MINING OF AGGREGATE ON A PORTION OF PORTION 2 (REMAINING EXTENT) OF THE FARM AROAMS 57, REGISTRATION DIVISION OF NAMAQUALAND, NORTHERN CAPE.

REHABILITATION PLAN

(IN ACCORDANCE TO GOVERNMENT NOTICE 940 OF THE NEMA, ACT NO 107 OF 1998 & REGULATION 62 OF THE MPRDA, ACT NO 28 OF 2002)

REFERENCE NUMBER:	**NC 30/5/1/2/2/10156MR**
DATE: OCTOBER 2019	

PREPARED FOR:

Aroams Quarry (Pty) Ltd

Contact person: Mr. Frikkie Fereira

Postal Address:

PO Box 160

Milnerton

7435

PREPARED BY:

Greenmined Environmental

Contact person: Mrs. Yolandie Coetzee

Tel: 011 9660 4390

Cell: 082 734 5113

Fax: 086 546 0579

Postal Address:

Suite 62

Private Bag X15

Somerset West

7129

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

DEFINITIONS

Abandonment: The act of abandoning and relinquishment of a mining claim or intention to mine, a voluntary surrender of the claim or mine to the next party.

Appropriately qualified: A person who has training in the skills appropriate to the type of work to be done, and experience of the type of mine shaft and of the size, complexity and safety classification of the deposit or the environmental conditions (or both) pertaining to the specific project.

Annual Rehabilitation and Final Rehabilitation, Decommission and Closure Plan: Final Rehabilitation Plan

Biodiversity: Biodiversity is an abbreviation of “biological diversity”. It means the variety of living things – the different plants, animals and microorganisms, the genes they contain and the ecosystems of which they are a part.

Closure: The act of sealing a redundant mine opening which is acceptable for final mine closure.

Context of an environmental impact: The overall environmental setting in which an environmental impact occurs. It includes all "natural" components and characteristics (or both) and all "human and social" components and characteristics (or both). It has both spatial and time dimensions.

Continual improvement: The process of enhancing a mine closure deposit management system, to achieve ongoing improvement in overall performance.

Contour berm: Is an embankment of topsoil, which is placed on contour with a slope of not flatter than 1:350 not steeper than 1:200, which slopes towards a common discharge, point. The intention of this berm is to prevent erosion on rehabilitated areas. These berms should be installed at 5m vertical intervals.

Design: The documented result of a systematic process during which all relevant factors and criteria are taken into account. The design includes the design report, the working drawings and the operations manual.

Diversion berm: Is an embankment often in conjunction with a trench to divert upslope clean water around and away from any activity or dirty area.

Environmental impact: Any change in the state of a component of the environment, whether adverse or beneficial, that wholly or partially results from activities, projects or developments.

Environmental integrity: The reliability of performance of the environmental impact management measures associated with the facility, with respect to the environmental performance objectives.

Environmental management programme: A programme contemplated in the Mineral and Petroleum Resources Development Act, submitted to and approved by the Director: Mineral Development, and detailing the plan to be adopted and implemented by a mine for managing the environmental effects of the operations of the mine.

Environmental objectives: Those objectives that represent the desired state of environmental components that have been adopted for the mine shaft deposit facility.

Grid pegs: Are set out on 10m intervals and are wooden stakes driven into the ground with the desired elevation painted on each stake

Hazard: The potential of a mine abandoned deposit to cause harm as a consequence of failure.

Intensity of an environmental impact: The severity of the consequences of an environmental impact, as judged by suitably qualified persons.

Manager of a mine (general manager): Any competent person appointed in terms of the Mine Health and Safety Act, 1996 (Act 29 of 1996), to be responsible for the control, management and direction of a mine.

Non beneficial: Not beneficial to the closure objective of the mine.

Perimeter berm: Is an embankment placed at the top outer edge of a stockpile. This berm's function is to prevent rainwater from washing over the edge and down the sides of the stockpile and causing erosion. It is to double up as a safety berm in order to prevent persons from driving or walking over the edge.

Rehabilitated land: Is defined as land that has previously been mined through or areas, which have been disturbed by the mining process. These areas have been levelled, covered with topsoil, fertilized, seeded and are capable of supporting a sustained long-term vegetation cover.

Redundant: Permanently no longer required for mining operation.

Reliability: The probability that a specified event will not occur in a specified time (usually expressed as a ratio, when measured in quantitative terms).

Risk: The probability that a specified event, such as failure, will occur in a specified time.

Scheduled closure: Planned closure of the mine

Significant environmental impact: An impact in respect of which consultation (with the relevant authorities and other interested and affected parties) on the context and intensity of its effects provides reasonable grounds for mitigating measures to be included in the environmental management programme. Significance is determined by the integration of the context and intensity of the effects of the impact, and the likelihood that the impact will occur.

Sump: This is an excavation to temporary hold any surface runoff or any seepage. In the event of this facility being required for extended periods, it should be lined.

Toe drain: A trench excavated down slope of any activity to intercept surface as well as near surface seepage to channel this into a receptor.

Topsoil: means the layer of soil covering the earth which –

(a) provides a suitable environment for the germination of seed;

(b) allows for penetration of water; and

(c) Is a source of microorganisms, plant nutrients and in some cases seed.

Unscheduled closure: The closure cost associated with immediate closure and provision.

ABBREVIATIONS

CoM	Chamber of Mines
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DTM	Digital Terrain Model
DWS	Department of Water and Sanitation
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMP PAR	Environmental Management Program Performance Assessment Report
EMPr	Environmental Management Program
ERA	Environmental Risk Assessment
Ha	Hectare
IDP	Integrated Development Plan
I&AP's	Interested and Affected Parties
IWULA	Integrated Water Use Licence Application
MAP	Mean Annual Precipitation
MAE	Mean Annual Evaporation
MPRDA	Mineral and Petroleum Resources Act
NWA	National Water Act
NEMA	National Environmental Management Act
NEM: WA	National Environmental Management: Waste Act
PPP	Public Participation Process (PPP)
RIP	Rehabilitation Implementation Plan
SAWB	South African Weather Bureau
SLP	Social and Labour Plan
WCMR	Waste Classification and Management Regulations
WUL	Water Use Licence
WWF	World Wildlife Fund

1. INTRODUCTION

Aroams Quarry (Pty) Ltd intends to apply for a mining right to mine 13.6ha of on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern 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, in pit crushing is also taking place, the material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as right holders are informed of each blasting event.

The granite to be mined at the site is found at surface level, and very little to no topsoil exist in the proposed mining area. Topsoil stripping is therefore not viable at the proposed quarry area. The overburden (product that could not be sold) will be removed and stockpiled separately for later use when the quarry is rehabilitated. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as right holders are informed of each blasting event.

Due to the remote locality of the proposed operation no infrastructure will be affected. Existing roads and tracks will be used and in the case of new tracks being developed it will be addressed at final closure and rehabilitation.

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. 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 information used in this report was sourced from the approved EMPr of the Aroams Quarry. As mentioned previously this report consist out of the Final Rehabilitation Plan.

The purpose of this document is to compile the Annual Rehabilitation Plan as well as the Final Rehabilitation, Decommissioning and Closure Plan of the quarry. The following documents forms part of the document:

1. Progressive rehabilitation as reflected in the annual rehabilitation plan; and
2. Final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in the final rehabilitation, decommissioning and mine closure plan.

1.1. OBJECTIVE OF THE REHABILITATION PLAN

The purpose of the Rehabilitation plan is to describe the rehabilitation process that will take place to ensure that the site reaches its full environmental potential. The aim is to ensure that the rehabilitation and environmental objectives associated with the mining activities are met.

The objectives of the Annual Rehabilitation Plan (According to government notice 940 of the NEMA, Act No. 107 of 1998) are to;

- Review concurrent rehabilitation activities already implemented;
- Establish rehabilitation goals and outcomes for the forthcoming 12 and;
- Establish a plan, schedule and budget for the forthcoming 12 months.

The primary objective is to obtain a closure certificate at the end of the life of the mine at minimum cost and in as short a time period as possible whilst still complying with the requirements of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) [MPRDA]. To realise this, the following objectives must be achieved:

- Remove all temporary infrastructure and waste from the site as per the requirements of this EMPr and of the Provincial Department Minerals and Resources.
- Demolish / dispose of all permanent infrastructures with no post - mining use potential.
- Demolish / dispose of all structures with no post-mining use potential.
- Ensure that no threat to underground water quality remains.
- Ensure that all permanent changes in topography are sustainable and do not cause erosion or the damming up of runoff.
- Shape and contour all disturbed areas in compliance with the EMPr.
- Make safe all dangerous excavations or subsidence on the surface.
- Rehabilitate all disturbed areas in compliance with the EMPr and of the Provincial Department Minerals and Resources.
- Ensure that all rehabilitated areas are safe, stable and self-sustaining in terms of vegetation.

2. DETAILS OF THE AUTHOR

Aroams Quarry (Pty) Ltd appointed Greenmined Environmental to prepare the Final Rehabilitation Plan. Mrs. Yolandie Coetzee is the responsible consultant for the project (Full CV is attached as Appendix A).

NAME OF PRACTITIONER:	Yolandie Coetzee
Expertise:	Mrs. Yolandie Coetzee has a BSc (Hons) in Environmental Sciences. Her expertise comprises a range of environmetal services wiich inlcude environental legal compliance audits, financial closure quantum calculations, preperations of Basic Assessments, Environmental Impact Assesments, applications for environmental authorisations, Water Use Licence Applications etc. 9 years experience in Environmental Control and Environmental Performance Assessments.
Professional Affiliations	Registered member of SACNASP *Pri.Sci.Nat*
Declaration of Independence:	I, Yolandie Coetzee in my capacity as environmental control officer declare that I; – • Act as independent environmental control officer in this compliance audit; • Do not have any financial interest in the undertaking of this project, other than the remuneration for the work performed in terms of the provided terms of reference; • Will perform the work relating to the audit in an objective manner, even if the results and findings are not favourable to the holder of the authorisation; • Do not have and will not have any vested interest in the activity other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014; • As a registered member of SACNASP, will undertake my profession in accordance with the Code of Conduct of the Council as well as other associations to which I am a member; • Undertake to disclose and provide to the competent authority any material of information at my disposal regarding this project as required in terms of the National Environmental Management Act and Environmental Impact Assessment Regulations; • Based on the information provided to me by the client and in addition to the information obtained during the course of this audit, I have presented the results and conclusion with regards to this project to the best of my professional ability; • Reserve the right to modify aspects pertaining to this audit should additional information become available through ingoing research and further work on this field; • Undertake to have my work peer reviewed on a regular basis by a competent specialist in the field of study.  Yolandie Coetzee Date: 18 October 2019

3. LEGAL BACKGROUND AND BEST PRACTICE

There are a number of statutory legal requirements that are relevant to this Final Rehabilitation Plan. These include, but are not limited to, the following:

3.1. Constitution of South Africa (Act No. 108 of 1996)

This section provides an overview of the legislative requirements applicable to this project and it includes the Acts, guidelines and policies considered in the compilation of this report. The legislative motivation for this project is underpinned by the Constitution of South Africa, 1996 (Act No. 108 of 1996), which states that:

The State must, in compliance with Section 7(2) of the Constitution, respect, protect, promote and fulfil the rights enshrined in the Bill of Rights, which is the cornerstone of democracy in South Africa. Section 24 of the Constitution:

24. Environment

-Everyone has the right-

(a) To an environment that is not harmful to their health or well-being; and

(b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that-

(i) Prevent pollution and ecological degradation;

(ii) Promote conservation; and

(iii) Secure ecologically sustainable development and use of natural resources while promoting a justifiable economic and social development.

Section 24 of the Constitution of South Africa requires that all activities that may significantly affect the environment and require authorisation by law must be assessed prior to approval. In addition, it provides for the Minister of Environmental Affairs or the relevant provincial Ministers to identify:

- New activities that require approval;
- Areas within which activities require approval; and
- Existing activities that should be assessed and reported on.

Section 28(1) of the Constitution of South Africa states that: *"every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring".* If such pollution or degradation cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution or degradation. These measures may include:

- Assessing the impact on the environment;
- Informing and educating employees about the environmental risks of their work and ways of minimising these risks;
- Ceasing, modifying or controlling actions which cause pollution/degradation;
- Containing pollutants or preventing movement of pollutants;
- Eliminating the source of pollution or degradation; and
- Remedying the effects of the pollution or degradation.

3.2. The Mineral and Petroleum Resources Act (Act No. 28 of 2002) (MRPDA)

Table 1: MRPDA applicable sections

Area Of Concern	Section	Legal Requirements
Environmental Management	Section 37	*Requires that the principles set out in section 2 of NEMA must apply to all prospecting and mining operations, and that the generally accepted principles of sustainable development must be applied by integrating social, economic and environmental factors during the planning and implementation phases of mining projects.*
	Section 38	*Requires the applicant to manage all environmental impacts in accordance with his or her environmental management plan (EMPr) or the approved environmental management program (EMPr).*
	Section 39	*Deals with the requirements of an EMP/EMPr, whichever is applicable.*
Financial Provision	Section 41	*Financial provision needs to be provided and annually asses the environmental liability.*
Closure Certificate	Section 43	*Holder of a mining right is responsible for all environmental liabilities as may be identified in the EMP, application needs to be made to the regional manager for the closure certificate.*
Removal of Infrastructure	Section 44	*When the mining operation comes to an end the mine may not remove buildings, structures or objects which may not be demolished or removed in terms of any other law*

3.2.1. Regulation 527 of the MRPDA

Government Notice No. R.527, as published in the Government Gazette, 23 April 2004 (GG No. 26275, Volume 466) of MPRDA stipulate that the following closure objectives must form part of the EMPr:

- Identify the key objectives for closure of the operation to guide the project design;
- Development and management of environmental impacts;
- Provide future land use objectives for the site; and
- Provide closure costs.

Table 2: Requirements of Government Notice 527

Area of concern	Regulation	Legal Requirements
The need to prevent and alleviate pollution arising from mining activities.	Regulation 42(1)	*Section 42(1) an of the MPRDA stipulates that the closure process must start at the commencement of a mining operation and continue throughout the entire life of the mine. Furthermore, future closure and land use objectives must be included in the EMP Section 42(1) d stipulates that any environmental damage or residual impacts that are identified during the Environmental Risk Assessment (ERA) phase must be acceptable to all Interested and Affected Parties (I&AP's) in line with Section 24(a) of the National Constitution (see Paragraphs 19.5.3 & 19.5.4 and Figures 6 & 7).*
	Regulation 43	*A closure plan contemplated in Section 43(3)(d) of the Act, forms part of the EMPr or EMP, as the case may be, and must include – a summary of the results of progressive rehabilitation undertaken*
Part III of R527 deals with environmental regulations for mineral development, petroleum exploration and production	Regulations 56	*In accordance with applicable legislative requirements for mine closure, the holder of a prospecting right, mining right, retention right or mining right must ensure that –The land is rehabilitates, as far as is practicable, to its natural state, or to a predetermined and agreed standard or land use which conforms with the concepts of suitable development*

3.3. The National Water Act (Act No. 108 of 2008) (NWA)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the NWA is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways, which take into account:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Facilitating social and economic development;
- Providing for growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- **Reducing and preventing pollution and degradation of water resources**;
- Meeting international obligations; and
- Managing floods and droughts.

The following sections of the Act are relevant:

Table 3: NWA applicable sections

Area of concern	Section	Legal Requirements
Prevention and remedying effects of pollution.	Section 19	*Any situation exist or which may cause or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.*
Control of emergency incidents	Section 20	*Incidences of pollution needs to be reported the Department and the relevant catchment agency.*

3.3.1.1. Regulation 398 of the National Water Act (March 2004)

Table 4: NWA Regulations applicable sections

Area of concern	Regulation	Legal Requirements
Rehabilitation of river diversions –Section 21(c)	1.7. (1)(c)(vii)	*All necessary measures are taken to stabilise the diversion structure and surrounding area,* *This will include: -* *(aa) rehabilitation of the riparian habitat integrity by ensuring that during rehabilitation only indigenous shrubs and grasses are used in restoring the biodiversity;* *(bb) rehabilitation of disturbed and degraded riparian areas to restore and upgrade the riparian habitat integrity to sustain a biodiversity riparian ecosystem;*
Rehabilitation of river diversions –Section 21(c)	1.7. (1)(c)(vii)	*All reasonable measures must be taken to ensure –* *(c) rehabilitation of the watercourse, including riparian and in stream habitat, is undertaken after any impendence or diversion of flow*

3.4. National Environmental Management Act (Act No. 107 of 1998) (NEMA)

The National Environmental Management Act (NEMA) strives to regulate national environmental management policy and is focussed primarily on co-operative governance, public participation and sustainable development. NEMA makes provisions for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state and to provide for matters connected therewith.

The following sections are relevant:

Table 5: NEMA Applicable Sections

Area of concern	Section	Legal Requirements
Principles that may significantly affect the environment	Section 28	*General duty of care on every person who causes, has caused or may cause significant pollution or degradation of the environment to take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.*
Control of emergency incidents	Section 30	*Incidences of pollution needs to be reported the Department.*
EMP	Section 34	*A draft* EMP *must include –* *information on any management or mitigation measures that will be taken to address the environmental impacts that have been identified in a report contemplated by these Regulations, including environmental impacts or objectives in respect of –* *(iv) rehabilitation of the environment;* *as far as reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally acceptable principle of sustainable development, including where appropriate, concurrent or progressive rehabilitation measures*

3.4.1. Regulation 1228 of NEMA, 1998

NEMA, GNR 1228 GG 41236, known as the NEMA Financial Provision Regulations, 2015 (amended 2017), was promulgated in November 2015, and in terms of these regulations holders of a mining right are allowed a transitional period of 39 months (19 February 2019) from the date of promulgation to comply.

As mentioned earlier the right holder must annually update the annual rehabilitation, final rehabilitation and remediation of latent environmental impacts and ensure it is compliant with the Financial Provision Regulations of 2015. The reports need to be conducted in the format that was supplied in the regulations as per Appendix 5 and Appendix 6.

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

The rehabilitation measures must be aligned with the objections of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM: WA) which includes:

(a) To protect health, well-being and the environment by providing reasonable measures for—

(i) Minimising the consumption of natural resources;

(ii) Avoiding and minimising the generation of waste;

(iii) Reducing, re-using, recycling and recovering waste;

(iv) Treating and safely disposing of waste as a last resort;

(v) Preventing pollution and ecological degradation;

(vi) Securing ecologically sustainable development while promoting justifiable economic and social development;

(vii) Promoting and ensuring the effective delivery of waste services;

(viii) Remediating land where contamination presents, or may present, a significant risk of harm to health or the environment; and

(ix) Achieving integrated waste management reporting and planning;

(b) To ensure that people are aware of the impact of waste on their health, well-being and the environment;

(c) To provide for compliance with the measures; and

(d) Generally, to give effect to Section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being.

3.5.1. Waste Classification and Management Regulations, 2013 (Government Notice NR: 634):

Waste Classification and Management Regulations (WCMR) promulgated under the National Environmental Management: Waste Act, 2008 (NEM: WA) (effective 2013) provides mechanisms to:

- Facilitate the implementation of the waste hierarchy to move away from landfill;
- Reuse, recovery and treatment;
- Separate waste classification from the management of waste;
- Divert waste from landfill and into utilisation where possible; and
- Provide measures to monitor the progress.

The Waste Classification and Management Regulations ultimately enables the improved and more efficient classification and management of waste; provide for safe and appropriate handling, storage, recovery, reuse, recycling, treatment and disposal of waste and will also enable accurate and relevant reporting on waste generation and management. All waste generators, excluding domestic generators, must ensure that the waste they generate is classified within 180 days of its generation.

All wastes that were classified in terms of the "Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste in terms of the Department of Water Affairs'' (2nd Edition, 1998; Department of Water Affairs and Forestry) or alternative classifications that were approved prior to the WCMR taking effect, must be re-classified and assessed within three years from the commencement of these Regulations.

Reference is made to the NEM: WA, part 8 of Chapter 4 regarding contaminated land:

All owners of land that is significantly contaminated become obliged to report that contamination is occurring. Part 8 of Chapter 4 is concerned with the remediation of contaminated land. This new legal regime for identifying contaminated land, determining its status and the risk that it poses, and regulating the remediation process is introduced. This law imposes significant legal obligation on the owners of land and on those who cause contamination, with potentially serious financial consequences.

Part 8 applies where the pollution only manifest sometime after the contamination occurred and also where the action of a person (for example, the excavation of land pursuant to a development) results in a change to pre-existing contamination. Along with the notice brining Part 8 into effect, norms and standards for the remediation of contaminated land and soil quality (list certain contaminants and specify soil screening values for human health and environmental protection). This act also has several important implications for the sale of and, sellers who know that their lands is contaminated can no longer keep silent and this is classified as an offence.

3.6. Other Acts That Is Relevant to Mine Rehabilitation

- The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- The South African Mineral Resource Committee (SAMREC) Code. Of particular importance in this regard is the determination of whether Aroams Quarry has made an adequate provision for environmental rehabilitation in terms of Section 41 of the MPRDA.

3.7. Best Practice and International Guidelines

Mine closure is an international challenge. South Africa has produced various well known and reputable guidelines on matters directly linked and or associated with mine closure. Such was the need for guidelines to manage mine closure provisions in a consistent manner provided for by the DMR (2005).

These guidelines are the only official mine closure guideline as contemplated in Regulation 54(1) in the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002). Of particular importance is that this guideline document governs the closure cost assessment process in South Africa and is applied by the DMR through its respective regional managers in each province.

The Chamber of Mines (CoM) (2007) issued a guideline for the rehabilitation of mined land. This document is a result of scientific knowledge experts. It is an on the ground reference document which provides written guidelines on the best rehabilitation techniques. Of value is how the document distinguishes between the financing, the planning and the licensing components of a typical mining program.

The World Wildlife Fund (WWF) in 2012 published a discussion document named the “Financial provision for the rehabilitation and closure in South African Mining: Discussion Document on Challenges and recommended improvements”. The document focuses on the adequacy of financial provisions and pulls a very strong link between insufficient financial allocations and that of derelict and abandoned mines in South Africa. The document further emphasizes the importance of establishing a dependency between the EMPr/EMP and financial provision which is updated and adequate

Recently a released guideline from the Government of Western Australia (GWA 2011) provides insight to the importance of mine closure. The guidelines (GWA 2011) in particular state that planning for mine closure is a critical component of environmental management in the mining industry. Notably is that this industry leading practice also requires that planning for mine closure should start before mining commences and should continue throughout the life of the mine until final closure and relinquishment. This approach enables better environmental outcomes. It is also good business practice as it should avoid the need for costly remedial earthworks late in the project lifecycle.

4. PROJECT CONTEXT

Aroams Quarry (Pty) Ltd intends to apply for a mining right to mine 13.6ha of on a portion of portion 2 (remaining extent) of the farm Aroams 57, which falls in the Khâi-Ma Municipality Local Municipality in the Registration Division of Namaqualand RD, Northern 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, in pit crushing is also taking place, the material is then loaded and hauled out of the excavation to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

The granite to be mined at the site is found at surface level, and very little to no topsoil exist in the proposed mining area. Topsoil stripping is therefore not viable at the proposed quarry area. The overburden (product that could not be sold) will be removed and stockpiled separately for later use when the quarry is rehabilitated. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

Due to the remote locality of the proposed operation no infrastructure will be affected. Existing roads and tracks will be used and in the case of new tracks being developed it will be addressed at final closure and rehabilitation.

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. 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.

Site Establishment / Construction phase:

There will be no site establishment / construction phase as Lime Sales will continue working from the SPH mining permit area into the Lime Sales mining permit area. Lime Sales will be using the same processing area that was used by SPH Kundalila during the mining permit timeframe. Potential expansion (less than 1ha) of this proposed processing area will take place.

During the site establishment phase the applicant have to fence the footprint area and clear the topsoil from the applied area, it should be noted that there is very little topsoil on site.

Upon stripping, the topsoil will be stockpiled along the boundaries of the mining area to be used during the rehabilitation phase. Topsoil stripping will be restricted to the areas to be used for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite stockpiling and mining. The complete A-horizon (topsoil – the top 100 – 200 mm of soil which is generally darker coloured due to high organic matter content) will be removed. If it is unclear where the topsoil layer ends the top 300 mm of soil has to be stripped. The topsoil will be stockpiled in the form of a berm alongside the boundary of the mining area where it will not be driven over, contaminated, flooded or moved during the operational phase. The topsoil berm will measure a maximum of 1.5 m high and should be planted with indigenous grass species if vegetation does not naturally establish within 6 months of stockpiling to prevent soil erosion and to discourage growth of weeds. The roots of the grass will also improve the viability of the soil for rehabilitation purposes.

The proposed mining area was previously used for Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining and therefore no construction phase is applicable. The area need to be cleared of topsoil and an access road already exist. The expansion of the quarry pit will be handled as part of the operational phase of the quarry. As the infrastructure are temporary the use of infrastructure and machinery that is either track-based or can be removed without difficulty. Temporary infrastructure to be used in the mining method will entail a temporary weighbridge and chemical toilet, with servicing of vehicles and equipment being done on-site at the workshop and washbay of the applicant. An on-site office will also be used for all administration purposes relating to the project.

During the site establishment phase the applicant, have to demarcate the boundaries of the site and fence the entire mining area.

EXISTING INFRASTRUCTURE:

As stated above, the proposed mining area will be established adjacent to an existing quarry

The following structures are present within a 3 km radius from the proposed mining area:

- ±150m from site: Borehole with pump
- ±890 m from site: Cement dam with water pipe line
- ±2.5 km from site: N14 national road

The impact of the proposed mining area on the infrastructural features of the surrounding area is deemed to be of very low significance. The impact of the mining activities will be concentrated within the 13.6ha footprint area of the mine.

Generators and solar power panels will be used to power the infrastructure on site. Future endeavours will dictate if or when an Eskom connection will be secured. 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. Potable water will be transported to site daily. See the requested map attached as Appendix B.

Operational phase:

The proposed mining site will be an extension of the existing quarry pit previously distributed by stone Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite mining activities. 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, where primary crushing is conducted in the pit, to the mobile crushing and screening plants. The granite will be stockpiled and transported to clients via trucks and trailers. All activities will be contained within the boundaries of the site. Blasting of rock and secondary blasting could occur more than once a month. The noise caused by blasting will be instantaneous and of short duration. As there are no residents within close proximity to the proposed mining area, the blasting at the site will not have an adverse effect on surrounding landowners. The applicant must ensure that all surrounding residents as well as permit holders are informed of each blasting event.

Mine area:

- Demarcating the mining area:
- The mining area will be clearly demarcated by means of beacons at its corners, and along its boundaries if there is no visibility between the corner beacons.
- Permanent beacons will be firmly erected and maintained in their correct position throughout the life of the operation.
- The blasted material is loaded with earth moving equipment onto tipper trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After crushing

and screening has taken place in the plant the crushed material is transported to the stockpile area. This activity will be continuous throughout the operation phase.

Mineral Processing:

- The mining methods will make use of blasting by means of explosives in order to loosen the hard rock and the material will then be loaded and hauled out of the excavation and loaded onto a mobile crusher plant in the mining area. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite will then be stockpiled and transported to clients via transporting trucks and trailers. Aggregate will be recovered mechanically with drilling equipment, excavating equipment, earth-moving equipment, mobile crushing & screening plants. The Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite that is recovered will be loaded on tipper trucks from where it will be transport to an area where it will be screened and stockpiled. Blasting noise will be instantaneous and of short duration. This will only occur once every two to three weeks. The blasted material is primarily crushed in the quarry by the blast. It is then loaded with earth moving equipment into trucks, which carts it to the crushing plant. Here it is fed into the crushers by means of a system of conveyor belts. After the crushing and screening has taken place in the plant the crushed material is transported into stockpile.
- Deliveries are made from the Aggregate, Granite, Aggregate, Gravel, Granite and Dolomite and Dolerite stockpiles. Delivery is by truck or alternatively it is collected by the client's transport.
- Approximately fourty five (45) will be employed at the site.

The stockpiling process includes mechanical loading and transportation of the sought granite. As mentioned previously the granite will be loaded with a front end loader onto trucks upon which it will be weighed and transported to the client. The product stockpiling activities will consist of the following:

- ***Loading of granite;***
- ***Weighing of granite; and***
- ***Transportation of granite.***

Working hours:

- All proceedings will be undertaken in 24 hours' day shifts to meet schedule demands.
- Two Shifts will be worked:
  - Sunrise to Sunset
  - Sunset to Sunrise

Plant Residue Disposal:

- No plant residue is generated that need to be disposed. Unsuited material will be put back into the excavations.

Roads and Transport:

- The site is located off the N14. Turn right on the unnamed road leading to Aroams Quarry. Haul trucks will travel along the existing farm road up to the N14. Turning right they will travel along the existing road, as illustrated below.

A chemical toilet (flushable) will be established on site to be used by the employees. The existing farm and provincial roads currently used to gain access to the property will be used to transport the granite from the mining site to the client. Haul trucks will travel along the existing farm road up to the provincial/public road. Turning onto the N14, they will travel along the existing N14 road, as illustrated below.

- In the event that new roads need to be constructed, these roads will be selected as far as possible to avoid watercourses and steep gradients. Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.
- Any new roads to be established to the site will be below the threshold of the EIA regulations of the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended June 2014
- The existing farm road will be used as access road to the site. Should a portion of the access road need to be newly constructed in future the following will be adhered to:
    - The route will be selected that a minimum number of bushes or trees are felled and existing fence lines will be followed as far as possible.
    - Adequate drainage and erosion protection in the form of cut-off berms or trenches will be provided where necessary.

Water:

- Process water will be obtained from the municipal line that runs across the property. Water will be bought from the municipality. The water will mainly be used for dust suppression purposes on the crusher plant, roads and mining area. T Potable water will be transported to site daily. The solid waste produced during the operational phase of the project will be transported from site to the nearest landfill site.

Decommissioning phase:

- ***The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use. The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.***
- ***Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.***
- ***Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.***

The decommissioning activities will consist of the following:

- Landscaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

The closure objectives for the mining area is to be made safe, and the remainder of the site to be returned to agricultural use (grazing). The perimeter of the site will be subject to top-dressed with topsoil and vegetated with an appropriate grass mix if vegetation does not naturally establish in the area within six months of the replacement of the topsoil.

Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding (if applicable) has been done in an area.

Site management will implement an alien invasive plant management plan during the 12 months' aftercare period to address germination of problem plants in the area.

The decommissioning activities will consist of the following:

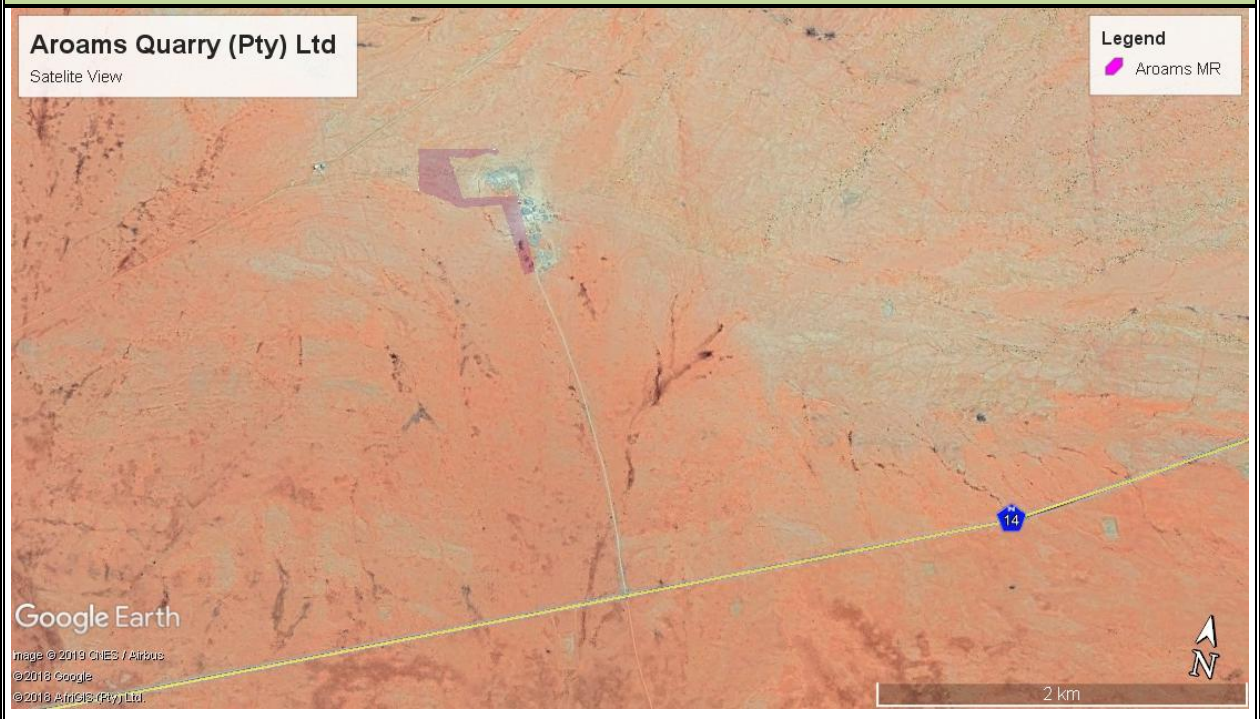
- Reshaping during rehabilitation;
- Replacing of topsoil; and
- Implementation of an alien invader plant management plan.

Right Number:	**NC 30/5/1/2/2/10156MR**	**Date of Commencement:**	13 April 1013
Site Name:	Aroams Quarry	**Inspection Date:**	29 May 2018
Contractor:	Aroams Quarry (Pty) Ltd (Pty) Ltd	**Report Number:**	Rehabilitation Plan
ECO:	Yolandie Coetzee	**Other Authorisations:**	None

Site Location:	Aroams Quarry is situated approximately 0.7 km East of the R33, 14.55km North-West of Carolina, Northern Cape Province. The area earmarked for 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.	
Site Coordinates:	A – 25.964892°S; 30.023357°E B – 25.966291S; 30.021705°E C – 25.967790°S; 30.023021°E D – 25.966602°S; 30.024680°E	A 25°57'53.61"S 30° 1'24.09"E B 25°57'58.65"S 30° 1'18.14"E C 25°58'4.04"S 30° 1'22.88"E D 25°57'59.77"S 30° 1'28.85"E

The mining area extends over an existing quarry pit previously distributed by stone aggregate mining activities.

2017 GOOGLE IMAGE OF THE MINING AREA



5. CLOSURE STRATEGY GUIDED BY THE ENVIRONMENTAL RISK ASSESSMENT

The overall objective of the final rehabilitation plan is to minimize adverse environmental impacts associated with the quarrying activities whilst maximising the future utilisation of the property. The idea therefore, is to leave the mined out dolerite quarry in a condition that reduces all negative impacts associated with the area.

Significant aspects to be borne in mind in this regard is visibility of the mining scar, revegetation of the mining footprint, and stability in an old mine environment. The depression and immediate area of the working must also be free of weeds and alien vegetation.

The quarrying and rehabilitation procedures was formulated to optimise the extraction of raw material while creating stable quarry sides that will not present an unreasonable safety risk once mine closure was approved. Mining operations will be conducted in stages, corresponding to the creation of precision blasted quarry sides and benches towards the base of the working.

The decommissioning phase and closure of the quarry will in addition to precision blasted quarry faces involve removal of all debris and rehabilitation of areas not rehabilitated during the operational phases of the project. This will comprise the scarification of compacted areas, reshaping of areas, top soiling and regeneration of all prepared surfaces. The crusher and screening plants will be dissembled and all other infrastructural development such as haulage roads and stockpile areas will be rehabilitated.

6. DESIGN PRINCIPLES

The design principles stipulated below (as extracted from the EMPR) were approved in 2015. It is suggested that new design principles be aligned to the current site conditions with the future closure goals of Aroams Quarry.

Mining activities are to be undertaken in a manner which facilitates site rehabilitation and the restoration of existing land capabilities. The primary objectives for rehabilitation includes:

a) The facilitation of the re-establishment of the land use and capability to as close as reasonably to the original conditions;
b) Removal of all infrastructure and material introduced to site
c) Removal of all wastes and their and their related disposal; and
d) And promotion of the rapid re-establishment of natural vegetation and the restoration of site ecology.

The disturbed areas shall be rehabilitated to ensure that:

- The biodiversity habitat is encouraged by the new land use after the Mining;
- Future public health and safety are not compromised;
- The site is reversed to almost its original state;
- Environmental and resources are not subject to physical and chemical deterioration;
- The after-use of the site is beneficial and sustainable in the long term;
- Any adverse socio-economic impacts are minimized; and
- All socio-economic benefits are maximized.

This will be done by complying with the conditions in the environmental management program below, and relevant statuary requirements. The contractor and employee will be made aware of their environmental responsibilities and will be empowered to execute the work program in compliance with the requirements of this EMPR.

The following closure objectives are proposed with regard to rehabilitation of the Mining area:

- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):
  - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
  - The topsoil will be placed back as a growth medium and the sides of the excavation will be sloped with acceptable contours (40º) to prevent soil erosion.
- No trees to be removed over areas where Mining is required.
- Rehabilitation will be conducted after the prospect drilling is complete.
- Rehabilitation will be ongoing and conform to 400 m^2 being stripped of topsoil and 400 m^2 being rehabilitated after the oversized and processed soil is worked back into the excavation.
- Thus there will only be 400 m^2 of land open for rehabilitation in operational times.
- Fill and topsoil could be placed over the slopes to provide a suitable medium for the establishment of vegetation.
- No waste will be right ted to be deposited in the excavations.
- If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed 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.
- Photographs of the camp and office sites, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.
- Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred.
- All Temporary Infrastructures, equipment, plant, temporary housing 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 recognized landfill facility, proof of this removal will be kept on file at the applicant's office. It will not be right ted to be buried or burned on the site.
- Weed / Alien clearing will be done in a sporadic manner during the life of the Mining activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.
- Final rehabilitation shall be completed within a period specified by the Regional Manager.

6.1. Rehabilitation of the excavation area

Due to the impracticality of importing large volumes of fill to restore the quarry area to its original topography, the rehabilitation option is to develop the quarry into a minor landscape feature. This will entail creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes on the benches below, thereby reducing the overall face angle. Oversized rocks and overburden will be used to make the quarry safe.

Fill and topsoil could be placed over the benches 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. The floor of the quarry should be capped with suitable soil material and re-vegetated. Rocks and coarse material removed from the excavation must be dumped into the excavation.

No waste will be right ted to be deposited in the excavations. The area shall be fertilized 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, the Regional Manager may require that the soil be analysed 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.

6.2. Rehabilitation of office, workshop and storage area

Coarse natural material used for the construction of ramps must be removed and dumped into the excavations. Stockpiles will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium. On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

Photographs of the office sites and workshop, before and during the mining operation and after rehabilitation, shall be taken at selected fixed points and kept on record for the information of the Regional Manager.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred. The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

6.3. Rehabilitation of the processing area, including the plant area

Coarse natural material used for the construction must be removed and dumped into the excavations. Stockpiles will be removed during the decommissioning phase, the area ripped and the topsoil returned to its original depth to provide a growth medium. On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002):

- Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
- Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.

On completion of mining operations, the surface of these areas, if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 200mm and graded to an even surface condition. Where applicable/possible topsoil needs to be returned to its original depth over the area.

Prior to replacing the topsoil, the material that was removed from these areas will be replaced in the same order as it originally occurred. The area shall then be fertilized if necessary to allow vegetation to establish rapidly. The site shall be seeded with a local, adapted indigenous seed mix.

If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, the Regional Manager may require that the soil be analysed and any deleterious effects on the soil arising from the mining operation be corrected and the area be seeded with a seed mix to his or her specification.

On completion of mining, the surface of the processing areas (especially if compacted due to hauling and dumping operations) shall be scarified to a depth of at least 200 mm and graded to an even surface condition, and the previously stored topsoil will be returned to its original depth over the area;
The area shall be seeded with local indigenous seed mix. Fertilisers should be avoided as far as possible to avoid nutrient loading of the nearby drainage channel.

6.4. Final rehabilitation:

Rehabilitation of the surface area shall entail reshaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.

All infrastructures, equipment, plant, temporary housing 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 recognized landfill facility. It will not be right ted to be buried or burned on the site.

Weed / Alien clearing will be done in a sporadic manner during the life of the mining activities. Species regarded as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species regarded as need to be eradicated from the site on final closure. Final rehabilitation shall be completed within a period specified by the Regional Manager.

Seeding of the area:

Once the pit slopes have been shaped and the soil replaced, the initial goal is to establish a good cover of a robust grass that will stabilise the soil and start the accumulation of soil organic carbon. This will be done using a combination of hydro seeding and physical planting of runners to apply a mix of commercial and indigenous species that includes both tufted and creeping species. The plants that were collected during the establishment and operational phases and kept in the designated area will be replanted.

7. POST MINING LAND USE

Upon rehabilitation the mining area will revert back to agricultural use and be suitable for grazing purposes. Upon closure the quarry pit will be left as a minor landscape feature.

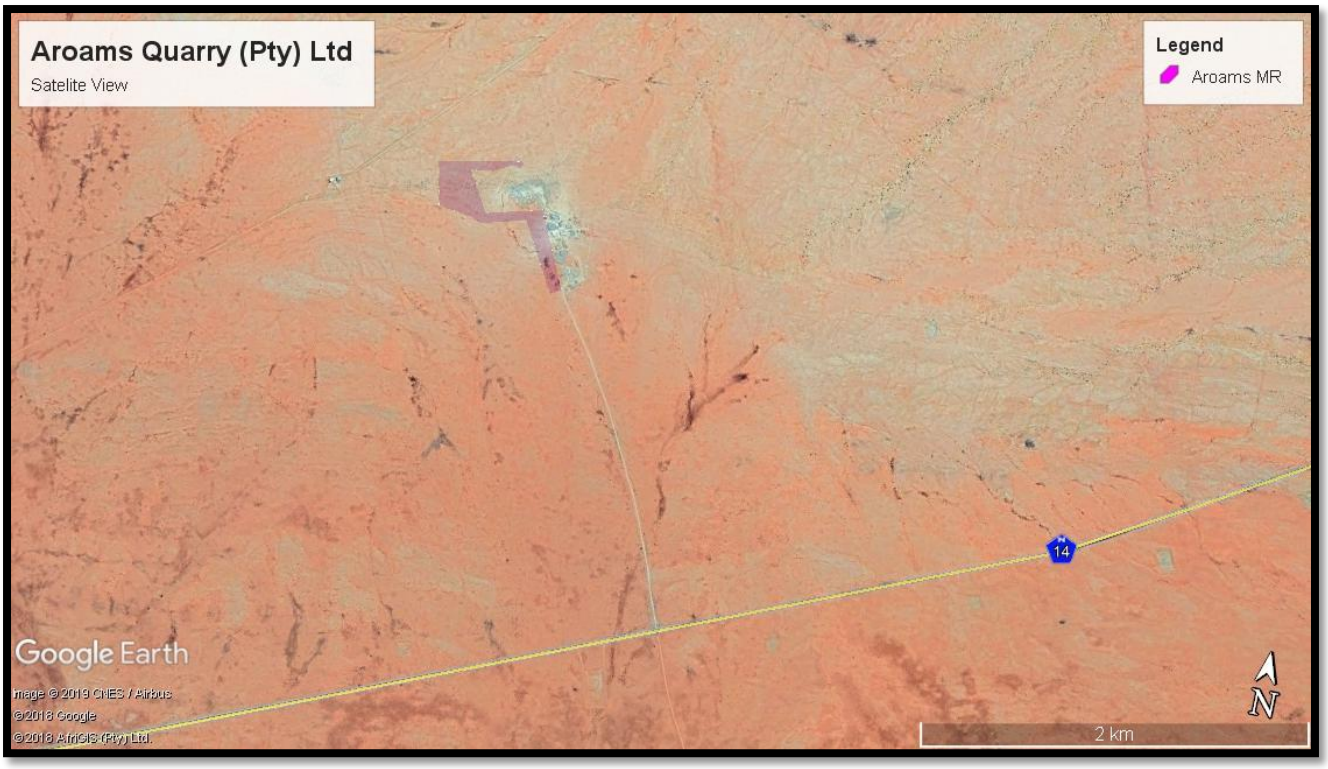


Figure 1: Google Earth Satellite Image (2018)

8. CLOSURE ACTIONS

The environment affected by the mining operations must be rehabilitated, as far as is practicable, to its natural state or to a predetermined and agreed to standards or land use which conforms with the concept of sustainable development.

6.1 Rehabilitation of the excavation area

- Creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes on the benches below, thereby reducing the overall face angle.
- Fill and topsoil placed over the benches to provide a suitable medium for the establishment of vegetation.
- The floor of the quarry should be capped with suitable soil material and re-vegetated.
- Rocks and coarse material removed from the excavation must be dumped into the excavation.
- No waste will be right ted to be deposited in the excavations.
    - *Raumix Mining Right area has been rehabilited with overburden rock being pushed into quarry area. Floor of quarry cannot be capped as it is still used for access to the SPH mining right area.*

6.2. Rehabilitation of office, workshop and storage area

- On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act [MPRDA], 2002 (Act No. 28 of 2002):
    - Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped.
    - Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.
    - The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
- Are must be scarified to a depth of at least 200mm and graded to an even surface condition. Where applicable / possible topsoil needs to be returned to its original depth over the area.
    - *No rehabilitation of the office, workshop or storage areas has been conducted.*

6.3 Rehabilitation of the processing area, including the plant area

- Shall be scarified to a depth of at least 200 mm and graded to an even surface condition, and the previously stored topsoil will be returned to its original depth over the area;
- The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.
    - *No rehabilitation of the processing areas has been conducted.*

6.4. Final rehabilitation:

- Rehabilitation of the surface area shall entail landscaping, levelling, top dressing, land preparation, seeding and maintenance, and weed / alien clearing.
- All infrastructures, equipment, plant, temporary housing 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 recognized landfill facility. It will not be right ted to be buried or burned on the site.
- Weed / Alien clearing will be removed as classified by as the National Environmental Biodiversity Act [NEMBA] (Act No. 10 of 2004) Alien and Invasive Species Regulation GNR 598 and 599 of 2014 Species
- Final rehabilitation shall be completed within a period specified by the Regional Manager.
    - *No final rehabilitation can be conducted on site as the site is still active.*

6.5. Seeding of the area

Once the pit slopes (40º) have been shaped and the soil replaced, the initial goal is to establish a good cover of a robust grass that will stabilise the soil and start the accumulation of soil organic carbon. This will be done using a combination of hydro seeding and physical planting of runners to apply a mix of commercial and indigenous species that includes both tufted and creeping species. The plants that were collected during the establishment and operational phases and kept in the designated area will be replanted.

1.1.1.1. Species selection

The species selection will be based on the flora surveys that were carried out during the impact assessment for the project. These surveys were conducted by consultants who are experts in the area of botanic surveys. It is likely that additional surveys will be undertaken throughout the project life to supplement these initial surveys. The latter will maximise the coverage of the areas and knowledge of the species present after varying seasonal rainfall conditions including post cyclonic surveys.

Possible species selection could include:
Prominent species are as follow:

Dwarf shrubs

Aridaria noctiflora	*Eriocephalus microphyllus*	*Galenia fruticosa*
Lycium bosciifolium	*Pentzia spinescens*	*Plinthus karroicus*
Pteronia mucronata	*Rhigozum trichotomum*	*Rosenia humilis*
Sarcostemma viminale	*Tetragonia arbuscula*	

Grasses

Aristida adscensionis	*Aristida congesta*	*Centropodia glauca*
Enneapogon desvauxii	*Schmidtia kalahariensis*	*Stipagrostis brevifolia*
Stipagrostis ciliate	*Stipagrostis obtusa*	

Forbs

Barleria rigida	*Berkheya spinosissima*	*Crassula muscosa*
Dicoma capensis	*Gazania lichtensteinii*	*Grielum humifusum*
Hermannia spinosa	*Hirpicium echinus*	*Manulea nervosa*
Monechma incanum	*Peliostomum leucorrhizum*	*Requienia sphaerosperma*
Ruschia robusta	*Salsola tuberculata*	*Senecio cotyledonis*
Sesamum capense	*Tribulus zeyheri*	*Zygophyllum flexuosum*
Zygophyllum microphyllum		

The mining area is situated within the Nama-Karoo Biome. The vegetation consists of Bushmanland Arid Grassland vegetation type (NKb 3 according to Mucina and Rutherford, 2006) covering an area of 45478.96 ha that is rated as least threatened with little of the area transformed. Erosion in this vegetation type is deemed to range from very low (60%) to low (33%).

A large amount of pioneer species occurs within the proposed mining area due to previous disturbance dominated by *Galenia fruticosa* and *Tetragonia arbuscula*.

The dominant species outside the disturbed area is covered by sparse open grassland, with prominent *Stipagrostis* grass species, along with scattered drought resistant

1.1.1.2. Establishment

The initial establishment of the indigenous vegetation will be from the seed bank contained within the topsoil. Due to Aroams Quarry proactive approach to topsoil management by returning the topsoil as soon as practicable to the rehabilitated areas (typically within a few weeks), it is likely that the seed bank from the topsoil will be maximised.

The propagation of indigenous species from the seed bank in the topsoil is a technique that can be utilised. If establishment is shown to be ineffective, trials of directly seeding the areas with a seed mix of indigenous vegetation will be undertaken. The final seed mix for a particular area will depend on the species that have already established.

1.1.1.3. Seed collection, processing and storage

Seed collection will be undertaken if the establishment of indigenous vegetation from the topsoil does not achieve the re-vegetation criteria. Seed used to re-vegetate an area will be sourced from the general location of the rehabilitation works. The collection, processing and storage methods implemented will be species specific. Generally, the following will be applied to collection, processing and storage methods:

- The capsules or pods that are collected may be dried in the sun or in an oven or cones may be burnt to release the seeds;
- Clean seed will be stored in dry, insect and vermin proof containers;
- Containers will be clearly labelled with details of the species, date collected and collection location;
- The seed may be treated with an insecticide and fungicide prior to storage;
- The seed storage area will be regularly fumigated if necessary;
- The seeds will be stored in a low humidity low temperature environment; and
- The seeds of some species may require pre-sowing treatment. This may include heat and/or smoke treatment. The species that are targeted for collection will be investigated to determine the most appropriate pre-sowing treatment.

1.1.2. Alien invasive control

An alien invasive species management plan has been developed for the project. Based on the vegetation surveys areas that contain a high density of weeds will be identified and appropriately managed. One such management technique will be the development of a vehicle hygiene procedure. Surveys of the rehabilitated areas will also be undertaken to determine species diversity, including classification categories according to NEMBA

Alien invasive species was identified on site and are subject to an eradication programme in accordance with the Botanical specialist recommendations. The various plants are classes according to the National Environmental Management, Biodiversity Act (Act No. 10 of 2004) (NEM: BA) and the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA). No alien invasive vegetation should be allowed in private areas in this site, in this context it is particularly important that no *Pennisetum clandestinum* (Kikuyu grass) be allowed on any erven bordering natural areas, as it is a highly invasive. *Stenotaphrum secundatum* (buffalo grass) is a suitable non-invasive alternative.

1.1.3. Fauna

Aroams Quarry will aim to encourage native fauna to return to the rehabilitation areas. Some of the invertebrate species will be introduced in the topsoil. This introduction will be maximised through the direct return of topsoil to the rehabilitated areas. Typically, faunal groups will quickly colonise any area which contain the resources they require such as food, shelter and breeding sites. As one of Aroams Quarry closure objectives is to re-establish a self-generating ecosystem comprising local native vegetation which resembles the surrounding environment, as close as practical, this will encourage the return of native fauna.

Aroams Quarry will also investigate the feasibility of using the cleared vegetation to encourage the return of fauna, for example by establishing log piles for shelter.

9. CLOSURE SCHEDULE

At this stage it is that the rehabilitation of the mining area will take approximately twelve months to complete.

The timeframes of implementation for the rehabilitation activities are as indicated below. According to the MPRDA Section 43 (4) refers to the issues of a closure certificate.

"Issuing of a closure certificate 43 (MPRDA)

(4) An application for a closure certificate must be made to the Regional Manager in whose region the land in question is situated within 180 days of the occurrence of the lapsing, abandonment, cancellation, cessation, relinquishment or completion contemplated in subsection (3) and must be accompanied by the prescribed environmental risk report.

Table 6: Closure Schedule

CLOSURE SCHEDULE	
DECOMMISSIONING / CLOSURE ACTION	**TIMEFRAME**
REHABILITATION OF THE QUARRY PIT AREA	
Quarry Pit: • Creating a series of irregular benches along the quarry faces, the top edges of each face being blasted away to form slopes on the benches below, thereby reducing the overall face angle. • Fill and topsoil placed over the benches to provide a suitable medium for the establishment of vegetation. • The floor of the quarry should be capped with suitable soil material and re-vegetated. • Rocks and coarse material removed from the excavation must be dumped into the excavation. • No waste will be right ted to be deposited in the excavations.	Week 1 – 25
REHABILITATION OF THE OFFICE, WORKSHOP AND STORAGE AREA	
• On completion of operations, all structures or objects shall be dealt with in accordance with section 44 of the Mineral and Petroleum Resources Development Act [MPRDA], 2002 (Act No. 28 of 2002): o Where sites have been rendered devoid of vegetation/grass or where soils have been compacted owing to traffic, the surface shall be scarified or ripped. o Areas containing French drains shall be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface. o The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora. • Are must be scarified to a depth of at least 200mm and graded to an even surface condition. Where applicable / possible topsoil needs to be returned to its original depth over the area.	Week 26 – 38
REHABILITATION OF PROCESSING AREA INCLUDING THE PLANT/ CRUSHING AND SCREENING AREA	
Processing Areas: • Scarify the surface of the processing area (especially if compacted due to hauling and dumping operations) to a depth of at least 200 mm and grade the area to an even surface condition; • Return the previously stored topsoil to its original depth over the area; • Seed the area with a local indigenous seed mix. Avoid fertilisers as far as possible to prevent nutrient loading of the nearby drainage channel.	Week 39 – 44
REHABILITATION OF STOCKPILE AREA	
Supporting infrastructure: • Scarify the surface of the processing area (especially if compacted due to hauling and dumping operations) to a depth of at least 200 mm and grade the area to an even surface condition; • Return the previously stored topsoil to its original depth over the area; • Seed the area with a local indigenous seed mix. Avoid fertilisers as far as possible to prevent nutrient loading of the nearby drainage channel.	Week 45 – 52
MAINTENANCE AND AFTER CARE	
• Erosion Monitoring • Weeds and Invader Plant Control	12 months duration after final closure of the mining area

10. IMPLEMENTATION AND RESPONSIBILITY OF CLOSURE PLAN

Implementation of the Final Rehabilitation, Decommissioning and Mine Closure Plan is ultimately the responsibility of Aroams Quarry (Pty) Ltd / Lime Sales (Pty) Ltd. 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.

10.1. Site Management Responsibility List:

- Inspect area for erosion and soil compaction;
- Soil survey and soil quality and depth monitoring;
- Inspect area for erosion and pooling;
- Inspect water management facilities;
- Surface water monitoring;
- Groundwater monitoring;
- Floral surveys need to be conducted to monitor cover abundance, plant succession and community structure;
- Monitor any ecologically sensitive species should they be observed on site; and
- Monitor alien invasion of plant;
- Report on any new faunal discoveries;
- Inspect area for erosion and soil compaction.

10.2. Environmental Control Officer Responsibility List:

- An ECO is appointed by the client. The ECO will report to the client on a monthly basis where he/she will provide all applicable environmental concerns that have occurred and how he/she managed to mitigate them successfully. The general duties of the ECO include the following;
- Conduct an environmental induction prior to construction of development;
- Provide the relevant competent authorities with all ***right*** s on request;
- Provide environmental solutions to problems occurring on site;
- Establish site rules based on the EMPR;
- Assist the Contractor on environmental issues where applicable;
- Review method statements for the Contractor;
- Update and keep legal register of all site activities;
- Update and keep accurate records of site activities;
- Record and report incidents of non-compliance;
- Record complaints from the public and employees on environmentally related matters;
- Update the Issues and Response Register;
- Ensure open and direct communication with all stakeholders;
- Prioritise environmental issues during site meetings;
- Conduct site inspections of all closure activities;
- Ensure site activities are in accordance to the EMPR and Environmental Authorisation;

- Review and update site rules to suit the needs of affected personnel;
- Promote environmental awareness on site;
- Take and keep photographic records of the site progress throughout the phases of development;
- Conduct training;
- Be available to attend to all environmentally related activities on site.

10.3. Management of Information and Data

The Final Rehabilitation Plan includes a description of the management strategies, and all information and data relevant to mine closures. These records are valuable during the all phases of mining to provide:

- A history of closure and implementation at the site;
- A history of past developments;
- Information for incorporation into state and national natural resource databases; and
- The potential for improved future land use planning and/ or site development.

Where practicable, the closure information system should contain an information database for each domain or feature, where all available information is collated and reviewed with the objective of building a 'base' of information for that particular domain or feature. Information may include, but not be limited to, the current status of the domain or feature, information from spatial datasets and databases, design and construction information, operation and monitoring information or other information that meets a specific purpose (e.g. maps, area statistics, species lists or modelled environmental impacts). All technical reports should be referenced and included in the database.

11. 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.

12. RELINQUISHMENT CRITERIA FOR CLOSURE ACTIVITIES

The following relinquishment criteria is for the closure activities of Aroams Quarry:

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.	Code of practice to combat rock fall and slope instability related accidents in surface mines.	Appropriate risk assessment undertaken and control measures are in place that will continue to meet agreed requirements.
Decommissioning of all structures and haul roads	No visible man-made structures should remain. Haul roads should be removed and sloped to blend in with the natural landscape.	Close-out inspection by site management upon end of decommissioning phase.	Photographic evidence that infrastructure 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 top soiling.	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 that which existed prior to mining.	Land capability and productivity	Comparison to equivalent areas.

12.1. Closure Cost Estimate

The Mineral and Petroleum Resources Development Act (MPRDA), (Act No. 28 of 2002) and its Regulations was promulgated on 1 May 2004. Financial provision for environmental rehabilitation and closure requirements of mining operations forms an integral part of the MPRDA. Section 41 of the MPRDA and Regulations 53 and 54 promulgated in terms of the MPRDA deal with financial provision for mine rehabilitation and closure.

Based on the extent of the current disturbance and by utilising the Department of Mineral Resources guideline document for calculating financial provision Aroams Quarry mine need to provide a financial provision value of R 64 664.77 (10052MP), R 860 890.29 (100400MP), and R 278 724.17 (10741MP) as stated by the EMPs that was compiled in by Greenmined Environmental. Upon approval of this amended environmental management programme report, Aroams Quarry (Pty) Ltd (Pty) Ltd will fund the difference between the current financial provision and the required financial provision in a method approved by the Department of Minerals and Resources. Financial provisions are updated annually as per the DMR regulations. See attached Financials Provisions for Aroams Quarry in Appendix 3.

Table 7: Calculation of the Financial Provision for rehabilitation at the end of the life of the mine, as per the guideline document for 10052MP

Calculation of closure costs

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision

CALCULATION OF THE QUANTUM							
Mine:	Portion 2 of the farm Aroams 57			Location:	Aggeneys		
Evaluators:	C Fouche			Date:	2013-02-22		
No	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A *B*C*D Amount (rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	12	1	1	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	161	1	1	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	237	1	1	R 0.00
3	Rehabilitation of access roads	m^2	0	29	1	1	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	279	1	1	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	152	1	1	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	321	1	1	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	1.3	168 272	0.04	1	R8 750.14
7	Sealing of shaft, audits and inclines	m^3	0	86	1	1	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0.2	112 181	1	1	R22 436.20
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing	ha	0	139 720	1	1	R 0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	405 813	0.51	1	R 0.00
9	Rehabilitation of subsided areas	ha	0	93 935	1	1	R 0.00
10	General surface rehabilitation	ha	0.2	88 867	1	1	R17 773.40
11	River diversions	ha	0	88 867	1	1	R 0.00
12	Fencing	ha	1.5	101	1	1	R151.5
13	Water Management	ha	0	33 790	0.17	1	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0	11 826	1	1	R 0.00
15(A)	Specialists study	Sum	0			1	R 0.00
15(B)	Specialists study	Sum	0				R 0.00
						Sum of items 1 to 15 above	R49 111.24
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R49 111.24		Sub Total 1	R51 566.80

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 R100 000 000.00	-
		12% of Subtotal 1 if Subtotal 1 R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R5 156.68
		Sub Total 2 (Subtotal 1 plus management and contingency)	R56 723.48
		Sub Total 3	R56 723.48
		Vat (14%)	R7 941.28
		GRAND TOTAL (Subtotal 3 plus VAT)	**R64 664.77**

Table 8: Calculation of the Financial Provision for rehabilitation at the end of the life of the mine, as per the guideline document for 100400MP

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision

CALCULATION OF THE QUANTUM							
Mine:	**Portion 2 of the farm Aroams 57**			**Location:**	**Aggeneys**		
Evaluators:	**C Fouche**			**Date:**	**2014-07-22**		
No	**Description**	**Unit**	**A Quantity**	**B Master rate**	**C Multiplication factor**	**D Weighting factor 1**	**E=A *B*C*D Amount (rands)**
			Step 4.5	**Step 4.3**	**Step 4.3**	**Step 4.4**	
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	12	1	1	R 0.00
2(A)	Demolition of steel buildings and structures	m^2	0	170	1	1	R 0.00
2(B)	Demolition of reinforced concrete buildings and structures	m^2	0	251	1	1	R 0.00
3	Rehabilitation of access roads	m^2	0	30	1	1	R 0.00
4(A)	Demolition and rehabilitation of electrified railway lines	m	0	295	1	1	R 0.00
4(B)	Demolition and rehabilitations of non-electrified railway lines	m	0	161	1	1	R 0.00
5	Demolition of housing and/or administration facilities	m^2	0	340	1	1	R 0.00
6	Opencast rehabilitation including final voids and ramps	ha	4.7	178 368	0.04	1	R33 533.18
7	Sealing of shaft, audits and inclines	m^3	0	91	1	1	R 0.00
8(A)	Rehabilitation of overburden and spoils	ha	0.2	118 912	1	1	R23 782.40
8(B)	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing	ha	0	148 103	1	1	R 0.00
8(C)	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	430 162	0.51	1	R 0.00
9	Rehabilitation of subsided areas	ha	0	99 571	1	1	R 0.00
10	General surface rehabilitation	ha	4.9	94 199	1	1	R461 575.10
11	River diversions	ha	0	94 199	1	1	R 0.00
12	Fencing	m	945	107	1	1	R101 115.00
13	Water Management	ha	0	35 817	0.17	1	R 0.00
14	2 to 3 years of maintenance and aftercare	ha	0	12 536	1	1	R 0.00
15(A)	Specialists study	Sum	0			1	R 0.00
15(B)	Specialists study	Sum	0				R 0.00
						Sum of items 1 to 15 above	R620 005.68
Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)		1.05		R620 005.68		**Sub Total 1**	R651 005.96

1	Preliminary and General	6% of Subtotal 1 if Subtotal 1 <R100 000 000.00	R 39 060.36
		12% of Subtotal 1 if Subtotal 1 >R100 000 000.00	-
2	Contingency	10.0% of Subtotal 1	R65 100.60
		Sub Total 2 (Subtotal 1 plus management and contingency)	R755 166.92
		Sub Total 3	R755 166.92
		Vat (14%)	R105 723.37
		GRAND TOTAL (Subtotal 3 plus VAT)	**R860 890.29**

Table 9: Calculation of the Financial Provision for rehabilitation at the end of the life of the mine, as per the guideline document for 10714MP

Table B.10 Template for Level 2: "Rules-based" assessment of the quantum for financial provision							
CALCULATION OF THE QUANTUM							
Mine:	Lime Sales Limited Aroams Quarry			Location:	Aggeneys		
Evaluators:	Yolandie Coetzee			Date:	28-Sep-18		
No	Description	Unit	A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A *B*C*D Amount (rands)
			Step 4.5	Step 4.3	Step 4.3	Step 4.4	
	Description		A Quantity	B Master rate	C Multiplication factor	D Weighting factor 1	E=A *B*C*D Amount (rands)
1	Dismantling of processing plant and related structures (including overland conveyors and power lines)	m^3	0	15	1	1	R 0,00
2a	Demolition of steel buildings and structures	m^2	0	215	1	1	R 0,00
2b	Demolition of reinforced concrete buildings and structures	m^2	0	317	1	1	R 0,00
3	Rehabilitation of access roads	m^2	0	38	1	1	R 0,00
4a	Demolition and rehabilitation of electrified railway lines	m	0	373	1	1	R 0,00
4b	Demolition and rehabilitations of non-electrified railway lines	m	0	203	1	1	R 0,00
5	Demolition of housing and/or administration facilities	m^2	0	430	1	1	R 0,00
6	Opencast rehabilitation including final voids and ramps	ha	5	225.186	0,04	1	R 45.037,20
7	Sealing of shaft, audits and inclines	m^3	0	115	1	1	R 0,00
8a	Rehabilitation of overburden and spoils	ha	0	150.124	1	1	R 0,00
8b	Rehabilitation of processing waste deposits and evaporation ponds (basic, salt-producing waste)	ha	0	186.977	1	1	R 0,00
8c	Rehabilitation of processing waste deposits and evaporation ponds (acidic, metal-rich waste)	ha	0	543.069	0,51	1	R 0,00
9	Rehabilitation of subsided areas	ha	0	125.706	1	1	R 0,00
10	General surface rehabilitation	ha	0	118.924	1	1	R 0,00
11	River diversions	ha		118.924	1	1	R 0,00
12	Fencing	m	1132	136	1	1	R 153.952,00
13	Water Management	ha		45.218	0,17	1	R 0,00
14	2 to 3 years of maintenance and aftercare	ha	0	15.826	1	1	R 0,00
15a	Specialists study	Sum				1	R 0,00
15b	Specialists study	Sum					R 0,00

							R 198.989,20
	Multiply Sum of 1-15 by Weighting factor 2 (Step 4.4)			1,05		Sub Total 1	R 208.938,66
	General and prelim		6% of subtotal 1				R 12.536,32
	Contingency			10.0% of Subtotal 1			R 20.893,87
	(Subtotal 1 plus management and contingency)					Sub Total 2	R 242.368,85
	Vat (15%)					Sub Total 3	R 36.355,33
	(Subtotal 3 plus VAT)					GRAND TOTAL	R 278.724,17

A mining right holder must also review the financial provision in terms of Section 24P of the NEMA Amendment Act, 2014 (Act No. 25 of 2014) read with the Regulations pertaining to the Financial Provision for Prospecting, Exploration, Mining or Production Operations, November 2015 (Financial Provision Regulations 2015), the Financial provisions needs to be annually reassessed and the Bank Guarantee needs to corresponds with the outcome of the calculation.

13. MONITORING, AUDITING AND REPORTING

In compliance with applicable legislation the mining right holder will conduct monitoring of the mining activities for the duration of the decommissioning and closure phase. 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. Monitoring, auditing and reporting needs to be conducted until mine closure has been approved by the DMR and the closing certificate obtained.

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 Management Programme and Closure Plan.	Daily compliance monitoring.	Any non-conformance must immediately be addressed by site management and weekly reported on.
	External Auditing		
	External 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** Greenmined Environmental **Independent Auditor**	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 right 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.
MONITORING			
Invader Plant Monitoring	Aroams Quarry (Pty) Ltd / Lime Sales Site Manager	Annual Monitoring	Site management has a maximum of two weeks to develop and implement an invader plant control plan should Category 1 plants in terms of the Conservation of Agricultural Resources Act, 1983 germinate on-site.

13.1. 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:

REPORTING REQUIREMENTS			
AUDIT	**LEGISLATION**	**REPORTING REQUIREMENTS**	**UPDATE DISCLOSURE**
Environmental	NEMA; EIA Regulations, 2014 (as amended 2017)	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	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 annually report on the adequacy of the financial provision and any adjustments that need to be made to the financial provision.
High Level Monitoring and Measurement		• Annual inspections of rehabilitated areas will be undertaken for the first five (5) years after rehabilitation or until such time that the areas are self-sustaining; • Monitoring of all re-vegetated areas up until such time that the areas initiate succession and create a sustainable cover; • Monitoring of key environmental variables (i.e. soils, vegetation, groundwater, surface water and air quality) in order to demonstrate stability of rehabilitated areas; and • Alien Invasive management for five (5) years after closure, limited to areas disturbed by mining or included in the mining area.	The auditor will annually report on the adequacy of the rehabilitation for 5 years after rehabilitation.
General Monitoring and Reporting		• The environmental manager on site will monitor the site for any pooling or erosion, especially after rainfall; and • All incidences and issues will be recorded, as will the actions taken to address issues. These will be filed and kept at the mine offices. • The environmental manager and site manager will inspect all water management facilities and associated pipelines at least weekly to ensure there are no leaks which would result in loss of water and that they are functioning optimally; • The environmental manager will be responsible for inspection of sites and keeping records of all monitoring activities; and • All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices.	• Any pooling will be addressed by filling depression and / or grading areas and re-vegetating such sites; • Any erosion will also be addressed as soon as practically possible utilising contour berms, gabion structures if necessary. A specialist may be consulted if deemed necessary. Any eroded soils will be lifted and returned to the affected area;

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

MONITORING PROGRAMMES	
MONITORING UNIT	**FREQUENCY**
DUST MONITORING	
Fallout Dust Monitoring: Fallout dust monitoring is an effective method to identify priority control areas that result in excessive dust emissions. Fallout dust, also known as precipitating dust, is monitored to identify the fine dust particles that are liberated and can travel from the site to another location. The site already has four fallout dust units in place that will be used to monitor the dust levels during the decommissioning phase. The dust units are emptied quarterly and the collected particular matter weighed to determine the dust fall rate averaged over 30 days. The residential fallout dust standard allocation of 0 – 600 mg/m²/day is used for the dust units at the site. • Dust suppression techniques and/or frequency will be altered as necessary should dust levels become excessive and exceed target values during rehabilitation; • The environmental manager will be responsible for managing the air quality database and implementing actions, should target levels and frequencies be exceeded. PM_{10} monitoring will be conducted if required as per the air quality act and also fall within the responsibility of the environmental manager; • The environmental manager will be responsible for managing noise level database and implement actions should acceptable noise levels be exceeded; • The site manager will be responsible for ensuring that all vehicles, including those of contractors, are maintained as per their maintenance plan; • All incidences and issues will be recorded, as will the actions taken to address issues. These will be kept at the mine offices; • Specialists will be consulted where necessary; • Visual monitoring of dust conditions should be done by the environmental control officer. All complaints by affected parties must be investigated and acted upon; and	Monthly until final closure of the site • Air quality monitoring and reporting will be conducted on a monthly basis; • Ambient noise will be monitored on a quarterly basis on the mine boundary in at least four compass directions; • Occupational noise will be monitored on a monthly basis as part of safety, health and environment; • Noise must be monitored n an ad-hoc basis. All compliant by affected parties must be investigated and acted upon.
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 five 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.	Quarterly until final closure of the site
LAND USE	
• A detailed monitoring and reporting programme will be established and followed; • Rehabilitated areas will be monitored for vegetation cover and alien invasive encroachment at least monthly by visual means; and • Areas of failed growth will be fertilised if necessary and re-seeded or planted with seedling plugs. All exotic and invasive vegetation should be removed.	

MONITORING PROGRAMMES	
MONITORING UNIT	**FREQUENCY**
NOISE MONITORING	
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).	Quarterly until final closure of the site
SOIL EROSION MONITORING	
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 if vegetation does not establish within the first six months of topsoil spreading.	Weekly monitoring for the first 6 months or until the first cover crop has established
TOPOGRAPHY AND EROSION CONTROL	

• The environmental manager will ensure annual soil assessments be conducted by specialist pedologists after rehabilitation of the site; • Ensure surface water monitoring and action plans are implemented; • All reports will be kept at the mining offices. All incidences and issues will be recorded, as will the actions taken to address issues. The environmental manager will be responsible for inspection of sites and keeping records of all monitoring activities; • The site manager is responsible for ensuring that all vehicles, remaining on site during the decommission phase, are serviced on a regular basis in terms of the maintenance plans;	• Surveys to be conducted every 2 months. • Dirty water channels to be inspected weekly. • Rehabilitated sites to be inspected monthly. • Alien invasive monitoring to be conducted every 6 months. • Floral surveys to be conducted on annual basis. • During decommissioning, the environmental manager together with the site manager will monitor construction activities at least weekly to ensure the trenches and dams are in accordance with the specification as per design; • After rehabilitation the site will be monitored for any pooling or erosion on site, especially after rainfall. This will be the responsibility of the environmental manager; • The area needs to be surveyed every two months to monitor differential settlement; • Weekly inspections will be conducted by the environmental manager for any erosion which must be addressed immediately if observed, and together with the site manager will inspect all pipelines and associated dirty water channels/compartments to ensure no leaks or damage to these; • All dirty water separation and containment facilities will also be inspected at least weekly (and after each rainfall event), to ensure adequate functioning of all systems to prevent leaks into the environment which will negatively impact on the soils; • The environmental manager will ensure monthly inspection of surrounding areas for soil compaction; • Rehabilitated sites will be inspected for soil erosion on a monthly basis, together with the visual inspection regards to the vegetation cover abundance; • The rehabilitated areas must be monitored for the type and depth of soil cover used; • Monitoring of any ecologically sensitive species should they be observed on site will be done as and when required; • The site will be monitored for alien invasive species at least every 6 months. This will, however, be dependent on the species of alien invasive species on site; • Floral surveys will be conducted on rehabilitated areas on an annual basis, together with the soil quality and depth monitoring; • Soil erosion monitoring will be done on an ongoing basis by all personnel. All problems will be reported to the mine manager.; and

MONITORING PROGRAMMES	
MONITORING UNIT	**FREQUENCY**
	• The mine manager will do a quarterly inspection of all areas in order to assess erosion damage.
VEGETATION MONITORING	
Vegetation needs to be monitored after hydro seeding to ensure that vegetation has established. If this process was deemed unsuccessful, another session hydro seeding will need to be conducted until vegetation has established. Following up bi-annually and site photographs at the same positions needs to be taken for a photo report for reporting purposes and record keeping. • Services of a qualified person will be used to monitor the re-vegetation of the rehabilitated areas; • Records of the monitoring will be kept on site; • The environmental manager will be responsible for inspecting and managing the protected flora within wetland areas. Specialists will be consulted regarding relocation of these species if necessary during rehabilitation or closure; • All incidences and issues during closure will be recorded, as will the actions taken to address issues. These will be filed and kept at the mine offices;	Monthly monitoring for the duration of the decommissioning phase. • The environmental manager will ensure that an alien invasive monitoring, eradication and control programme is established during closure and the area will be inspected at least every 3 months and more frequently in areas where alien species were observed; • Rehabilitation will be visually inspected at least monthly with regards to vegetation cover abundance; • The rehabilitated area will be inspected monthly for general erosion and vegetative cover; • Rehabilitated areas will be monitored for soil quality and depth annually; • The wetlands downstream of the opencast area will be monitored to see if siltation occurs; and • Bio-monitoring of wetlands will also be conducted at least every 6 months during the closure phase. This will fall under the responsibility of the environmental manager.
WEEDS AND INVADER PLANT MONITORING	
Management of Weed or Invader Plants: 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 weeds that need to be eradicated from the site the plants listed in the AIS regulations are used as guideline. Control of weeds and alien invasive plant species is an important aspect after topsoil replacement and seeding has been done in an area. Site management must implement an alien invasive plant management plan during the 12-months aftercare period to address germination of problem plants in the area.	Monthly monitoring for the duration of the decommissioning phase.
STORM WATER MONITORING	
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. Monitoring needs to continue during the 12 months aftercare period.	Monthly monitoring for the duration of the decommissioning phase.
HEALTH AND SAFETY MONITORING	
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, and 1996 (Act No 29 of 1996).	Daily monitoring for the duration of the decommissioning phase.

MONITORING PROGRAMMES	
MONITORING UNIT	**FREQUENCY**
SURFACE WATER	
Surface Water bodies that was impacted or could have been impacted upon by the mining activities needs to be monitored by obtaining samples on a bi-annual basis to determine if there are any changes in the water quality. All Surface Water Monitoring (in Decommissioning Phase) cost needs to be included into the Annual Quantum calculation under the 2 -3-year aftercare and maintenance. The environmental manager will ensure that surface water quality is monitored on a monthly basis during the closure phase; A water quality report will be compiled on a quarterly basis and will show all the high risk areas and areas deviating from current background water quality; Specialists recommendations with regard to water quality issues observed, will be implemented as appropriate; Water management features will be upgraded as necessary if water quality issues arise from these structures; The rehabilitated area will be monitored for ponding; and Any areas where ponding occurs will be filled and reshaped as per the rehabilitation plan to ensure surface water runoff from the area and discourage ponding.	Monthly monitoring for the duration of the decommissioning phase.
GROUNDWATER	

Groundwater (Boreholes) that was impacted or could have been impacted upon by the mining activities needs to be monitored by obtaining samples on a bi-annual basis to determine if there are any changes in the water quality. All ground Water Monitoring (in Decommissioning Phase) cost needs to be included into the Annual Quantum calculation under the 2 -3-year aftercare and maintenance. • Up slope and down slope groundwater monitoring will be conducted on a quarterly basis during the closure phase; • 6 monthly and annual reports must be generated for mine management and reported to the regional catchment forum; • Water management features will be upgraded as necessary if water quality issues arise from these structures; • The environmental manager will be responsible for the implementation and maintenance of the groundwater monitoring and results obtained; • Existing boreholes will be monitored at least quarterly as per the monitoring plan attached. This plan is preliminary and changes may be likely after annual review of report and findings; • The groundwater quality and levels will be monitored on a quarterly basis; • All monitoring boreholes must be demarcated and protected to prevent damage or tampering; • All samples will be submitted to an accredited laboratory for analysis; • The following chemical parameters are recommended for the analysis during the closure phase; o Total Dissolved Solids / Electrical Conductivity; o pH level; o Alkalinity; o Carbonates; o Magnesium; o Calcium; o Sodium; o Potassium; o Sulphate; o Chloride; o Fluoride; o Iron; o Nitrate; o Manganese; and o Aluminium. • The groundwater monitoring programme will be reviewed every 2 years, during the closure phase, and the groundwater model updated; and • Water use and water consumption on site will be monitored at various strategic areas on site.	Monthly monitoring for the duration of the decommissioning phase.
SOCIO-ECONOMIC	

MONITORING PROGRAMMES	
MONITORING UNIT	**FREQUENCY**
• SLP initiatives and commitments will be monitored by the stakeholder engagement; • Commitments made by the mine to I&AP's in the issues register will be followed up on a regular basis; • SLP implementation will be monitored and audited (by the environmental officer); • Public Participation Process (PPP) reports and meeting minutes will be made available to all who attended and copies kept on site. This will include an issues and response register; and • The stakeholder engagement manager will be responsible for keeping all records and following up on commitments made to affected parties.	Frequently

14. CONCLUSION

This Rehabilitation plan needs to be implemented in accordance with the EMP's and its amendments when the end of mining is reached.

This document gives all the necessary information when planning the rehabilitation of the mine together with the cost associated with the rehabilitation.

Sufficient work needs to be undertaken during the life of mine, to ensure that all key environmental issues and workable management mechanisms are relevant to the mine closure are identified timeously which will allow strategies, mitigation measures and closure designs to be designed, assessed and reviewed in the years leading up to closure.

The following, common closure issues may be faced during the life of the mine (not an exhaustive list) as highlighted below but are not limited to:

- Hazardous materials;
- Hazardous and unsafe facilities;
- Contaminated sites;
- Non-target metals and target metal residues in mine wastes;
- Adverse impacts on surface and groundwater quality;
- Design and maintenance of surface water management structures;
- Dust emissions;
- Flora and fauna diversity/threatened species;
- Visual amenity; and
- Heritage issues.

It's important for the site management to realise the effects that the current effect has on the mining operation. The importance of minimizing the impact of the current mining operation on the environment is understood. The mine commits itself to providing all the necessary resources to ensure that the rehabilitation of the mine is done in such a way that will be acceptable to all parties involved. The mine or site management must understand and accepts the responsibility to rehabilitate the disturbed areas in the Life of Mine (LoM).

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

Not applicable as no amendments were made to the Final Rehabilitation, Decommissioning and Mine Closure Plan.

18. SIGNATURE OF AUTHOR

NAME	SIGNATURE	DATE
Yolandie Coetzee		07 ovember 2018

19. UNDERTAKING BY APPLICANT

I, ……., the undersigned and duly authorised thereto by ..... ……. that Aroams Quarry will comply with the provisions of the MPRDA and its Regulations as set out in Government Gazette no. 26275 (23 April 2004), as well as NEMA.

I have studied and understand the contents of this document and duly undertake to adhere to the conditions as set out therein, unless specifically or otherwise agreed to in writing.

Signed at …….. on this ……day of ……20……

_____

Name:

Designation:

20. REFERENCES

- Acocks, J.P.H. 1988. Veld types of South Africa. Bot. Surv. S. Afr. Mem. No 57.
- Chamber of Mines of South Africa, 1981. Guidelines for the rehabilitation of land disturbed by surface product mining in South Africa, Johannesburg
- Coastal and Environmental Services, 1999: Rating the Severity and significance of Environmental Impact
- Department of Water Affairs and Forestry, 2003. Draft: A practical procedure for the identification and delineation of wetlands andarian areas, Pretoria
- Department of Environmental Affairs and Tourism: Integrated Environmental Management Information Series: Impacts Significance
- Environmental, G. (2018). *Aroams Quarry BAR/EMPR.* Lime Sales Limited.
- Environmental, G. (2012). *Aroams Quarry BAR/EMPR.* Raumix Aggregates.
- Environmental, G. (2015). *Aroams Quarry BAR/EMPR.* SPH Kundalila.
- Low, A.B. & Rebelo, A.R. 1996. Vegetation of South Africa, Lesotho and Swaziland Department of Environmental Affairs and Tourism: Pretoria.
- Patridge, J.C & Maud, R.R. 1987. Geomorphic evaluation of South Africa since Mesozoic.
- Roberts 2003. Robert Multimedia Bird of Southern Africa. Southern African Birding, Westville.
- Department of Water Affairs and Forestry (DWAF) (2007b) Best Practice Guideline A4: Pollution control dams. The Government Printer, Pretoria.

APPENDIX A: CV AND EXPERTISE OF ENVIRONMENTAL CONSULTANT

APPENDIX B: MONITORING CHECKLIST ANNUALLY

Date: _____ Inspected by: _____ Accepted by: _____

Plant/Site Manager Mine Manager

ANNUAL INSPECTIONS:				
Activity/ Structure: Maintenance/ Management	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Has the status of the biodiversity been assessed?				
Has the status of the land management been assessed?				

Activity/ Structure: Rehabilitation	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Has topsoil been replaced on levelled areas?				
Has the depth of the topsoil been related to the post-mining land capability plans?				
Were the soil horizons placed in the same order as they occur in naturally? Has mixing of soil horizons been prevented?				
Has the placement of material been conducted in the same sequence as the original material i.e.: hards at the bottom, covered with softs which will be compacted using tyre compaction, and capped with topsoil?				
Where possible, have the original topsoil types been placed back into the area where it was initially found?				
Has the layer of topsoil replaced as even as possible, i.e. it must be smooth and the depth must remain consistent throughout?				
Have the levelled areas been inspected and approved by the Mine Manager/Site Manager? If so, has topsoil be placed to a depth of 0.5m?				
Has the overburden that was temporarily stockpiled been placed back into the pit once the coal has been mined out? Has the natural topography been restored?				
Is runoff from the freshly top-soiled areas channelled to the pollution control structures? Do any eroded soils leave the property at all?				
During rehabilitation, are soil samples taken to determine soil fertility, depth, compaction, acidity and mine related pollution? Are treatments recommended for soils according to the results obtained?				
Once topsoil placement is complete, did the Mine Manager/ Site Manager inspect the area? Is the topsoil thickness recorded? Are inspections carried out using an auger to auger the area on a representative grid covering?				
Are former DTMS's used to establish what contours were present prior to mining taking place? Have these been used to help shape the area to the final topographical plan?				
Have all final voids been filled and contoured to fit in with the surrounding landscape?				
Have natural drainage lines been followed to reduce loss of water in the natural catchments?				
Have erosion control measures such as contour banks and cut off berms been constructed and vegetated in the rehabilitated areas?				
Does water flow off gentle slopes as quickly as possible without causing erosion? Does water ever infiltrate the slopes and come into contact with carbonaceous material?				
Is water encouraged to slightly infiltrate steeper slopes to help prevent soil erosion?				
Does the profile ensure free drainage? Do the slopes comply with the intended land capability?				
Does the final rehabilitation profile change the catchment dynamics?				

Activity/ Structure: Rehabilitation	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Are there any areas of potential ponding? If so, have these been re-profiled to encourage free draining?				

Activity/ Structure: Fertiliser and Seeding Requirements	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Does the rehabilitation follow the seed bed preparation and fertilising procedures?				
Is lime required? If so, has it been added to the topsoil prior to fertilising?				
Is the fertiliser added as per the specified nutrient requirement? Are mechanical methods being utilised as far as possible?				
Was all equipment calibrated prior to spreading the fertiliser?				
Has the fertiliser been worked into the soils? Has the area been re-disced?				
Has seeding been done before or during the rainy season?				
Has the specified seed mix in been used?				
Has a Cambridge roller been used to ensure consolidation around the seeds and effective moisture retention?				
Have all seeded lands been checked after germination has occurred? This is done via the taking and analysis of a soil sample from the applicable area.				
Do the soil sampling results require a post dressing of fertiliser?				
Has access to all the seeded areas been restricted?				
Have all the rehabilitated areas been re-vegetated with local indigenous flora as far as possible? Have red data and other natural species also been used?				
Have all exotic and invasive vegetation been removed?				

APPENDIX C: MONITORING CHECKLIST (6 MONTHLY)

Date: _____

Inspected by: _____ Accepted by: _____

Plant/Site Manager Mine Manager

6 MONTHLY INSPECTIONS:				
Activity/ Structure: Maintenance/ Management	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Has the movement of vehicles within the rehabilitated areas been restricted?				
Is vegetative growth extensive / sufficient?				
Is a photographic record of the vegetative cover / abundance kept?				
Is additional seeding required?				
Are there any signs of alien invasive encroachment?				
Have the rehabilitated areas that are suitable for grazing been fenced off from the adjacent mining areas and made available to the owners?				
Have the pollution control dams been kept on site to intercept all surface runoff from the disturbed area? Are these dams monitored to that there is no pollution discharge into the surrounding environment?				
Is ground and surface water monitoring undertaken? Are the results satisfactory?				
Have all the areas that have been rehabilitated (water quality dependant) been incorporated back into the local catchment?				
Have animal shelters and habitats been recreated to encourage new animals, insects and birds into the area?				
Are soil samples taken, analysed and corrective fertilizer application applied at the beginning of each growing season?				

6 MONTHLY INSPECTIONS:				
Activity/ Structure: Maintenance/ Management	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Has the movement of vehicles within the rehabilitated areas been restricted?				
Is vegetative growth extensive / sufficient?				
Is a photographic record of the vegetative cover / abundance kept?				
Is additional seeding required?				
Are there any signs of alien invasive encroachment?				
Have the rehabilitated areas that are suitable for grazing been fenced off from the adjacent mining areas and made available to the owners?				
Have the pollution control dams been kept on site to intercept all surface runoff from the disturbed area? Are these dams monitored to that there is no pollution discharge into the surrounding environment?				
Is ground and surface water monitoring undertaken? Are the results satisfactory?				
Have all the areas that have been rehabilitated (water quality dependant) been incorporated back into the local catchment?				
Have animal shelters and habitats been recreated to encourage new animals, insects and birds into the area?				
Are soil samples taken, analysed and corrective fertilizer application applied at the beginning of each growing season?				

APPENDIX D: MONITORING CHECKLIST (MONTHLY)

Date: _____ Inspected by: _____ Accepted by: _____

Plant/Site Manager Mine Manager

MONTHLY INSPECTIONS (and after each heavy rainfall event):				
Activity/ Structure: Maintenance/ Management	Compliancy:	Mitigation/ Action:	Person Responsible:	Corrected:
Are areas free draining? Is any pooling of water evident?				
Are there signs of erosion?				
Are there any signs of subsidence?				

APPENDIX E: ANNUAL REHABILITATION INSPECTION CHECKLIST AND CERTIFICATE

Description of the area:

_____

_____

_____

Start date of rehabilitation activities: _____

Average depth of topsoil replaced (mm): _____

Has a site assessment been complete?

_____

_____

_____

_____

Describe the objective/aim of the rehabilitation:

_____

_____

_____

_____

Detail staging of rehabilitation, including sequencing and timing of major event:

_____

_____

_____

_____

Seed mix used:

_____

_____

_____

_____

Materials required for rehabilitation:

_____

_____

_____

_____

Completion date of rehabilitation activities (seeding): _____

Total area rehabilitated (hectare) [Attach a map of the site indicating all areas requiring rehabilitation, proposed treatment and where sediment and erosions controls would be located]:

_____

_____

How will the site be prepared for planting?

How will sediment and erosion controls be maintained?

How will the bare ground be protected?

What sort of mulch will be used?

STAFF AND INDUCTION MATTERS.

List human resources required for rehabilitation, their role and training requirements /experience:

Position	Role	Number of People	Training Requirements

Note matters that will be covered during the site induction for all people entering the site:

_____

_____

_____

_____

PROTECTION OF RESOURCES AND VALUES DURING DEVELOPEMNT

Weed management

Does the site contain weeds that needs to be managed proper to the rehabilitation works? If so, describe what species are present and how they will be managed:

Describe measures that will be taken during the works to minimise potential for the transport of weeds or pathogens:

PROTECTIONS OF NATURAL AND CULTUREAL VALUES

What Natural / Cultural Values Need To Be Protected At The Site?

How will these be protected?

Earthworks

Detail any earthworks required for rehabilitation or attach plans that shows these earthworks.

WASTE MANAGEMENT

Detail all waste that will be produced during rehabilitation and how it will be managed?

PLANTING

Layout and density of planting (attach a map of the site showing where different species will be planted and indicating the density of the planting).

Use of fertiliser (will they be required, what type and how they will be applied)

POST REHABILITATION

Maintenance of rehabilitation

Who is responsible for maintaining the site?

Maintenance task and frequency

Task	Frequency

How long will maintenance be continued

_____

_____

_____

_____

MONIOTING

Monitoring task and frequency

Task	Responsibility	Frequency

AUDITING

Will the rehabilitation work be audited on completion_____ _____

Inspected by:

_____ _____

Delegated person **Date**

Comments:

_____

_____

_____

_____

Accepted

_____ _____

Environmental Coordinator **Date**

SITE HANDOVER

Who handover be required?

Who will the site be handed over to?

When will then handover occur?

Detail matters that needs to be considered in handover