

*Appendix 9*



Environmental  
Management  
Group (Pty) Ltd.

## **REHABILITATION AND CLOSURE PLAN FOR:**

APPLICATION FOR A MINING  
PERMIT FOR THE MOQHAKA LOCAL  
MUNICIPALITY

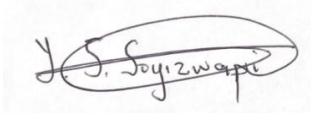
KROONSTAD MAGISTERIAL  
DISTRICT

**Moqhaka Local Municipality**  
Free State Province

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## 1. Introduction

Mining operations are finite economic activities, typically of relatively short-term duration. While the long-term environmental and social performance of a site becomes apparent once mining and mine site operations have ceased, the environmental, social, and economic impacts are determined by the processes and procedures undertaken during both the active mining and mine closure phases.

It is imperative for mine operators to engage in adequate progressive rehabilitation throughout the extraction process. Progressive rehabilitation involves sequential rehabilitation within a reasonable timeframe following the completion of resource extraction. As one area of the mine is being extracted, rehabilitation must be concurrently completed in areas where mining reserves have been depleted. Progressive rehabilitation offers numerous benefits, including the reduction of open areas within the mine, mitigation of soil erosion potential, and minimization of double handling of soils and spoil material.

## 2. Regulatory requirements and special conditions

The following key regulatory requirements and conditions were documented for closure in the environmental management program:

- Mineral and Petroleum Resources Development Act (Act 28 of 2002)
- Mine Safety and Health Act, 1996 (Act 29 of 1996)
- The National Water Act, 1998 (Act 36 of 1998)
- The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
- National Environmental Management Act (Act 107 of 1998)

The summary of the regulatory requirements pertaining to closure mentioned in the Environmental Management Program are:

- a) All waste to be disposed of at authorised disposal sites.
- b) No ponding of water will be allowed to limit drainage disruption and the risk of groundwater pollution.
- c) The mined areas are to be landscaped to a profile in line with the surroundings.
- d) On completion of the mining process all topsoil should be spread back on disturbed surfaces to enable vegetation to grow again.

### **3. Key objectives of closure**

The closure management objectives take into account the existing environment, environmental impacts and the expectations at closure. To ensure that the closure objectives are informed by the type of environment, the anticipated impacts and damage at closure, the sensitivity of the area and expected post closure land use were taken into account. In doing so, principles of integrated environmental management were taken into account together with the principles of sustainable development. The closure objectives are:

- To create a post mining environment that eliminates unacceptable health hazards and ensures public safety.
- To leave the site in a stable, non-polluting and tidy condition with no remaining plant or infrastructure that is not required for post mining operational use.
- To minimise or eliminate the downstream environmental impacts on the ecosystem due to interruption of drainage once the mine operations cease.
- To rehabilitate the disturbed areas to an end land, use similar to that prior to commencement of any mining activities as far possible; in this case grazing land.
- To establish a stable post-mining land surface which has been rehabilitated.

### **4. Mechanisms for monitoring compliance**

Effective monitoring, review and evaluation provide information on emerging issues, improve performance and ensure accountability of the closure activities. Photographs of the camp and office sites, before and during the mine operational period and after rehabilitation, shall be taken at selected fixed points and kept on record.

#### **4.1. Monitoring**

Successful monitoring delivers timely and relevant information that allows tracking of progress towards outcomes and allows adjustments to implementation arrangements as necessary. The day-to-day monitoring and verification that the EMPr and Closure and Rehabilitation Plan are being adhered to shall be undertaken by the Contactor or mine operator appointed by the Moqhaka Local Municipality.

#### **4.2. Reviewing and auditing**

An Independent Environmental Control Official (ECO) shall visit the site quarterly during the closure and rehabilitation process to ensure that the provision of closure and rehabilitations are being met. A report on non-conformances observed will be made and submitted to the applicant. Reviews of the closure plan and financial provisions will be made yearly to ensure that the plan is relevant and adequate.

## **5. Land end –use plan**

The proposed mining site is located in an agricultural, isolated open space adjacent to a previously mined area near Kroonstad. Upon completion of the closure process and successful re-establishment of vegetation, the area will revert to its natural state as an open rangeland.

## **6. Time for implementing the closure plan**

The closure and rehabilitation activities are to be implemented immediately at the cessation of the extraction of weathered dolerite and gravel material from the proposed mine area.

## **7. Environmental risk report.**

A risk assessment will be taken at the end of the mining period. The purpose of this risk assessment will identify the risks present at the closure of the mine, to evaluate them and have management measures in place so as to eliminate the risk or reduce the risks to levels that are in line with legal requirements, acceptable to the community and have long term sustainability.

## **8. Final environmental performance assessment**

A final environmental performance assessment is to be done at the end of the mining period. The scope of the performance assessment is to identify any deviation from the Environmental Management Program measures and any outstanding issues regarding the final rehabilitation of the mined site.

## **9. Rehabilitation measures**

### **9.1. Progressive rehabilitation**

Mining is to be done in sections to allow progressive rehabilitation during mining to take place. If during mining activities, it is deemed that the mined section will no longer be mined again, then the area can be rehabilitated as after cessation of the mining of the section. Backfilling of overburden, subsoil, topsoil and mulch must be done in levelled and profiled layers. The area is to be properly profiled, and the sides sloped and smoothed. This is done in order to improve the visual impact of the area and to simplify the management of storm water runoff and improve slope safety. Topsoil is to be put back on the disturbed surfaces to enable the re-vegetation process to take place.

### **9.2. Rehabilitation of access roads**

- Whenever the mine is suspended, cancelled or abandoned any access road or portions thereof, constructed by the holder of the environmental authorisation and



which will no longer be required by the landowner, shall be removed and rehabilitated to the satisfaction of the owner.

- Any gate or fence erected by the appointed mine operator which is not required by the landowner/tenant, shall be removed and the situation restored to the pre-mine situation. However, the pit fence should be left intact until all the vegetation has fully recovered on site and the area is safe.
- Roads shall be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road materials which may hamper regrowth of vegetation must be removed and disposed of in an approved manner prior to rehabilitation.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the soil must be analysed and any deleterious effects on the soil arising from the quarry, be corrected and the area be seeded with a seed mix which is similar with the vegetation of the area.

### **9.3. Offices, storages area and plant structures**

- On completion of operations, all buildings, structures or objects on the site shall be demolished and removed.
- Where office/camp sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- On completion of mine operations, the above areas shall be cleared of any contaminated soil, which must be disposed of through a licensed disposal facility or operator.
- All infrastructure, equipment, plant and other items used during the mining period will be removed from the site
- Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the mining area and disposed of at a registered waste disposal facility. It will not be permitted to be buried or burnt on the site.
- Photographs of the sites, before and during the mining and after rehabilitation, shall be taken at selected fixed points and kept on record.
- The surface shall then be ripped or ploughed and the topsoil previously stored shall be spread evenly to its original depth over the whole area. The area shall then be fertilised if necessary (based on a soil analysis).
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, there might be need for the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be re-seeded with a suitable vegetation seed mix that is matches the local flora.

#### **9.4. Rehabilitation of excavation areas**

- Excavated areas should be kept in a safe and stable manner. No unstable block should be present. Reshaping of the excavated area may need to be done to ensure that this objective is reached.
- Preventative measures may be necessary during closure to construct adequate drainage structures including ditches and other structures to facilitate the movement of surface water and prevent damming. An assessment will need to be done when mining has ceased to determine if there is need for such measures. The objective of these measures is to avoid water build-up that affects the physical stability of the slopes and also interferes with the drainage of the whole area.
- The excavated area must serve as a final depositing area for the placement of overburden and un-used material.
- Rocks and coarse materials removed from the excavation must be backfilled into the excavation. General waste and hazardous waste will not be permitted to be deposited in the excavations.
- Once excavation parts that can be filled have been refilled with overburden, rocks and coarse natural materials and profiled with acceptable contours and erosion control measures, the topsoil previously stored shall be returned to its original depth over the area.
- The area shall be fertilised if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local or adapted indigenous seed mix in order to propagate the locally or regionally occurring flora.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, there may be need for the soil to be analysed and any deleterious effects on the soil arising from the quarry, be corrected and the area be seeded with a vegetation seed mix that matches the local indigenous flora.

The environment affected by the operations shall be rehabilitated, as far as is practicable, to its natural state or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development. The affected environment shall be maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The rehabilitation activities shall require the re-planting of vegetation in areas cleared for the mine activities. This will promote soil stability, improve the visual environment and provide faunal habitat into the operation stage.

#### **10. Managing impacts arising from undertaking closure activities**

The undertaking of the closure and rehabilitation activities is not expected to generate additional impacts that are different from the ones generated during the operational stage of the mine. The impact mitigation and management measures that are provided in the environmental management program are deemed



adequate to manage the impacts arising from the closure process itself. However, in the event those additional new issues are noted, appropriate mitigation will be put in place to manage the impacts.

#### **11. Long term management and maintenance after closure**

No long-term monitoring and maintenance are expected. There is no risk of acid mine drainage.

#### **12. Public participation process for closure plan**

The public participation process for the closure plan was done as part of the basic assessment process and the details are provided for in Appendix 3.

#### **13. Financial provisions for closure**

Financial provisions will be submitted by the Applicant, the Moqhaka Local Municipality. The rehabilitation and the subsequent costs will all be the responsibility of the contractor, which will be overseen by an Environmental Compliance Officer and DMR.

#### **14. Conclusion**

Proper profiling of the disturbed areas and re-vegetation of the areas will result in proper rehabilitation of the mined areas. The closure plan serves to provide details of the closure activities to be undertaken based on the anticipated mode of operation of the mine/quarry. It is expected that adequate implementation of the closure activities as stated in this document will minimise the negative impacts of the mine on the environment and enable a self-sustaining ecosystem to be re-established. If during the closure stage any unanticipated aspects occur, these should be assessed immediately and adequate mitigation measure implemented to minimise their effect at and after closure.