impact may increase if rehabilitation (i.e. re-vegetation) is unsuccessful. Increased radiation exposure to surrounding residents may occur from wind erosion across the TSF.	The TSF and RWD must be fenced to prevent public access. The mine design has to ensure compliance with the radiation dose constraint long after closure of the mine. Provided rehabilitation of the TSF is successful, the dose will decrease with time after closure. The TSF must be successfully capped and vegetated.
Soil and land capability	
Soil erosion in disturbed denuded areas and soil stockpiles, prior to vegetation re-establishment, may occur as result of stormwater runoff and wind erosion. Erosion will negatively impact the soil potential and subsequently the final land capability.	Soil potential is to be acceptable for the end land use (i.e., grazing land) by implementing erosion control measures, prior to vegetation establishment. All areas susceptible to erosion must be monitored annually and repair, maintenance and prevention measures implemented (if erosion is noted) for a period of 2 years post-closure.
Socio-economic	
At closure the unemployment rate in the area will increase.	The provisions of the Social and Labour Plan (SLP) relating to minimizing the negative impact of retrenchment must be implemented to mitigate this eventuality.
Any permanent depressions or excavations remaining on site, any waste or hydrocarbons left on site and access to water management infrastructure to remain on site for residual pollution control pose a health and safety risk to residents of surrounding communities and animals in the area.	The rehabilitated areas must ultimately be rendered safe for the nearby communities and animals.
Post-closure wind erosion across bare areas, should rehabilitation not be successful may result in dust, which may have air quality impacts and increased exposure to radiation. The WRD and TSF to remain on surface may result in the pollution of groundwater resources and will alter the visual landscape character.	The TSF must be successfully capped and vegetated. The TSF and RWD must be fenced to prevent public access.
Surface water	
Once underground mining ceases, the flooding of underground workings will occur as the groundwater table re-establishes which may result in a pollution plume. Should decant occur and water qualities be unacceptable it may subsequently report to and pollute the Rietspruit catchment.	To prevent the post-closure impacts resulting from decant, a groundwater model indicating areas for post-closure decant must be developed and updated during the LoM. It is expected that the groundwater level in the shafts will stabilise to pre-mining levels post-closure and decant is unlikely due to the surface topography. The impact can be mitigated by sealing the shaft system during decommissioning to ensure that a mixing zone does not occur.
Should decant not be able to be prevented the decant points must be fitted with post-closure decant control dams/ passive treatment systems that can treat decant prior to discharge to the environment.	The commitment to install passive treatment systems at expected decant points is included in this closure plan.
The demolishing of the isolation berms will result in the runoff reporting to the catchment.	Contouring of the surface must be implemented to ensure that the site is free draining and that no damming of surface water will occur.
Overflow of pollution control infrastructure may result in pollution of the catchment and contamination and / or sedimentation of watercourses.	The TSF must be successfully rehabilitated and pollution control facilities left in place post-closure. Areas where there has been a leakage of hazardous and hydrocarbon containing materials must be cleaned up and the decommissioning process must include cleaning of the soil ensuring that there are no contaminants left behind. In-situ treatment products are also available on the market.
Any permanent depressions or excavations remaining on site will result in the area not being free-draining and thus preventing rainfall runoff from adequately recharging the catchment.	The landform in rehabilitated areas must be shaped to ensure that it is free draining.

Closure risk	Closure strategy
Sediment loads may enter downstream watercourses as a result of erosion in disturbed denuded areas and of the WRD from stormwater runoff, especially during the rainy season if denuded disturbed areas and the WRD is not adequately rehabilitated.	Implementing erosion control measures, prior to vegetation establishment and ensuring that the rehabilitation interventions are adequately implemented.
The above potential impacts (i.e. alteration in drainage patterns and contamination and / or sedimentation of watercourses) may subsequently disrupt the aquatic ecology of the impacted watercourses as well as negatively impact surrounding local communities using the water for domestic and agricultural purposes.	Implement aforementioned strategies. Monitor surface water resources for at least three years post-closure to ensure that there is early detection of impacts that can trigger implementation of mitigation measures

8.2 Uncertainties relating to the closure strategies

Throughout the LoM any uncertainties that may arise relating to closure must be described and potential closure strategies identified. It is expected that the groundwater level in the shafts will stabilise to pre-mining levels post-closure and decant is unlikely due to the surface topography, however there is a potential that decant may occur. Refer to Section 14.

8.3 Risk assessment

8.3.1 Methodology

The following assessment model was used for determination of the *significance* of closure related risks.

SIGNIFICANCE = (MAGNITUDE + DURATION + SCALE) X PROBABILITY

The maximum potential value for significance of an impact is 100 points. Closure related risks can therefore be rated as high, medium or low significance on the following basis:

High environmental significance	60 – 100 points
Medium environmental significance	30 – 59 points
Low environmental significance	0 – 29 points

Magnitude (M)	Duration (D)
10 – Very high (or unknown)	5 – Permanent
8 – High	4 – Long-term (ceases at the end of operation)
6 – Moderate	3 – Medium-term (2-8 years)
4 – Low	2 – Short-term (0-1 years)
2 - Minor	1 – Immediate
Scale (S)	**Probability (P)**
5 – International	5 – Definite (or unknown)
4 – National	4 – High probability
3 – Regional	3 – Medium probability
2 – Local	2 – Low probability
1 – Site	1 – Improbable
0 – None	0 – None

Many of the risks identified below may only manifest as a result of rehabilitation or system failure. The significance of the identified risks was determined using the above methodology. The individual risks were then reassessed to determine whether the residual impacts can be reduced or avoided by implementing the closure strategy (post-closure strategy values are indicated within square brackets). Refer to Table 7 below for the Ventersburg Gold Mine closure risk assessment.

Table 7. Assessment of the potential closure related risks associated with the Ventersburg Gold Mine

Environmental Attribute	Process	Risk	Magnitude	Duration	Scale	Probability	Significance	
							Rating	Value
Aesthetic quality	WRD and TSF will remain a permanent feature of the landscape upon closure	Alteration of the landscape character of surrounding area	6 [4]	5 [3]	2 [2]	5 [5]	High [Medium]	65 [45]
Air quality	Unsuccessful rehabilitation	Dust may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation	6 [6]	4 [3]	2 [1]	3 [2]	Medium [Low]	36 [20]
		Fine particulates may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation which may result in health impacts at sensitive receptors	8 [8]	4 [3]	2 [1]	3 [2]	Medium [Low]	42 [24]
Groundwater	Flooding of the underground workings and shafts to pre-mining levels for all aquifer units	Decrease in groundwater qualities through mixing of groundwater from shallow and deep aquifers	8 [8]	5 [3]	2 [2]	4 [1]	High [Low]	60 [11]
		Potential negative impact on surface water resources as a result of decant	10	5	2	5	High	85
	Seepage of contaminated runoff from the WRD and TSF	Potential contamination of shallow groundwater resources through seepage	8 [8]	5 [4]	1 [1]	5 [1]	High [Low]	70 [13]
Surface water	WRD and TSF to remain on surface post-closure	Overflow of pollution control infrastructure and pollution of the catchment	6 [6]	5 [3]	2 [2]	3 [2]	Medium [Low]	39 [22]
	The groundwater levels will stabilise post-closure	Potential decant and pollution of the catchment	10 [6]	5 [5]	2 [2]	3 [2]	Medium [Low]	51 [26]
Radiation	• Radon emissions from the TSF • Wind erosion across the TSF resulting in dust	Increased radiation exposure to surrounding residents	8 [2]	5 [3]	2 [2]	5 [3]	High [Low]	75 [21]
Biodiversity-Terrestrial ecology	TSF and WRD	Potential contamination of the environment as a result of seepage and / or dust	6 [2]	5 [4]	2 [1]	4 [2]	Medium [Low]	52 [14]
Soil and land capability	Increased stormwater runoff if re-establishment of vegetation is slow	Increase in soil erosion	8 [4]	5 [3]	1 [1]	4 [2]	Medium [Low]	56 [16]
	• Sealing of shafts • WRD, pollution control facilities to remain on site	Permanent loss of arable agriculture land	8	5	1	5	High	70
	Established TSF to remain on site	Permanent loss of grazing land	6	5	1	5	High	60
Socio-economic	Mine closure	Mine employees will be retrenched during decommissioning which will cause increased unemployment rate in the area	10 [10]	3 [2]	2 [2]	5 [4]	High [High]	75 [56]
	Rehabilitated TSF as tailings material dries out	Risk of TSF failure resulting in risk to surrounding life and damage to property and agricultural land on adjacent farms	4	5	1	2	Low	20

8.3.2 Outcomes

As indicated in Table 7, if the closure strategies are achieved through the implementation of the action plan the overall significance of most closure-related risks identified can be suitably managed to an acceptable degree. The following latent / residual risks were, however, identified which will be further evaluated in terms of the Environmental Risk Assessment Report:

- Dust may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation and fine particulates may be generated from wind erosion of exposed areas due to unsuccessful rehabilitation which may result in health impacts at sensitive receptors.
- Potential contamination of the environment may occur as a result of seepage and / or dust from the TSF and WRD. The failure to successfully rehabilitate disturbed areas or to maintain rehabilitated areas until vegetation fully re-establishes may result in a decrease in biodiversity in the long term, due to the establishment of grass monocultures, invasion by alien species and erosion. This will result in a permanent impact upon the disturbed area, unless management measures are implemented to remove alien vegetation and ensure indigenous vegetation is able to fully re-establish.
- Flooding of the underground workings may decrease groundwater qualities through mixing of groundwater from shallow and deep aquifers and there may be a potential negative impact on surface water resources as a result of decant.
- Potential contamination of shallow groundwater resources may occur through seepage from the TSF and RWD.
- Any permanent depressions or excavations remaining on site will result in the area not being free-draining and thus preventing rainfall runoff from adequately recharging the catchment. The landform in rehabilitated areas must be shaped to ensure that it is free draining.
- Mine employees will be retrenched during decommissioning which will cause an increased unemployment rate in the area.
- Accessing permanent water management infrastructure for residual pollution control may pose a health and safety risk to engineers or contractors, in charge of monitoring and maintenance, if health and safety procedures are not followed correctly.
- Prior to vegetation re-establishment, or as a result of failed rehabilitation, soil erosion in disturbed and denuded areas, including the TSF and WRDs remaining on site, may occur as a result of stormwater runoff and wind erosion.
- The TSF and WRDs will remain permanent features of the landscape post closure and thus will permanently alter the landscape character of the surrounding area.
- There are natural sources of radiation present due to the geology in the area. The radiation sources at the Ventersburg Gold Mine will increase the dose of radiation exposure to the surrounding public. However, it is expected that the dose limit (1.0 mSv/yr) for members of the public will still be complied with despite the contribution as a result of the mine.

8.4 Assumptions and uncertainties relating to the closure strategies

Uncertainties have been identified relating to the closure strategy for the Ventersburg Gold Mine. The following actions are recommended to address these uncertainties:

- It is expected that the groundwater level in the shafts will stabilise to pre-mining levels post-closure and decant is unlikely due to the surface topography, however there is a potential that decant may occur. To prevent the post-closure impacts resulting from decant, a groundwater model indicating

areas for post-closure decant must be developed and updated during the LoM to inform the Final Closure Plan. The results of the updated models must be used to update this plan on an annual basis.

- It is recommended that the geochemical model be updated during the LoM (at least every 5 years) to:
    - Determine additional potential impacts (considering sources, pathways and receptors) should be evaluated in adequate detail (i.e., identify impacts/potential impacts, quantify and monitor these impacts in terms of specific management objectives and measurable parameters);
    - Determine infiltration/seepage rates and quality from the WRD and TSF; and
    - Assess the groundwater flow regime and determine the rate of contaminant movement in the aquifers.
- During the operational phase, the possibility should be investigated of installing additional internal drains (at higher elevations) in the TSF. This will lower the phreatic head and will allow the TSF to dry out quicker after closure.
- Throughout the LoM any uncertainties that may arise relating to closure must be described and potential closure strategies identified.

9 CLOSURE AND REHABILITATION ACTIONS

The following section is a summary of the preferred closure and rehabilitation actions, for each mine component, in line with the closure strategy, which must be implemented to ensure that closure objectives are met and the realisation of the potential residual risks is avoided. The general measures detailed under this section apply to all areas affected by mining and related activities.

9.1 General measures

The general measures detailed under this section apply to all areas affected by mining and related activities.

9.1.1 Topsoil handling and management

Stockpiled soils must be removed and used for rehabilitation at closure after soil contamination investigations and remedial actions are undertaken. To ensure that the proper soil handling and management is carried out, the following should be taken into account:

- During decommissioning, a survey should be compiled on the topsoil available for rehabilitation
- Preliminary soil fertility monitoring on stockpiled topsoil should be carried out, prior to rehabilitation, to accurately determine the fertiliser requirements that may be needed. A representative sampling of the stripped and stockpiled soils must be analysed to determine the nutrient status and chemistry of the utilisable materials. As a minimum the following elements must be tested for: EC, CEC, pH, Ca, Mg, K, Na, P, Zn, Clay % and organic carbon. These elements provide the basis for determining the fertility of soil
- Based on the analysis and with input from a soil specialist, the fertility remediation requirements need to be verified and fertilizers must be applied as necessary prior to re-vegetation
- The utilisable soil removed during the construction phase, must be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the approved post development end land use, and will attain a free draining surface profile. A minimum layer of 30 cm of topsoil should be replaced over the project area to return the area to a grazing post mining land use.

9.1.2 Dismantling and demolition of infrastructure

It is anticipated that all of the infrastructure will be dismantled and removed at mine closure (with the exception of the TSF, WRDs and RWD). During dismantling, the following should be undertaken:

- Demolition activities must be undertaken during the dry season, where possible to minimise the potential for contaminated stormwater runoff to arise
- All aboveground electrical, water and other service infrastructure and equipment to be removed and disposed of as general waste or, if they are salvageable, be removed to a designated temporary salvage yard
- All conveyor belts must be removed and shredded prior to disposal
- All temporary infrastructure (fencing, pumps and pipelines, turnstiles and compressors) should be dismantled and removed from site
- All permanent infrastructure must be dismantled / demolished to ground level (the water management infrastructure should be removed last during decommissioning)

The associated foundations / hard-standing areas must be demolished by ripping and levelling of areas, extending to 1 m below the final surface in order to reduce compaction.

9.1.3 Rehabilitation

- All excavations must be filled in with inert material, followed by at least 1 m of subsoil and reshape to a slope not greater than 1:5 wherever the natural topography allows
- Deep ripping with a tine of at least 50 cm will be undertaken. Where space allows, cross ripping to be undertaken, with the final rip to be parallel to contours
- Stockpiled soil must be used to rehabilitate disturbed sites and must be redistributed in a manner that achieves an approximate uniform stable thickness consistent with the end land use (grazing), at least 30 cm and a minimum layer of 30 cm of soil must be replaced on the TSF and WRD
- All soils compacted as a result of decommissioning and rehabilitation activities must be ripped to a depth of 20 cm and fertilised
- The areas where topsoil has been deposited must be re-vegetated with indigenous grass and shrub species to reflect a species composition and density similar to that of a reference analogue site established in a similar ecotype under the supervision of a botanist
- In areas where topography requires a slope steeper than 1:5, Vetiver grass should be planted to stabilize the slopes and minimise erosion
- Rehabilitated areas should be cordoned off to limit equipment, and human movement on the rehabilitated areas
- Soil should be ameliorated and fertilized as required (if re-establishment of vegetation does not occur successfully or as per recommendations of a specialist)
- Once the topsoil in the stockpiles has been completely removed for rehabilitation, the footprint must be rehabilitated as above
- Alien invasive vegetation species monitoring and eradication must be conducted during decommissioning and rehabilitation and ongoing thereafter
- After closure, all areas susceptible to erosion must be monitored annually and repair, maintenance and prevention measures implemented (if erosion is noted) for 2 years, until vegetation has re-established and is self-sustaining.

9.1.4 Contaminated land

- A soil contamination investigation must be conducted on completion of demolition activities. The purpose of this is to identify areas of possible contamination and design and implement appropriate remedial measures to ensure that the soil potential is retained and the end land-use capabilities are achieved
- If the soil contamination investigation indicates that soil is contaminated, the first management priority is to treat the contamination by means of in situ bioremediation
- If *in situ* treatment is not possible or acceptable then the contaminated soil must be classified according to the applicable legislation and disposed of at a licensed landfill facility.

9.2 Underground workings and shafts

- During decommissioning, a rock mechanics specialist will assess the underground mine workings and make recommendations in order to prevent any subsidence or seismic activity occurring post-closure;
- All infrastructure associated with the shafts, underground workings and ventilation system must be dismantled and removed
- Shafts must be sealed with approved seals designed by a professional engineer and in accordance with specifications provided by the DMPR and rendered safe.

9.3 Hazardous materials storage facilities

- All tanks, pipes and sumps containing hydrocarbons to be flushed or emptied prior to removal to ensure no hydrocarbon/chemical residue remains; and
- All hazardous material to be inventoried to prevent surplus material being present on site during decommissioning and rehabilitation. Any residual hazardous materials must be removed from site.

9.4 Salvage yards

- Where practical, equipment and materials with salvage value must be sold and removed from the site. All other equipment must be demolished and disposed of off-site. Equipment with scrap or salvage value must be removed from the shaft and stored in a temporary area designated for this purpose during the closure period
- Recyclable materials should be collected and removed by an appointed recycling contractor
- Non-recyclable wastes must be safely removed and disposed of by a contractor at a licensed landfill facility
- All items of mobile machinery are to be sold.

9.5 Roads

All access roads, which are not going to remain for use by the surrounding farmers/communities post-closure, must be rehabilitated.

9.6 Water management facilities

The water management facilities, excluding those to remain post-closure for residual pollution control, must be the last mine components to be dismantled / demolished to ensure that any contaminated runoff from the decommissioning activities remains contained. The following measures must be applied to the components of the water management system to be removed:

- Disused surface pipes, pump stations and facilities must be removed from the site
- Pollution control dams and water storage facilities to be drained and water treated and discharged
- Sediment contained within the pollution control dams and water storage facilities should be assessed, and disposed of at a licensed landfill facility as either general or hazardous waste depending on the outcomes of the assessment
- All liners to be removed from dams and water storage facilities. These will require testing to determine whether there are secondary precipitates adhering to the liner surface, which may render these liners as hazardous. Liners to be disposed of at a licensed landfill facility as either general or hazardous waste depending on the outcomes of the testing
- Soil underlying the pollution control dams must be assessed for salts. Where contamination occurs, soil must be removed to a depth of 50 cm and disposed of on the TSF.

9.7 Waste rock dump

Any remaining waste rock at closure must be consolidated at the WRD to remain *in situ* post-closure (must not be located within 100 m of a watercourse), which must be rehabilitated by:

- Constructing a number of benches on the side slopes at strategic positions, which can be used for the establishment of vegetation and altering the slope characteristics
- Ensuring a sustainable slope not greater than 1:2

- Minor landscaping of the upper surface and side slopes of the dump, to allow for a more natural appearance aligned with surrounding hilly terrains
- Improving the colour of the WRD in relation to the natural surroundings using oxidants available in the industry
- Crests of the dump must be vegetated; the species composition must be aligned with that of surrounding hilly terrains
- Construction of stormwater control berms on the crests of the dump to prevent concentrated flow down the slopes is recommended
- Construct toe protection structures around the dump to prevent silt which will migrate from the dump from being spread into the environment as necessary.

9.8 Tailings storage facility

- Throughout the operational phase the side slopes of the TSF must be vegetated and trees planted at strategic points to reduce residual visual impacts
- At closure, the penstock must be sealed
- The top of the TSF must be vegetated
- The solution trenches and seepage control facilities must be retained as part of the permanent residual pollution control facilities. Seepage water must continue to be gravity fed to the RWD which is designed to allow for evaporation of seepage water hence the RWD must also be left *in situ*.

10 ORGANISATIONAL CAPACITY AND RESPONSIBILITIES

As the mine nears end-of-life, mine closure will be approached as a project with a dedicated team to ensure the implementation of the closure plan. The project team will be responsible for appointing and managing suitable subcontractors to implement the physical work where such skills and expertise are not available in-house.

Closure and rehabilitation will be the ultimate duty of the Mine Manager under guidance of a multidisciplinary team, with input from the various mine technical disciplines including engineering and mining, mine surveyor, Safety, Health, Environment and Quality (SHEQ), the social department and the finance section.

Closure and rehabilitation responsibilities must be carried out under the supervision of a suitably qualified ECO to ensure that the various closure and rehabilitation actions detailed herein are implemented and that the necessary auditing, reporting and monitoring are conducted. The ECO should be suitably qualified to fulfil the responsibilities. The ECO will also be responsible for employing the relevant suitably qualified specialists to conduct monitoring and auditing as required.

The ECO will also be responsible for training and supervising the staff to be employed to undertake decommissioning and rehabilitation activities to ensure competence in appropriate closure and rehabilitation measures. Staff will undergo environmental awareness training as part of induction prior to the commencement of decommissioning activities, and copies of the EMPr, this plan, Environmental Awareness Plan and Emergency Preparedness and Response Plan will be provided to all staff.

Training and capacity building of employees of the mine who may be able to assist in the facilitating the closure of the mine will be undertaken through the training structures contained within the SLP. As the mine nears known closure, the SLP will be adapted to focus more on portable skills.

11 MONITORING AND REPORTING

Within 180 days of the cessation of mining operations, an application for a closure certificate in terms of Regulation 43 of the MPRDA must be submitted to the DMPR. This application must be competed in Form P in Annexure II and must be accompanied by the required information, programmes, plans and reports prescribed in terms of the MPRDA and NEMA including the closure plan, an environmental risk report contemplated, a final performance assessment report contemplated in the EIA Regulations and a completed application form to transfer environmental liabilities and responsibilities, if the transfer of such liabilities has been applied for.

A post-closure monitoring and maintenance period of three years after decommissioning and closure has been assumed. The scope of post-closure monitoring and maintenance should be informed by the regular updates to the groundwater model, which will be calibrated once mining operations commence.

11.1 Closure monitoring

A period of one year is assumed to account for decommissioning and a post-closure monitoring and maintenance period of three years after decommissioning has been assumed. The closure monitoring programme has been designed to collect information to demonstrate that the relinquishment criteria (refer to Table 8) have been achieved. During decommissioning the following monitoring must be undertaken:

- Monthly dust fallout monitoring.
- Alien invasive plant species monitoring and eradication must take place in November and March.
- All areas susceptible to soil erosion must be monitored annually and repair, maintenance and prevention measures implemented (if erosion is noted).
- The geochemical model should be updated at least every five years to calibrate and validate its results and to construct an effective closure plan. Groundwater monitoring must include monthly inflow volume monitoring; monthly groundwater level monitoring of boreholes; quarterly water quality monitoring in all boreholes (pH, EC, TDS, Ca, Mg, Na, K, Cl, SO_4, NO_3, Total Alkalinity, and any parameters stipulated by DWS in the WUL) and annual water quality monitoring in all boreholes (Si, Fe, Mn, Al and ICP-scan and TPH, and any parameters stipulated by DWS in the WUL).
- Surface water sampling, water quality monitoring and reporting should continue on a monthly basis until surface water quality returns to baseline levels.
- During the initial biannual monitoring survey during decommissioning, the wetland specialist must provide recommendations on where disturbed wetland areas must be rehabilitated and the procedure to be followed.

11.2 Reporting

The following requirements apply to the monitoring programmes:

- A report must be prepared after each monitoring survey. This report must be based on the findings at the proposed monitoring points. The report must be submitted to management to ascertain compliance with the required standards at sensitive receptors.
- An annual report (including photographs and recommended management if required) must be made available incorporating the monitoring results. Trends must be identified, and mitigation measures recommended where necessary.
- A record of all rehabilitation requirements and actions should be kept by the ECO. If monitoring records indicate that closure risks are being realized, the appropriate specialist should be consulted, and the recommended management measures implemented.

- A closure report must be prepared by the ECO, including all of the monitoring data recorded. This must be submitted to the DMPR. Closure reporting by the ECO must include whether the relinquishment criteria have been achieved. Refer to Table 8 below for the relinquishment criteria and indicators. Recommendations for additional actions to be taken, where relinquishment criteria have not been achieved, must also be included in the report.

11.3 Maintenance plan

It is assumed that these closure measures will be implemented effectively. Post-closure monitoring will assist in determining the success of the closure rehabilitation actions. Should rehabilitation of an area be unsuccessful or poorly implemented, maintenance measures may be required. Maintenance measures should primarily be passive in nature with minimal long-term maintenance and operating costs. Maintenance which may be required until intervention achieves the necessary relinquishment criteria includes:

- Dust suppression methods should be implemented (as per the recommendations of a specialist) if dust monitoring indicates that dust fallout is exceeding limits at surrounding sensitive receptors.
- Fertilizing rehabilitated areas as per the findings of soil fertility monitoring, should a botanist indicate that vegetation establishment has not be successful
- Eradication of alien invasive vegetation, as per the eradication plan to be compiled by a botanist as per the outcomes of the alien and invasive vegetation monitoring
- Management of the vegetation surrounding watercourses to prevent erosion and siltation of the watercourses characterizing the receiving environment, should vegetation establishment monitoring indicate the need for intervention
- Erosion repair and, where required, the implementation of additional erosion protection measures (e.g., contours, berms, energy dissipaters such as gabions and application of straw mulches or soil binders to exposed soils) based on the findings of erosion monitoring
- Recommendations from a geohydrologist, hydrologist and/or engineer, relating to the maintenance of water management infrastructure, to remain *in situ* post closure for residual pollution control, must be adhered to.

11.4 Relinquishment criteria

Relinquishment can be defined as the formal approval by the relevant regulating authority indicating that the completion criteria for the activity have been met through post-rehabilitation monitoring, management, and evaluation to the satisfaction of the authority. In this regard the relinquishment criteria are driven by the objectives of closure and consequently the indicators applicable to each impact associated with closure and decommissioning. The proposed relinquishment criteria for the Ventersburg Mine are described in Table 8 below.

Table 8. Relinquishment criteria for the closure of the Ventersburg Gold Mine

Environmental attribute	Relinquishment criteria	Indicators	Reporting requirements
Aesthetic quality	Landform of areas affected by mining and related activities is aesthetically acceptable	All surface infrastructure (apart from the TSF, WRD and associate pollution control facilities) is dismantled and removed from site; no waste remains on site; the landscape is inconspicuous in relation to the existing landscape; WRD are landscaped, coloured and vegetated; and the TSF is vegetated	Photographic evidence of removal of all surface infrastructure (apart from the TSF, WRD and associate pollution control facilities); an inconspicuous project site; rehabilitated WRD and TSF; safe waste disposal certificates; and close-out reports
Air quality	Ensure that dust being generated from wind erosion across rehabilitated areas, the rehabilitated WRD and TSF is not resulting in nuisance	Dust generation is decreasing as vegetation is establishing in rehabilitated areas; dust levels are within acceptable limits	Dust monitoring reports compiled by a qualified air quality specialist
Biodiversity	Return the affected area to reflect the pre-mining grazing vegetation communities and promote biodiversity to the maximum extent possible	Adequate rehabilitation with indigenous species, no alien invasive species present	Monitoring reports compiled by qualified botanist confirming rehabilitation has been with indigenous species to promote biodiversity and alien invasive species eradication has taken place
Soil and land capability	Ensure that the agricultural potential is returned to the pre-mining potential (grazing) and the land is acceptable for the end land use	No erosion taking place; area has the capacity to withstand long-term wind and water erosion; land capability rendered suitable for the planned end land uses (i.e., grazing)	Photographic evidence of land returned to planned end land use and no erosion taking place
Surface water	Ensure landform is free draining	No pooling is occurring within the rehabilitated site	Photographic evidence taken after large rainfall events to indicate that no pooling is occurring
Safety	Ensure that community safety is not adversely affected	The area is stable; the shafts are adequately sealed; all surface infrastructure (apart from the TSF, WRD and associate pollution control facilities) is dismantled and removed from site; no waste remains on site; water management infrastructure to remain *in situ* for pollution control is stable and fenced off	Structural integrity risk assessments undertaken at decommissioning and signed off by an appropriately qualified engineer; photographic evidence of the sealed shafts and rehabilitated stable areas; and safe waste disposal certificates

11.5 Liability assessment

The update of this Closure Report includes an update of the rates used in line with inflation. As per Section 24(P)(3) of NEMA, Gold One Africa must annually assess their environmental liability and, if circumstances so require, must adjust their financial provision to the satisfaction of the Minister responsible for Mineral Resources.

The annual assessment must be undertaken by a specialist and includes reviewing this plan together with the ARP and the ERA Report. The annual assessment must then be reviewed by an independent auditor.

Should the review, assessment, and audit of the adequacy of the financial provision identify a shortfall in the financial provision, Gold One Africa must increase the financial provision within 30 days from the date of signature on the final auditor's report, to meet the assessed and audited sum.

The results of the assessment of the adequacy of the financial provision, including proof of payment or arrangements for any adjustments required, must be submitted by Gold One Africa to the DMPR for approval, in the form of an auditor's report, together with the ARP, this plan and the ERA Report. All of the above-mentioned documentation submitted to the Minister by Gold One Africa must be signed off by the Chief Executive Officer or person appointed in a similar position, as well as an independent auditor.

This plan is to be audited annually and updated when necessary (i.e., progressive rehabilitation takes place, changes in the mine layout or description occur, additional potential risks arise, additional closure actions are required and/ or adjustments are made to the financial provision).

11.6 Additional legislative requirements

The IEA contains the following closure-related conditions:

- In terms of sections 28 and 30 of NEMA, and sections 19 and 20 of the NWA, any costs incurred to remedy environmental damage must be borne by the person responsible for the damage. It is therefore imperative that the holder of the IEA reads through and understands the legislative requirements pertaining to the project. It is the holder of IEA's responsibility to take reasonable measures which include informing and educating contractors and employees about environmental risks of their work and training them to operate in an environmentally acceptable manner.
- Should any shortcomings in terms of Regulation 34(4) be identified, the holder must submit recommendations to amend the EMPr/closure plan in order to rectify any shortcomings with the aforementioned audit report.
- The holder of the EA must apply for a closure certificate as prescribed in the MPRDA and any other applicable legislation.
- The application for closure indicated above must be submitted together with all relevant documents as prescribed in the MPRDA and any other applicable legislation.
- No exotic plants may be used for rehabilitation purposes only indigenous plant can be utilized for rehabilitation purposes.
- Care must be taken to ensure that the material and excavated soil required for backfilling are free of contamination from hydrocarbons
- The holder of the IEA remains responsible for any environmental liability, pollution or ecological degradation, the pumping and treatment of extraneous water, compliance with the conditions of IEA and the management and sustainable closure thereof until the Minister has issued a Closure Certificate in terms of Section 43 of the MPRDA as amended. Where necessary the Minister may retain a portion of financial provision for residual, health or environmental impacts that might be known in future.

In terms of Regulation 43 of the MPRDA, within 180 days of:

- the lapsing, abandonment or cancellation of the right,
- cessation of the prospecting or mining operation,
- the relinquishment of any portion of the prospecting of the land to which a right, permit or permission relate, or
- completion of the prescribed closing plan to which the right relates.

An application for a closure certificate, in terms of Regulation 57 of the MPRDA, must be completed and submitted to the DMPR. This application must be competed in Form P in Annexure II and must be accompanied by the required information, programmes, plans and reports prescribed in terms of the MPRDA and NEMA including the closure plan, an environmental risk report contemplated, a final performance assessment report contemplated in the EIA Regulations, and a completed application form to transfer environmental liabilities and responsibilities, if the transfer of such liabilities has been applied for.

The IEA associated with the EMPr and Closure Plan is required to be audited on an annual basis as stipulated in the IEA (January 2018).

No closure certificate may be issued unless each government department charged with the administration of any law which relates to any matter affecting the environment has confirmed in writing that the provisions pertaining to health and safety and management pollution to water resources, the pumping and treatment of extraneous water and compliance to the conditions of the EA have been addressed. Notwithstanding the issue of a closure certificate, liability for the environmental degradation on the site remains the responsibility of the holder of the right.

Should any mine components have to be placed under care and maintenance, the requirements in terms of GN1147 of 2015 will apply. The financial provision must be maintained and reviewed, assessed, and adjusted annually throughout the care and maintenance period as detailed in Section 11.5 above.

11.7 Post-closure monitoring

In accordance with the requirements of GN1147 the post-closure monitoring and reporting requirements, are described below. The closure monitoring programme has been designed to collect information to demonstrate that the relinquishment criteria (Table 9) are achieved.

11.7.1 Air quality

Conduct monthly dust fallout monitoring for two years post-closure or until monitoring indicates that rehabilitation (i.e., vegetation) is successfully preventing dust. Dust fallout monitoring must be undertaken at the selected sites as indicated in the approved EMPr.

11.7.2 Biodiversity and wetlands

Rehabilitation monitoring and reporting is to be conducted seasonally for two years post-closure. Alien invasive plant species monitoring and eradication must take place in November and March each year, throughout decommissioning, and for two years post-closure. Vegetation rehabilitation monitoring must take place seasonally during the summer months for two years post-closure.

Wetland monitoring must be undertaken biannually during the decommissioning phase and rehabilitation must be monitored on a quarterly basis for three years post-closure.

11.7.3 Groundwater

Groundwater monitoring for at least two years post-closure must include monthly groundwater level monitoring of boreholes, quarterly water quality monitoring in all boreholes (pH, EC, TDS, Ca, Mg, Na, K, Cl, SO_4, NO_3, Total Alkalinity, and any parameters stipulated by DWS in the WUL) and annual water quality monitoring in all boreholes (Si, Fe, Mn, Al and ICP-scan and TPH, and any parameters stipulated by DWS in the WUL). Existing hydrocensus boreholes and 13 additional boreholes are to be monitored, as per the approved EMPr.

Updates to the groundwater model must be used to inform the post-closure monitoring and maintenance period and the monitoring actions to be undertaken.

11.7.4 Surface water

There are likely to be three possible risk factors with the potential to impact surface water quality during post closure, which are as follows:

Decant

Once underground mining ceases, the flooding of underground workings will occur as the groundwater table re-establishes which may result in a pollution plume. To prevent the post-closure impacts resulting from decant, a groundwater model indicating areas for post-closure decant must be developed and updated during the LoM. It is expected that the groundwater level in the shafts will stabilise to pre-mining levels post-closure and decant is unlikely due to the surface topography. The impact can be mitigated by sealing the shaft system during decommissioning to ensure that a mixing zone does not occur.

Should decant occur and water qualities be unacceptable it may subsequently report to and pollute the Rietspruit catchment. Should decant not be able to be prevented the decant points must be fitted with post-closure decant control dams/ passive treatment systems that can treat decant prior to discharge to the environment. The commitment to install passive treatment systems at expected decant points is included in the closure plan.

TSF and WRD

Should permanent containment systems for the TSF and WRDs fail as a result of poor management practise, contaminated tailings and return water will pollute downstream watercourses, which would negatively impact downstream water users as well as aquatic biodiversity.

Post-closure water quality monitoring should continue monthly at the monitoring points as per the EMPr, until surface water quality returns to baseline levels.

Free-draining landform

Successful rehabilitation of the Ventersburg Gold Mine will ensure that the landform is free draining and that, where possible, natural drainage patterns are able to re-establish.

11.7.5 Soil

After closure, all areas susceptible to erosion must be monitored annually and repair, maintenance and prevention measures implemented (if erosion is noted) until a closure certificate is issued.

12 ANNUAL REHABILITATION PLAN

Since the mine has not yet been constructed, no rehabilitation / remediation activities have been implemented for the preceding 12 months, nor will any rehabilitation or remediation activities be implemented in the forthcoming 12 months.

When the construction phase commences the ARP must be updated accordingly for the approved operations for which annual rehabilitation measures can be undertaken.

12.1 Identification of risks for rehabilitation and remediation

Since the mine has not yet been constructed, monitoring has not yet commenced. The preliminary risks identified in the final rehabilitation, decommissioning and mine closure plan are shown in Table 7 Once mining commences the FRDC Plan must be used to identify potential risks and inform the planned annual rehabilitation and remediation activities, with the aim of ultimately reducing the identified impacts at closure.

12.2 Review of prior rehabilitation and remediation and shortcomings experienced

This review and update of the ARP was compiled in terms of GN1147. A site visit was undertaken to Ventersburg Mine during September 2025 to assess the current status of the area. No mining activities were occurring on site at the time, but it has been reported by Gold One Africa that further exploration activities commenced shortly after the site visit.

Since the mine has not yet been constructed, no rehabilitation / remediation activities have been implemented for the preceding 12 months. As such there are no shortcomings to report on for the previous year.

When the construction phase commences the ARP must be updated accordingly for the approved operations for which annual rehabilitation measures can be undertaken and the shortfalls experienced in the preceding 12 months can then be identified and assessed.

Concurrent rehabilitation activities during the LoM should focus on addressing visual impacts (rehabilitating disturbed areas and maintaining aesthetic appeal) and non-visual impacts identified through monitoring of water, air and soil.

12.3 Planned annual rehabilitation and reclamation activities

Since the mine has not yet been constructed, no rehabilitation / remediation activities will be implemented in the forthcoming 12 months.

When the construction phase commences the ARP must be updated accordingly for the approved operations for which annual rehabilitation measures can be undertaken and the planned rehabilitation/remediation activities planned for the forthcoming 12 months must then be described.

13 QUANTUM FOR CLOSURE-RELATED FINANCIAL PROVISION

As per GN1147 of 2015 a holder of a right in terms of the MPRDA must determine and make financial provision for the rehabilitation and management of negative environmental impacts from mining operations to the satisfaction of the Minister responsible for Mineral Resources.

According to Regulation 5 a holder must make financial provision for rehabilitation and remediation; decommissioning and closure activities at the end of prospecting, exploration, mining, or production operations; and remediation and management of latent or residual environmental impacts which may become known in future, including the pumping and treatment of polluted or extraneous water.

Regulation 6 makes provision for the method of determining the costs of the financial provision and states that a holder must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for the above.

The 2005 Guideline for Evaluation of the Quantum for Closure-Related Financial Provision compiled by the then Department of Minerals and Energy (DME) (now DMPR) describes the recommended procedure for determining the quantum for financial provision in Section B thereof, entitled "Working Manual for the Determination of the Quantum". The recommended procedure was therefore followed for the purposes of calculating the quantum (Table 9).

13.1 Previous quantum calculation

The previous quantum calculation was undertaken by Umhlaba in November 2024. It addressed the period from 2021 to 2024. As no invasive mining activities took place over the period, the update only accounted for inflation. The November 2024 calculation provides:

- R 0.00 for annual rehabilitation requirements
- R 168 223 589 for the Final Rehabilitation, Decommissioning & Mine Closure Plan
- R 7 764 835 to address the contingencies identified in the Environmental Risk Assessment Report.

Therefore, the total liability was R 175 988 424.

13.2 Updated quantum for closure

The updated quantum for closure-related financial provision for 2025 has been determined. Refer to Table 11, Table 12, and Table 13.

Total 1, the financial provision for the final rehabilitation, decommissioning, and mine closure activities at Ventersburg Gold Mine, has been calculated to be **R 173 370 073** (incl. weighting factor 2) (Table 11).

Total 2, the financial provision for the residual environmental impacts (Section 5 of the Environmental Risk Assessment Report), is calculated as **R 8 002 439** (incl. weighting factor 2) (Table 12).

The total financial provision (Total 1 + Total 2) for the Ventersburg Gold Mine is therefore **R 181 372 512** (Table 11), which equates to an increase of R 5 384 088.

Table 9. Procedure for calculating the quantum for closure-related financial provision

Step	Description	Finding
1	Determine mineral mined and saleable by-products	Gold and associated minerals
2A	Determine primary risk class	Primary Risk or Hazard is Class A (Large Mine >10 000, including a mine, mine waste, plant and plant waste).
2B	Revised primary risk class based on saleable by-products	Not applicable, no saleable by-products are produced
3	Environmental sensitivity of the mining area	Medium
4.1	Level of information available	Limited
4.2	Identification of closure components	Areas, volumes and lengths of disturbances and each applicable closure component are as per the mine layout plans in the EIA/EMPr.
4.3	Unit rates for closure components	The DMPR guideline rates were adjusted using contractor rates to provide actual costs for decommissioning and rehabilitation. The rates utilised are based on contractor rates which have been escalated by the CPI reported by Umhlaba (2024) and the mean CPI as reported by Statistics South Africa up until August 2025 (i.e. 3.06%).
4.4	Weighting factors	Weighting factor 1, Nature of the terrain where the mine is located: • The natural terrain at the Ventersburg Gold Mine is flat, therefore the assigned weighting factor is 1. Weighting factor 2, Proximity to urban area: • The site is located approximately 40 km away from Welkom. Therefore, it is classed as peri-urban (less than 150 km from an urban centre), to which a weighting factor of 1.05 applies.
4.5	Areas of disturbance	Refer to 4.2 above.
4.6	Identify closure costs from specialist studies	The approved EMPr was developed utilising several specialist studies. The following recommendations were made in the EMPr relating to closure: • Successfully rehabilitate the disturbed area with indigenous species and include the implementation of soil saver and hydro seeding on the TSF. • Implement alien and invasive vegetation monitoring and eradication • Erosion monitoring, prevention and maintenance measures to be implemented • During the operational phase, the possibility should be investigated of installing additional internal drains (at higher elevations) in the TSF. This will lower the phreatic head and will allow the TSF to dry out quicker after closure. • The Applicant must notify the Minister five years prior to mine closure of the planned closure and provide a closure and rehabilitation plan for the prevention of pollution of the atmosphere by dust after operations have ceased. • Numerical groundwater models will be updated/ calibrated during the LoM, however it is important that the design criteria for any mitigation measures be determined through numerical groundwater flow and transport modelling, at least 2 years prior to mine closure. • It is unlikely that decant will occur, however groundwater modelling will be conducted during operations to confirm this. The commitment to install decant control dams and passive treatment systems at expected decant points, should investigations show that it is likely that decant will occur, is included in this Closure Plan. Commitments to ensure that decant is treated to qualities stipulated by DWS prior to discharge (and discharged to the environment in a manner that prevents flooding) are also included in this Closure Plan.
4.7	Calculate closure costs	Closure costs have been determined for final rehabilitation, decommissioning and mine closure activities as well as for the residual environmental impacts. Refer to Table 11.
5	Independent review by competent person	This assessment represents an independent review by a competent person.

Table 10. Unit rates utilised for evaluation of the quantum (2025)

No.	Main Description (as per DME Guideline)	Relevant Component On-site	Unit	Rate 2025
1	Dismantling of processing plant and related structures	Powerlines	m	R 89
2(A)	Demolition of steel buildings and structures	Carports and general steel	m^2	R 168
		Plant infrastructure	m^2	R 414
		Conveyor infrastructure	m	R 838
		General steel structures, substation, pump station, extractor fans	m^2	R 355
2(B)	Demolition of reinforced concrete buildings and structures	Reservoirs, diesel bay, sewage works/ tank, silos, dams	m^2	R 690
		Concrete structures/ slabs/ plinths/ ramps	m^2	R 690
		Reef stockpile area	m^2	R 690
		Water tanks, bund walls, potable and service water tanks	m^2	R 690
3	Rehabilitation of access roads	Gravel toads (5m wide)	m^2	R 690
		Surfaced (tarred) roads (5m wide)	m^2	R 887
5	Demolition of housing and/or administration facilities		m^2	R 542
7	Sealing of shafts, adits and inclines		m^3	R 157
8(A)	Rehabilitation of overburden and spoils	Waste rock dump - re-shaping and profiling	ha	R 197 114
		Haul cover material and spread		R 111 913
		Vegetate and fertilize rock dump area		R 34 495
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	Cover material and spread	ha	R 165 355
		Establishment of vegetation		R 34 495
10	General surface rehabilitation, including grassing of all denuded areas	General disturbed areas, shaft - rip and level, surface reshaping/profiling, vegetation, dams, contractor laydown area	ha	R 123 195
		Platforms and waste rock	ha	R 440 583
12	Fencing	Removal of fencing	m	R 49
13	Water management	Maintenance of the TSF and RWDs to prevent failure of water management systems, surface and groundwater monitoring	ha	R 61 426
14	2-3 years of maintenance and aftercare	Rehabilitation - ensuring vegetation re-establishes adequately	ha	R 601 355
15(A)	Site-specific closure costs identified as per specialist study	Groundwater model to determine if there will be any decant	Sum	R 440 583

Table 11. Quantum for the Final Rehabilitation, Decommissioning and Mine Closure activities at the Ventersburg Gold Mine (2025)

No.	Main description (as per DME Guideline)	Relevant component on site	Unit	Master rate (2025)	Quantity	Multiplication Factor	Nature of Terrain Weighting Factor	Total 2025
1	Dismantling of processing plant and related structures	Powerlines	m	R 89	3700,0	1	1	R 328 169
2(A)	Demolition of steel buildings and structures	a) Carports and general steel	m^2	R 168	9500,0	1	1	R 1 591 655
		b) Plant infrastructure	m^2	R 414	13000,0	1	1	R 5 385 335
		c) Conveyor infrastructure	m	R 838	1200,0	1	1	R 1 005 285
		d) General steel structures, substation, pump station, extractor fans	m^2	R 355	710,0	1	1	R 251 908
2(B)	Demolition of reinforced concrete buildings and structures	a) Reservoirs	m^2	R 690	1500,0	1	1	R 1 034 861
		b) Diesel bay	m^2	R 690	802,0	1	1	R 553 306
		c) Sewage works/ tank	m^2	R 690	4136,0	1	1	R 2 853 457
		d) Silos	m^2	R 690	2000,0	1	1	R 1 379 815
		e) Dams	m^2	R 690	80000,0	1	1	R 55 192 589
		f) Concrete structures/ slabs/ plinths/ ramps	m^2	R 887	30200,0	1	1	R 26 788 065
		g) Reef stockpile area	m^2	R 690	20000,0	1	1	R 13 798 147
		h) Water tanks, bund walls, potable and service water tanks	m^2	R 345	1283,0	1	1	R 442 568
3	Rehabilitation of access roads	Gravel roads (5m wide)	m^2	R 27	109270,0	1	1	R 2 957 754
		Surfaced (tarred) roads (5m wide)	m^2	R 63	21220,0	1	1	R 1 340 585
5	Demolition of housing and/or administration facilities	a) Winch and fan building	m^2	R 542	86,0	1	1	R 46 612
		b) Workshops			1670,0	1	1	R 905 140
		c) Change houses			2000,0	1	1	R 1 084 000
		d) Salvage yard, main stores			602,0	1	1	R 326 284
		e) Core shed			1750,0	1	1	R 948 500
		f) Elec W/S			285,0	1	1	R 154 470
		g) Lamp room/ Crush			550,0	1	1	R 298 100
		h) Substation and gensets			7000,0	1	1	R 3 794 000
		i) Offices/ brick buildings			3681,0	1	1	R 1 995 102
		j) Sewage and water Treatment			686,0	1	1	R 371 812
7	Sealing of shafts, adits and inclines	a) Ventilation shaft - backfill shaft	m^3	R 157	600,0	1	1	R 93 982
		b) Backfill and seal shaft	m^3	R 157	1000,0	1	1	R 156 637
8(A)	Rehabilitation of overburden and spoils	a) Waste rock dump - re-shaping and profiling	ha	R 197 114	16,0	1	1	R 3 153 826
		b) Haul cover material and spread		R 111 913	16,0	1	1	R 1 790 607
		c) Vegetate and fertilize rock dump area		R 34 495	16,0	1	1	R 551 920
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	a) Cover material and spread	ha	R 165 355	70,0	1	1	R 11 574 838
		b) Establishment of vegetation		R 34 495	70,0	1	1	R 2 414 648
10	General surface rehabilitation, including grassing of all denuded areas	a) General disturbed areas	ha	R 123 195	100,0	1	1	R 12 319 451
		b) Shaft - rip and level	ha	R 123 195	0,2	1	1	R 19 711
		c) Surface reshaping/profiling, vegetation	ha	R 123 195	13,2	1	1	R 1 621 240
		d) Dams	ha	R 123 195	5,0	1	1	R 615 973
		e) Contractor laydown area	ha	R 123 195	4,0	1	1	R 492 778
		f) Platforms	ha	R 440 583	3,0	1	1	R 1 330 559

No.	Main description (as per DME Guideline)	Relevant component on site	Unit	Master rate (2025)	Quantity	Multiplication Factor	Nature of Terrain Weighting Factor	Total 2025
		g) Waste Rock	ha	R 440 583	1,0	1	1	R 440 583
12	Fencing	Removal of fencing	m	R 49	7740,0	1	1	R 381 410
13	Water management	Maintenance of the TSF and RWDs to prevent failure of water management systems; surface and groundwater monitoring	ha	R 61 426	74,0	0,6	1	R 2 727 320
15(A)	Site-specific closure costs identified as per specialist study	Groundwater model to determine if there will be any decant.	Sum	R 601 355	1,0	1	1	R 601 355
							SUM OF CLOSURE COMPONENT COSTS	R 165 114 355
							TOTAL 1 = SUM OF CLOSURE COMPONENT COSTS X WEIGHTING FACTOR 2 = 1.05	**R 173 370 073**

Table 12. Quantum for the residual environmental impacts which may occur in the future (2025)

Description		Unit	Master Rate (2025)	Quantity	Multiplication Factor	Nature of Terrain Weighting Factor	Total 2025
2-3 years of maintenance and aftercare	Rehabilitation - ensuring vegetation re-establishes adequately	ha	R 27 596	220,0	1	1	R 6 071 113
Dust	Monthly dust fallout monitoring	yr	R 91 192	2	1	1	R 182 383
Biodiversity and Wetlands	Alien invasive species monitoring and eradication, vegetation rehabilitation and wetland monitoring	yr	R 45 596	3	1	1	R 136 787
Groundwater	Groundwater levels and chemical analysis of mine monitoring boreholes	yr	R 531 951	2	1	1	R 1 063 902
Surface water	Surface water quality monitoring	yr	R 75 993	2	1	1	R 151 986
Erosion	Annual erosion monitoring	yr	R 7 599	2	1	1	R 15 199
						SUM OF CLOSURE COMPONENT COSTS	R 7 621 370
						TOTAL 2 = SUM OF CLOSURE COMPONENT COSTS X WEIGHTING FACTOR 2 = 1.05	**R 8 002 439**

Table 13. Total Financial Provision for 2025

Total 1. FINAL REHABILITATION, DECOMMISSIONING AND CLOSURE	R 173 370 073
Total 2. RESIDUAL ENVIRONMENTAL IMPACTS WHICH WILL OCCUR IN THE FUTURE	R 8 002 439
SUM Total 1 + Total 2 = TOTAL FINANCIAL PROVISION	**R 181 372 512**

14 GAPS AND ACTION PLAN

This update of the plan includes an update of the rates used in line with inflation. This document is to be audited annually and updated.

Uncertainties have been identified relating to the closure strategy for the Ventersburg Gold Mine. The following actions are recommended to address these uncertainties:

- It is expected that the groundwater level in the shafts will stabilise to pre-mining levels post-closure and decant is unlikely due to the surface topography, however there is a potential that decant may occur. To prevent the post-closure impacts resulting from decant, a groundwater model indicating areas for post-closure decant must be developed and updated during the LoM to inform the Final Closure Plan. The results of the updated models must be used to update this plan on an annual basis and inform the scope of the post-closure monitoring and maintenance.
- It is recommended that the geochemical model be updated during the LoM (at least every 5 years) to:
    - Determine additional potential impacts (considering sources, pathways and receptors) should be evaluated in adequate detail (i.e., identify impacts/potential impacts, quantify and monitor these impacts in terms of specific management objectives and measurable parameters)
    - Determine infiltration/seepage rates and quality from the WRD and TSF; and
    - Assess the groundwater flow regime and determine the rate of contaminant movement in the aquifers.
- During the operational phase, the possibility should be investigated of installing additional internal drains (at higher elevations) in the TSF. This will lower the phreatic head and will allow the TSF to dry out quicker after closure.
- Throughout the LoM any uncertainties that may arise relating to closure must be described and potential closure strategies identified.

15 CONCLUSION

The measures and recommendations made in this report, serve to assist the holder of the Mining Right in responsibly and timeously planning for and implementing closure of the Ventersburg Gold Mine. This plan must be assessed annually and updated as necessary, with the end target being a closed mine having minimal residual impact on the environment or safety of people.

Within 180 days of the cessation of mining operations an application for a closure certificate, in terms of Regulation 43 of the MPRDA, must be submitted to the DMPR. No closure certificate may be issued unless each government department charged with the administration of any law which relates to any matter affecting the environment have confirmed in writing that the provisions pertaining to health and safety and management of pollution to water resources, the pumping and treatment of extraneous water and compliance to the conditions of the EA have been addressed. Notwithstanding the issuing of a closure certificate, liability for the environmental degradation on the site remains the responsibility of the holder of the right.

An application to the DMPR must be made to transfer the responsibility regarding the maintenance of the surface infrastructure to remain on site for use by the community, to the relevant authority post issuing of a closure certificate.

If the holder fails to rehabilitate or to manage any impact on the environment or is unable to undertake such rehabilitation or to manage such impact, the Minister responsible for Mineral Resources may, upon written notice, use all or part of the financial provision to rehabilitate or manage the environmental impact in question.

The financial provision for the Final Rehabilitation, Decommissioning and Mine Closure Related activities at the Ventersburg Gold Mine has been calculated to be **R 173 370 073**(incl. weighting factor 2). This amount forms part of the total financial provision amount of **R 181 372 512**(Total 1 + Total 2). The total financial provision has increased by R 5 384 088.