

**PROPOSED MINING OF AGGREGATE ON A PORTION OF
PORTION 8 OF THE REMAINING EXTENT OF THE FARM
DRIEFONTEINEN 243, REGISTRATION DIVISION OF MOSSEL
BAY, WESTERN CAPE**

CLOSURE PLAN



APRIL 2019

REFERENCE NUMBER: WC 30/5/1/3/2/10206 MP

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AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

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 aggregate from the farm Driefonteinen 243, Portion 8 (Remaining Extent).

2. DETAIL OF THE AUTHOR

The Applicant, Haw and Inglis Civil Engineering (Pty) Ltd appointed Greenmined Environmental to prepare the final rehabilitation, decommissioning and mine closure plan. Mrs. Yolandie Coetzee has a B.Sc. Degree in Microbiology and Biochemistry and an Honours Degree in Environmental Sciences. (Full CV is attached as Appendix J to the BAR & EMPR).

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3. PROJECT CONTEXT

Haw and Inglis Civil Engineering (Pty) Ltd intends to apply for a mining permit to mine 5 ha of on a portion of portion 8 of the remaining extent of the farm Driefonteinen 243 which falls in the Mossel Bay Local Municipality in the Registration Division of Mossel Bay RD, Western Cape Province.

The area earmarked for the proposed mining falls on a section of the farm that was previously used as an existing quarry and the intention of this application is to increase the existing quarry. The mining methods will make use of blasting means of explosives in order to loosen the hard rock. The material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The aggregate will be screened to various sized stockpiled. The aggregate will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting will only occur once every six (6) to eight (8) weeks.

The proposed mining area is approximately 5 ha in extent and the applicant, Haw and Inglis Civil Engineering (Pty) Ltd, intends to win material from the area for at least 2 years with a possible extension of another 3 years. The aggregate to be removed from the quarry will be used local construction and building projects in the vicinity. The proposed quarry will therefore contribute to the upgrading / maintenance of road infrastructure and building contracts in and around the Mossel Bay area.

The mining activities will consist out of the following:

- Stripping and stockpiling of topsoil;
- Blasting;
- Excavating;
- Crushing;
- Stockpiling and transporting;
- Sloping and landscaping upon closure of the site; and
- Replacing the topsoil and vegetation the disturbed area.

The mining site will contain the following:

- Drilling equipment;
- Excavating equipment;
- Earth moving equipment;
- Static crushing and screening plants.
- Access Roads;
- Site Office (6m Containers);
- Security Gate;
- Site vehicles;
- Parking area for visitors and site vehicles;
- Vehicle service area;
- Wash bay;

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

- Workshop (6m Containers);
- Salvage Yard;
- Bunded diesel (20 000l tank) and oil storage facilities;
- Generator on bunded area;
- Ablution Facilities (6m Container with Septic Tank);
- Weigh Bridge; and
- Demarcated general and hazardous waste area.

An Eskom connection will be used to power the infrastructure on site. All diesel storage will be below the threshold as mentioned in the EIA regulations of the National Environmental Management Act, 1998 (Act No 107 of 1998) as amended 2017.

The proposed mining area will be reached via the existing access road to the quarry, making use of the existing internal/haul roads to access the material within the mining area. Trucks delivering the materials to the destinations will take the N2 national route. Marker info according to the SANRAL roads system N2-6 67.2E.

Any water required for the implementation of the project will be drawn from a borehole to be established on site, a water use authorization application will be made for this.

Should the MP be granted and the mining of quartzite (aggregate) be allowed, the Driefonteinen Quarry project will comprise of activities that can be divided into 3 key phases namely the:

- (1) *Site establishment/construction phase* which will involve the demarcation of the permitted mining area and required buffer no-go zones pertaining to areas of significant importance identified during the environmental impact assessment.
- (2) *Operational phase* that is presently expected to entail the mining of aggregate from the approved footprint area via conventional open cast mining methods.

The mining method will make use of blasting in order to loosen the hard rock; upon which the loosened material will be transported to the crushing and screening processing plant where it will be screened to various sized stockpiles, before it is sold and transported from site to clients.

- (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 upon closure of the site.

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

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

DECOMMISSIONING PHASE		
NO	DESCRIPTION	QUANTITY
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	2 500m ³
6	Opencast Rehabilitation	2 ha
8a	Rehabilitation of overburden and spoils	2ha
10	General surface rehabilitation	1ha
14	2 to 3 years of maintenance and aftercare	5ha

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.

As mentioned earlier the Applicant will not establish any permanent infrastructure in the footprint area. Upon closure of the mining area all equipment will be removed from the footprint area. The area will be landscaped in order to rehabilitate the disturbance and will subsequently revert back to agricultural use. Due to the impracticality of importing large volumes of fill material to restore the excavation to its original topography, the rehabilitation option is to render the quarry safe and leave it as a minor landscape feature. This will entail sloping of the perimeter walls, or creating a series of irregular benches along the quarry faces, the top edges of the face being blasted away to form scree slopes on the benches below, thereby reducing the overall face angle. Fill and topsoil will be placed over the benches / screes to provide a suitable medium for the establishment of vegetation, especially trees which will break up the line of the faces and enhance their appearance.

5. DESIGN PRINCIPLES

Upon closure of the quarry the mining permit holder will commence with the rehabilitation of the disturbed area. The decommissioning activities will be directed by the closure objectives proposed in the EMPr, as stipulated below:

- ❖ Excavation Area:
 - Deposit overburden, rocks and coarse material into the excavation;
 - Sloping of the perimeter walls at 1:3 to the pit floor or create benches of not more than 3 meters high;
 - Replacing the topsoil;
 - Seeding the reinstated area.

6. POST-MINING LAND USE

The future land use of the proposed area will be agriculture. Upon the replacement of the topsoil, the area around the excavation will once again be available for grazing purposes, and the planting of the cover crop (to protect the topsoil) will tie in with the proposed land use.

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

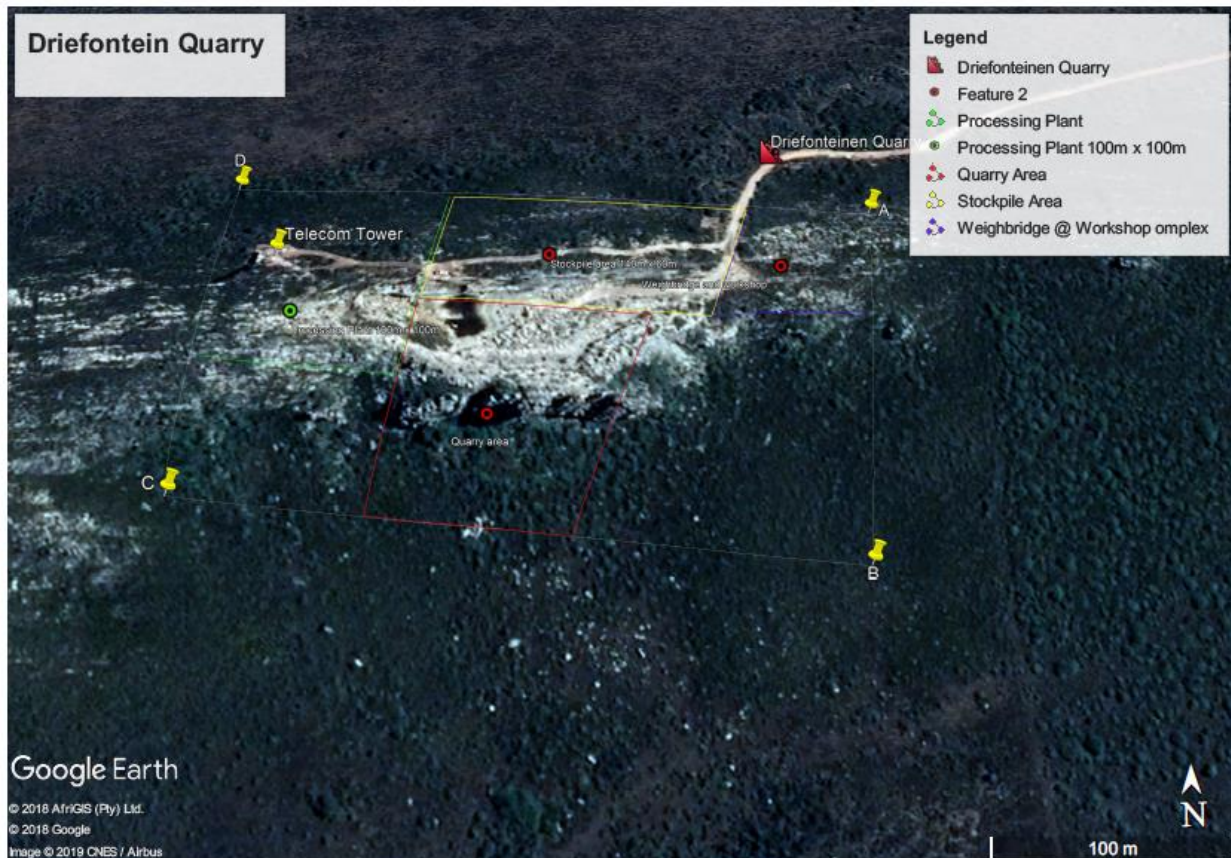


Figure 1: Satellite image (2019) of the mining area (red polygon) that will revert back to agricultural use upon rehabilitation.

7. CLOSURE ACTIONS

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

The perimeter walls of the opencast pit will either be sloped at 1:3 to the pit floor, to prevent soil erosion, or be stepped by creating benches of not more than 3 meters high. The applicant will comply with the minimum closure objectives as prescribed by DMR and detailed below:

Rehabilitation of the excavated area:

- ❖ The excavated area must serve as a final depositing area for the placement of overburden.
- ❖ Rocks and coarse material removed from the excavation must be dumped into the excavation.
- ❖ No waste may be permitted to be deposited in the excavations.
- ❖ Once overburden, rocks and coarse natural materials has been added to the excavation and it was profiled with acceptable contours and erosion control measures, the topsoil previously stored must be returned to its original depth over the area.

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

- ❖ The area must be fertilized 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, should natural vegetation not re-establish within 6 months from closure of the site.
- ❖ If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager (DMR) may require that the soil be analyzed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a vegetation seed mix to his or her specification

Final rehabilitation:

- ❖ Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding (if required), maintenance, and clearing of invasive plant species.
- ❖ All equipment, plant, and other items used during the mining period must be removed from the site (section 44 of the MPRDA).
- ❖ 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.
- ❖ 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.
- ❖ Final rehabilitation must be completed within a period specified by the Regional Manager (DMR).

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 during the 12 months' aftercare period to address germination of problem plants in the area.

8. CLOSURE SCHEDULE

At this stage it is proposed that the rehabilitation of the mining area will take approximately four 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 J of the BAR & 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
EXCAVATION	
Quarry Pit: <ul style="list-style-type: none"> ❖ Deposit overburden, rocks and course material into excavation; ❖ Slope perimeter walls according to design principles; ❖ Backfill overburden into the quarry floor; ❖ Cover the final floor of the quarry and the top of the benches with topsoil; ❖ Seed the reinstated area. 	Month 1 – 4
MAINTENANCE AND AFTER CARE	
<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:

1. that the topography has been sufficiently sloped without steep excavation edges that pose a safety risk;

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

2. that topsoil has been spread on the reinstated areas;
3. 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;
4. 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
Slope stability and safety.	The site is safe for use by humans and animals for the foreseeable future.	Close-out inspection by the Mine Health and Safety officer.	Appropriate control measures are in place that will continue to meet agreed 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 has been 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.

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	Internal Review		
	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.
External Auditing			

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

MONITORING, AUDITING AND REPORTING REQUIREMENTS			
AUDIT	RESPONSIBLE PERSON	FREQUENCY OF AUDIT	CLOSE OUT APPROACH
LEGISLATED AUDITING AND REPORTING			
	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	Financial Provision Review Independent Consultant Independent Auditor 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			
Dust Monitoring	Site Management. Compliance checked by Independent Consultant.	Monthly Dust Monitoring	Site management has a maximum of two weeks to amend the dust management plan should the dust monitoring results show the dust level of the site to be excessive.
Invader Plant Monitoring	Site Management. Compliance checked by Independent Consultant.	Monthly Monitoring	Site management has a maximum of two weeks to eradicate Category 1a and b plants in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) that germinate on-site.
Storm Water Monitoring	Site Management. Compliance checked by Independent Consultant.	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	The environmental audit report will indicate the ability of the EMP and Closure Plan to adequately manage the activity. Should the reports not be sufficient, amendment will be proposed.

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

REPORTING REQUIREMENTS			
AUDIT	LEGISLATION	REPORTING REQUIREMENTS	UPDATE DISCLOSURE
		set out in Appendix 7 of the said Regulation.	
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.
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.

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

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 6: Monitoring programme

MONITORING PROGRAMME	
MONITORING UNIT	FREQUENCY
DUST MONITORING	
<p>Dust Monitoring: Dust control through the implementation of good housekeeping and site management is the key method of controlling dust emissions. It is proposed that monthly fallout dust monitoring be implemented at the mining area in order to record the dust conditions of the site. The dust monitoring must be conducted by a qualified specialist and dust results must monthly be populated and filed in the environmental site file and be available for auditing purposes. The environmental control officer must inspect the fallout dust results during the environmental performance audit. Should the ECO find that the dust levels of the mining area are excessive and impacting on the surrounding land use, the dust management plan of the Applicant must be amended and additional dust control measures must be instigated.</p>	<p>Monthly until final closure of the site</p>
<p>Gravimetric Dust Monitoring: Gravimetric sampling of dust is the internationally acceptable method to determine respirable dust concentrations of a site. This monitoring is implemented to determine the level of exposure employees are subjected to during each shift as prolonged exposure to atmospheric dust can give rise to a number of lung disorders or diseases. Personal and/or static monitoring is done by a qualified Occupational Hygienist in accordance with the guidelines for gravimetric sampling published under the auspices of the Department of Mineral Resources – Guidelines for the Compilation of a Mandatory Code of Practice – No. 1 Personal Exposure to Airborne Pollutants.</p>	<p>Quarterly until final closure of the site</p>
NOISE MONITORING	
<p>Personal Noise Monitoring: 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>	<p>Quarterly until final closure of the site</p>
SOIL EROSION MONITORING	
<p>Soil Erosion: 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 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>	<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.</p>
INVASIVE PLANT SPECIES MONITORING	
<p>Management of Invasive Plant Species: 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</p>	<p>Monthly monitoring for the duration of the decommissioning phase and a 12-months aftercare period.</p>

AGGREGATE MINE CLOSURE PLAN: DRIEFONTEINEN QUARRY

MONITORING PROGRAMME	
MONITORING UNIT	FREQUENCY
plant species management plan (attached as Appendix J to the BAR & EMPR) during the 12 months aftercare period to address germination of problem plants in the area.	
STORM WATER MONITORING	
<p>Storm Water Monitoring: 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>	Monthly monitoring for the duration of the decommissioning phase and a 12-months aftercare period.
HEALTH AND SAFETY MONITORING	
<p>Management of Health and Safety Risks 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>	Daily monitoring for the duration of the decommissioning phase.

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

Not yet applicable.



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