

**PROPOSED SAND MINE ON A PORTION OF PORTION
2 (REMAINING EXTENT) OF FARM 199 RD,
CLANWILLIAM, WESTERN CAPE PROVINCE**

CLOSURE PLAN



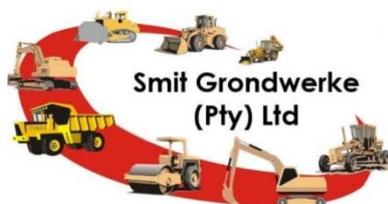
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1. INTRODUCTION

The objective of the final rehabilitation, decommissioning and mine closure plan is to identify a post-mining land use that is feasible through:

- a) providing the vision, objectives, targets and criteria for final rehabilitation, decommissioning and closure of the project;
- b) outlining the design principles for closure;
- c) explaining the risk assessment approach and outcomes and link closure activities to risk rehabilitation;
- d) detailing the closure actions that clearly indicate the measures that will be taken to mitigate and/or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post closure;
- e) committing to a schedule, budget, roles and responsibilities for final rehabilitation, decommissioning and closure of each relevant activity or item of infrastructure;
- f) identifying knowledge gaps and how these will be addressed and filled;
- g) detailing the full closure costs for the life of project at increasing levels of accuracy as the project develops and approaches closure in line with the final land use proposed; and
- h) outlining monitoring, auditing and reporting requirements.

(Financial Provision Regulations, 2015 Appendix 4)

In accordance to Appendix 5 of the NEMA EIA Regulations, 2014 a closure plan for the mining of sand from a portion of Portion 2 (Remaining Extent) of Farm 199 was formulated.

2. DETAIL OF THE AUTHOR

The Applicant, Smit Grondwerke (Pty) Ltd appointed Greenmined Environmental to prepare the final rehabilitation, decommissioning and mine closure plan. Ms. Christine Fouche is the responsible consultant for the project and holds a Diploma in Nature Conservation and a BSc in Botany and Zoology (Full CV is attached as Appendix M to the BAR & EMPR).

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3. PROJECT CONTEXT

The Applicant, Smit Grondwerke (Pty) Ltd (herein after referred to as “the Applicant”), applied for environmental authorisation and a mining permit (MP) to mine sand from a portion of Portion 2 (Remaining Extent) of Farm 199, Clanwilliam, Western Cape Province.

The proposed mining area of the Applicant will be 4.9 ha and will be developed over an area currently used for agricultural purposes. The mining method is representative of the small scale mining industry where the mineral (sand) is loaded with a front-end-loader (FEL) directly from the footprint area onto a truck that delivers it to the clients. Strip mining will be implemented with little to no stockpiling required. No washing of sand is needed. Due to the small scale of the operation no infrastructure, other than a chemical toilet, will be established within the mining footprint. The proposed project does not require any electrical connections, and no chemicals will be stored on site. Vehicle/equipment maintenance will be done at an existing off-site workshop (Clanwilliam Town) of the Applicant, and the area will be reached via an existing farm road.

If the proposed mining footprint is apportioned into five strips, the mining direction will be in a north-westerly direction starting from strip 1 working towards strip 5. Using the existing access road the Applicant could access each strip to be mined without the need of driving over rehabilitated areas. Strip mining the earmarked area in this manner, allows for mined-out areas to be rehabilitated / signed back to the landowner for continued cultivation without the need of mining equipment re-entering rehabilitated areas.

The mining activities will be as listed below:

- 3 Stripping and stockpiling of the topsoil from a 1 ha strip;
- 3 Loading and hauling of the sand from the open strip;
- 3 Sloping and landscaping of the mined strip prior to the opening and mining of the consecutive strip; and
- 3 Replacing the topsoil and vegetating the disturbed area.

Should the MP be issued and the mining of sand be allowed, the proposed project will comprise of activities that can be divided into 3 key phases (discussed in more detail below) namely the:

- (1) *Site establishment phase* which will involve the demarcation of the permitted mining area and the identification of the first 1 ha strip to be mined. Site establishment may

necessitate the clearing of vegetation (that established through succession), the stripping and stockpiling of topsoil, and the introduction of the mining machinery.

(2) *Operational phase* that will entail the strip mining of sand from the approved footprint area through direct excavation. The Applicant will make use of a front-end-loader to load the sand directly onto a truck that will deliver it to the clients. Little to no stockpiling will be required and no washing of sand is needed.

(3) *Decommissioning phase* which entails the rehabilitation of the affected environment prior to the submission of a closure application to the Department of Mineral Resources (DMR). The permit holder will further be responsible for the seeding of all rehabilitated areas. Once the full mining area is rehabilitated, the mining permit holder will be required to submit a closure application to the DMR in accordance with section 43(4) of the MPRDA, 2002. The Closure Application will be submitted in terms of Regulation 62 of the MPRDA, 2002, and Government Notice 940 of NEMA, 1998 (as amended).

In light of this, the table below shows the areas to be disturbed by mining that will be in need of rehabilitation throughout the operation phase.

Table 1: Areas that will be in need of rehabilitation during the operational phase.

OPERATIONAL PHASE		
NO	DESCRIPTION	QUANTITY
6	Opencast Rehabilitation	1 ha (±1 ha strip open at any given time)
DECOMMISSIONING PHASE		
6	Opencast Rehabilitation	1 ha (±1 ha final strip)
14	2 to 3 years of maintenance and aftercare	2 ha

4. CLOSURE STRATEGY GUIDED BY ENVIRONMENTAL RISK ASSESSMENT

A very important factor affecting the success of rehabilitation, and consequently the significance of all direct impacts, is the level of care that is taken to rehabilitate effectively. This is dependent on the level of environmental management of all mining activities that can impact on rehabilitation, both during the mining process and during the rehabilitation phase.

The closure objectives for the sand mine entail progressive rehabilitation of each strip as mining progress. The applicant proposes the following with regard to rehabilitation of the mined-out strips:

- 3 The mine plan will be such that topsoil is stockpiled for the minimum possible time through rehabilitating each mining block as mining continues.
- 3 To ensure minimum impact on drainage, the applicant will take care not to leave any depressions in the mining floor. A surface slope (even if minimal) will be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- 3 After mining, any steep slopes at the edges of excavations will be reduced to a minimum and profiled to blend with the surrounding topography, and allow the travel of the centre pivot.
- 3 The stockpiled topsoil will then be evenly spread over the disturbed mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying layer. The depth will be monitored during spreading to ensure that coverage is adequate and even.
- 3 The Applicant will strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- 3 A cover crop that ties in with the proposed land use will be planted immediately after spreading of topsoil to stabilize the soil and protect it from erosion. The cover crop will be fertilised for optimum biomass production, and any soil chemical deficiencies will be corrected, based on a chemical analysis of the re-spread soil.
- 3 The rehabilitated area as well as the land down slope of it will monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- 3 The Applicant will ensure monthly monitoring of weeds/invaser plants that may germinated within the rehabilitated area. The invasive plant species management plan (Appendix K of the EMPR) will continually be implemented on site.

Upon closure of the mining area all mining related equipment will be removed from the site. Topsoil will also be spread over the final mined out strip. The entire mining area will be landscaped in order to rehabilitate the disturbance and will subsequently revert back to agricultural use.

5. DESIGN PRINCIPLES

Rehabilitation of the mining area will largely fall within two categories namely, those that will occur within the short term when a strip is mined out, and those that will occur in the long term upon final closure of the site.

In the short term, progressive rehabilitation of each mined-out 1 ha strips will be done and will include the following closure objectives:

- 3 Reduce any steep slopes at the edges of excavations to a minimum and profile it to blend with the surrounding topography and allow the travel of the centre pivot;
- 3 Maintain a surface slope across the mining area and out of it on the down-slope side to assist drainage;
- 3 Replace the stockpiled topsoil evenly over the mined-out area to a depth of 300 mm;
- 3 Seed the reinstated area with a locally adapted grassmix, or arrange for planting of relevant cover crop;
- 3 Control invasive plant species for at least one growth seasons;
- 3 Monitor the area for erosion until vegetation established.

Upon closure of the mine, the permit holder will commence with the reinstatement of the final strip. The closure objectives will include the following:

- 3 Final Mined Strip:
 - Reduce any steep slopes at the edges of excavations to a minimum and profile it to blend with the surrounding topography and allow the travel of the centre pivot;
 - Maintain a surface slope across the mining area and out of it on the down-slope side to assist drainage;
 - Replace the stockpiled topsoil evenly over the mined-out area to a depth of 300 mm;
 - Seed the reinstated area with a locally adapted grassmix, or arrange for planting of relevant cover crop;
 - Control invasive plant species for at least two growth seasons;
 - Monitor the area for erosion until vegetation established.

6. POST-MINING LAND USE

The future land use of the proposed area will be to return the area to the landowner to continue the use of it as center pivot lands.



Figure 1: Satellite image of the mining area that will revert back to agricultural use upon rehabilitation.

7. CLOSURE ACTIONS

The following closure actions was stipulated in the Environmental Management Programme Report (EMPr) in order to successfully rehabilitate the mining area:

- 3 The mine plan must be such that topsoil is stockpiled for the minimum possible time through rehabilitating each mining block as mining continues.
- 3 To ensure minimum impact on drainage, the applicant must take care not to leave any depressions in the mining floor. A surface slope (even if minimal) must be maintained across the mining floor in the drainage direction, so that all excavations are free draining.
- 3 After mining, any steep slopes at the edges of excavations must be reduced to a minimum and profiled to blend with the surrounding topography, and allow the travel of the centre pivot.
- 3 The stockpiled topsoil must then be evenly spread over the disturbed mining area, so that there is a depth of 300 mm of sandy topsoil above the underlying layer. The depth must be monitored during spreading to ensure that coverage is adequate and even.

- 3 The Applicant must strive to (when possible) spread topsoil at a time of the year when vegetation cover can be established as quickly as possible afterwards, so that erosion of returned topsoil by both rain and wind, is minimized.
- 3 A cover crop that ties in with the proposed land use must be planted immediately after spreading of topsoil to stabilize the soil and protect it from erosion. The cover crop must be fertilised for optimum biomass production, and any soil chemical deficiencies must be corrected, based on a chemical analysis of the re-spread soil.
- 3 The rehabilitated area as well as the land down slope of it must monthly be monitored for erosion, and appropriately stabilized if any erosion occurs.
- 3 The Applicant must ensure monthly monitoring of weeds/invasiver plants that may germinated within the rehabilitated area. The invasive plant species management plan (Appendix K of the EMPR) must continually be implemented on site.

The applicant will comply with the minimum closure objectives as prescribed by DMR and detailed below:

- 3 Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- 3 All equipment, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- 3 Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognized landfill facility. It will not be permitted to be buried or burned on the site.
- 3 The management of invasive plant species must be done in a sporadic manner during the life of the mining activities. Species regarded as Category 1a and 1b invasive species in terms of NEM:BA (National Environmental Management: Biodiversity Act 10 of 2004 and regulations applicable thereto) need to be eradicated from the site.
- 3 Final rehabilitation must be completed within a period specified by the Regional Manager (DMR).

8. CLOSURE SCHEDULE

As explained earlier the Applicant intends progressive rehabilitation of each mined-out strip prior to opening the consecutive strip, thereby minimizing the denuded areas as a result of the mining activity. The Applicant is committed to rehabilitate each strip within the first week after mining of the area is completed.

At this stage it is proposed that the rehabilitation of the mining area will take approximately two months to complete. Rehabilitation will, however, not be considered complete until the first cover crop is well established and therefore the rehabilitation phase will extend over at least a six-month period.

Control of invasive plant species is an important aspect after topsoil replacement and seeding has been completed in an area. Site management will implement an invasive plant species management plan (see Appendix K of the EMPR) during the 12-month aftercare period to address germination of problem plants in the area. Final rehabilitation shall be completed within a period specified by the Regional Manager.

Table 2: Closure schedule.

CLOSURE SCHEDULE	
REHABILITATION / DECOMMISSIONING ACTION	TIMEFRAME
<i>EACH MINED-OUT STRIP (OPERATIONAL PHASE)</i>	
<ul style="list-style-type: none"> ☞ Replace the stockpiled topsoil over the mined-out area; ☞ Landscape and level the area to prevent any depressions and allow for agricultural activities; ☞ Seed reinstated area or arrange for planting of relevant cover crop. 	Within 1 week subsequent to area being mined-out
<i>FINAL MINED STRIP (DECOMMISSIONING PHASE)</i>	
<p><i>Reinstatement of final strip and any other area still in need of rehabilitation:</i></p> <ul style="list-style-type: none"> ☞ Replace the stockpiled topsoil over the mined-out area; ☞ Landscape and level the areas in order to allow for agricultural activities; ☞ Seed reinstated area, or arrange for planting of relevant cover crop. 	Week 1 – 6
<i>MAINTENANCE AND AFTER CARE</i>	
<ul style="list-style-type: none"> ☞ Erosion Monitoring ☞ Invasive Plant Species Control 	Monthly monitoring for 12 months after final rehabilitation of the mining area

9. IMPLEMENTATION AND RESPONSIBILITY OF CLOSURE PLAN

Implementation of the closure plan is ultimately the responsibility of the mining permit holder. Upon commencement of the closure phase daily compliance monitoring will be the responsibility of the site manager. The site manager will be responsible for ensuring compliance with the guidelines as stipulated in the EMPR as well as the prevention and/or rectification of environmental incidents. The applicant will appoint an Environmental Control Officer to oversee compliance of the rehabilitation/closure activities.

10. IDENTIFIED GAPS IN THE PLAN

The assumptions made in this plan, which relate to the closure objectives and associated impact on the receiving environment, stem from site specific information gathered by the project team. No gaps in the Rehabilitation, Decommissioning and Mine Closure Plan could be identified.

11. RELINQUISHMENT CRITERIA FOR CLOSURE ACTIVITIES

The specific rehabilitation outcomes against which the effectiveness of completed rehabilitation must be measured are (*Agricultural Impact Assessment attached as Appendix G to the BAR & EMPR*):

1. that the topography has been sufficiently smoothed without steep excavation edges to allow for cultivation;
2. that topsoil has been spread on the surface;
3. that there is a potential rooting depth of at least 300 mm, of non-compacted soil material, which is suitable for root growth, across the entire mining area;
4. that there are no non free-draining depressions across the surface;
5. that there is no visible erosion across the area, or down-slope of it as a result of mining, and that no part of the area has been left unacceptably vulnerable to erosion;
6. that a successful cover crop has been established across the entire area.

In addition to the above, the following relinquishment criteria is proposed for the closure activities of the mining area:

Table 3: Relinquishment criteria for closure activities

RELINQUISHMENT CRITERIA FOR CLOSURE ACTIVITIES			
CATEGORY	RELINQUISHMENT CRITERIA	INDICATORS	REPORTING REQUIREMENTS
Decommissioning of all mining equipment.	No visible man-made equipment may remain.	Close-out inspection by site management upon end of decommissioning phase.	Photographic evidence that equipment was removed.
Soil erosion	Implementation of erosion control measures or the establishment of vegetation in denuded areas.	Engineered structures to control water flow	Proof in final closure report that required structures are in place and functional.
Vegetation	Seeding of a cover crop after topsoiling.	Biodiversity monitoring	Monitoring report
Invader plant management	Continuous management of invader plants until the establishment of the first cover crop.	Biodiversity monitoring	Monitoring report
Land Use	Land capability and productivity similar to, or better than that which existed prior to mining.	Land capability and productivity	Comparison to equivalent areas.

12. MONITORING, AUDITING AND REPORTING

In compliance with applicable legislation the mining permit holder will conduct monitoring of the mining activities for the duration of the operational- and decommissioning phases. The compliance of the site will be audited and reporting will be done to the relevant authorities. The table below stipulates the actions to be followed in this regard.

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Table 4: Monitoring, auditing and reporting requirements

MONITORING, AUDITING AND REPORTING REQUIREMENTS			
AUDIT	RESPONSIBLE PERSON	FREQUENCY OF AUDIT	CLOSE OUT APPROACH
LEGISLATED AUDITING AND REPORTING			
Environmental Auditing	<u>Internal Review</u>		
	Site manager to ensure compliance with Environmental Authorization, Environmental Management Programme and Closure Plan.	Daily compliance monitoring.	Any non-conformance must immediately be addressed by site management and weekly reported on.
	<u>External Auditing</u>		
	Independent Consultant	Annual auditing and reporting to the Department of Mineral Resources.	Depending on the significance of the findings site management has a maximum of four weeks to address and close out auditing results.
Financial Provision Review	<u>Financial Provision Review</u> Independent Consultant <u>Independent Auditor</u> Independent financial consultant	Annual review of the financial provision, and reporting of the findings to the Department of Mineral Resources	Should the review of the financial provision indicate a shortfall the holder of the permit will increase the financial provision to meet the audited financial provision within 90 days from the date of the signature on the auditor's report.
Health and Safety Auditing	Health and Safety Manager	Monthly auditing of health and safety aspects on-site. Monthly reporting to the Mine Health and Safety division of the Department of Mineral Resources.	Depending on the significance of the findings site management has a maximum of 48 hours to address and close out auditing results.
MONITORING			
Invader Plant Monitoring	Site Management. Compliance checked by Independent Consultant (annually).	Monthly Monitoring	Site management has a maximum of two weeks to eradicate Category 1a and b plants in terms of the National Environmental Management:

MONITORING, AUDITING AND REPORTING REQUIREMENTS			
AUDIT	RESPONSIBLE PERSON	FREQUENCY OF AUDIT	CLOSE OUT APPROACH
LEGISLATED AUDITING AND REPORTING			
			Biodiversity Act, 2004 (Act No. 10 of 2004) that germinate on-site.
Storm Water Monitoring	Site Management. Compliance checked by Independent Consultant (annually).	Monthly Monitoring	Site management has a maximum of two weeks to improve the storm water control measures on site should signs of erosion occur.

12.1 Schedule of reporting requirements providing an outline of internal and external reporting including disclosure of updates of the plan to stakeholders

The following table stipulates the reporting requirements and how document updating will be handled:

Table 5: Reporting requirements

REPORTING REQUIREMENTS			
AUDIT	LEGISLATION	REPORTING REQUIREMENTS	UPDATE DISCLOSURE
Environmental Auditing	NEMA; EIA Regulations, 2014 (as amended 2017)	Annual reporting on the environmental compliance of the mining area will be in accordance with Regulation 34 of the NEMA EIA Regulations, 2014 (as amended 2017). The environmental audit report will contain the information set out in Appendix 7 of the said Regulation.	The environmental audit report will indicate the ability of the EMPr and Closure Plan to adequately manage the activity. Should the reports not be sufficient, amendment will be proposed.
Financial Provision Review	NEMA Amendment Act, 2014 (Act No 25 of 2014) Financial Provision Regulations, 2015	Annual reporting on the financial provision for closure of the mining area will be in accordance with Section 24P of the NEMA Amendment Act, 2014 (Act No 25 of 2014) read with the Financial Provision Regulations 2015.	The auditor will report on the adequacy of the financial provision and any adjustments that need to be made to the financial provision.

REPORTING REQUIREMENTS			
AUDIT	LEGISLATION	REPORTING REQUIREMENTS	UPDATE DISCLOSURE
Health and Safety Auditing	Occupational Health and Safety Act, 1993 Mine Health and Safety Act, 1996	Reporting on the health and safety compliance of the mining area will be in accordance with the Mine Health and Safety Act, 1996.	The safety manager will quarterly report on the safety aspects at the mine, and annually update the Code of Practices applicable to the site.

12.2 Monitoring Plan and Compliance Assessment

The following list presents the monitoring programs to be implemented on site for the duration of the decommissioning phase:

Table 5: Monitoring programme

MONITORING PROGRAMME	
MONITORING UNIT	FREQUENCY
NOISE MONITORING	
<p>Personal Noise Monitoring:</p> <p>Personal noise exposure monitoring is done to determine the noise levels employees are exposed to during an eight-hour shift. Excessive noise exposure can lead to hearing loss and therefore continuous monitoring and demarcation of noise zones are of the utmost importance. This monitoring is conducted by a qualified Occupational Hygienist who has to submit his findings on Form 21.9(2)(e) prescribed by the Department of Mineral Resources in terms of the National Environmental Management: Air Quality Act, 2004 (Act No 39. of 2004).</p>	Quarterly until final closure of the site
SOIL EROSION MONITORING	
<p>Soil Erosion:</p> <p>The definition for erosion is defined in the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) as the loss of soil through the action of water, wind, ice or other agents including the subsidence of soil. Soil erosion monitoring has to be implemented by site management to prevent the loss of exposed soil as a result of the mining activities. If the replaced topsoil stay</p>	Weekly monitoring for the first 6 months or until the first cover crop has established, whereafter the mining areas must be monitored monthly through at least one wet and one dry season.

MONITORING PROGRAMME	
MONITORING UNIT	FREQUENCY
<p>exposed it is especially vulnerable to soil erosion. It is therefore proposed that a cover crop be planted on reinstated topsoil and topsoil heaps to be stored for more than six months.</p>	
INVASIVE PLANT SPECIES MONITORING	
<p>Management of Invasive Plant Species:</p> <p>All species listed in terms of the Alien and Invader Species (AIS) regulations published in terms of section 97(1) of NEM:BA as amended 2016, are deemed to be declared invasive species, and should be managed accordingly. When identifying invasive plant species that need to be eradicated from the site the plants listed in the AIS regulations are used as guideline. Control of invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management must implement an invasive plant species management plan (attached as Appendix K to the EMPR) during the 12 months aftercare period to address germination of problem plants in the area.</p>	<p>Monthly monitoring for the duration of the decommissioning phase and a 12-months aftercare period.</p>
STORM WATER MONITORING	
<p>Storm Water Monitoring:</p> <p>The risk of erosion or loss of topsoil due to uncontrolled storm water flowing through the decommissioning area can be reduced through proper monitoring and implementation of effective storm water infrastructure. Site management must implement a storm water management plan for the duration of the operational- and decommissioning phases. Monitoring needs to continue during the 12 months aftercare period.</p>	<p>Monthly monitoring for the duration of the decommissioning phase and a 12-months aftercare period.</p>
HEALTH AND SAFETY MONITORING	
<p>Management of Health and Safety Risks</p> <p>All operations must comply with the Occupational Health and Safety Act, 1993 (Act No 85 of 1993) as well as the Mine Health and Safety Act, 1996 (Act No 29 of 1996).</p>	<p>Daily monitoring for the duration of the decommissioning phase.</p>

**13. MOTIVATION FOR AMENDMENTS MADE TO FINAL REHABILITATION,
DECOMMISSIONING AND MINE CLOSURE PLAN**

Not yet applicable.



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