APPENDIX E

Revised Final Rehabilitation, decommissioning and mine closure plan
Including Environmental Risk Assesment

Rondawel Koalien CC Reference NC30/5/1/3/2/10178 MR
portion of Portion 1 Farm Rondawel 638 Namaqualand District

Contends

1 INTRODUCTION

1.1 Background

This document serves to comply with regulation 6 of the NEMA Financial Regulations (2015) that states that an applicant must determine the financial provision through a detailed itemisation of all activities and costs, calculated based on the actual costs of implementation of the measures required for—

(a) annual rehabilitation, as reflected in an annual rehabilitation plan;

(b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations, as reflected in a final rehabilitation, decommissioning and mine closure plan; and

(c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

2 CONTEXT OF THE PROJECT

2.1 Issues that have guided the development of the plan

Three approaches were employed to identify the key aims for the closure process that form part of the approved final rehabilitation, decommissioning and mine closure plan:

- Technical assessments which involved the recording of the project activities over the full life cycle of the mining operation (including closure) and the consequent potential impacts on the environment (including cumulative impacts). This resulted in the compilation of a draft Scoping, EIA, EMPr and Closure plan that facilitated discussions with the authorities as well as Interested and Affected Parties (I&APs).
- Identification and consultation with the relevant authorities and I&APs to solicit/record their suggestions/issues/concerns. The public participation process has been conducted according to the requirements as prescribed in Regulations 40 to 44 of the EIA Regulations, 2014 (as amended).
- The collection of available/published environmental data, the review thereof for adequacy and hence the identification of the need for more comprehensive environmental studies/investigations and/or further information gathering.

As a result of the consultation and recommendations from the environmental studies/investigations completed the operation identified three key closure goals for the final decommissioning and closure of the mining operation that are listed below.

- To create a safe and healthy post-mining environment with no residual environmental impact.
- To create a stable, free draining post mining landform, which is compatible with the surrounding landscape and which is capable of a productive land use that achieves a land capability equal to that of pre- mining conditions.
- To provide optimal post-mining social opportunities

Each goal is supported by a suite of key objectives and activities which are elaborated on in section 2 and 3 of this review. This review also describes how these objectives are planned to be met and elaborate on the implementation of certain risk mitigation actions (section 5).

With risk assessment and mitigation being integral to the planning and executing of the rehabilitation and closure of the mine. Aftercare and maintenance of rehabilitated sites is often the difference between the ultimate successes or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved (section 3).

3 SCOPE OF THE RONDAWEL MINING OPERATION

3.1 Mine Plan

This final rehabilitation, decommissioning and mine closure plan that include the environmental risk assessment is applicable to the Rondawel Kaolien Mining operation that is carried out under cover of Reference NC30/5/1/3/2/10178MR.

The mining area consist of a 232Ha portion of Portion 1 of the farm Rondawel 638 situated in the Namakwa District Municipality and Kamiesberg local authority of the Namaqualand administrative district of the Northern Cape. The farm is registered in the name of Adriaan Allettus Nieuwoudt (Id 4505085037087) by virtue of title deed T30303/2003. The area is situated along the secondary road between Garies and Groenrivier 40Km from Garies with an approximate locality Latitude S30.78464° and Longitude E17.79455°.

Diagram 1 shows the mine locality in relation to the prospecting area, Operation Company Head-Quarters (HQ) and access. Refer to Diagram 2 for the mine layout and co-ordinates.

3.2 Project Description

Kaolin clay is an inert material that is non-toxic and not affected by weathering. Kaolin residues are typically benign from a pollution point of view. Mining will be in the form of a simple process that only includes an opencast quarry with excavation, loading and hauling of Kaolin. The depth of the excavations at final footprint will be less than 20 meters.

Mining will be in the form of an opencast mine and Kaolin (clay) are mined from a burrow pit. Processing will be in the form of screening making use of a static screening plant still under review and development as part of an application for a patent right.

The project can be divided in three phases as follow:

- Construction, including the planning and implementation phases, creation of infrastructure, mine or pit footprint, access ramps and haul roads, waste, residue and product stockpiles, handling areas, water reticulation and electrical power.
- Operation, including daily activities, mine development and expansion.
- Decommissioning and Closure, including scaling down of activities ahead of temporary or permanent closure, cessation of mining or production, implementation of rehabilitation programme, monitoring and maintenance for prescribed period after cessation of operations; and closure, including completion of rehabilitation goals, application for closure, transfer of liability to the State and agreed post-closure monitoring or maintenance

Refer Diagram 3 Site Plan which shows the design of the mine pit, infrastructure, laydown areas and access routes. Refer to sections below for a description of the proposed activities in the Construction, Operational and Decommissioning Phases.

3.2.1 Construction phase: Development of infrastructure and logistics

Access and service roads: Access to the mine works will be via the Garies-Groenriviermond public road and existing farm tracks as shown in Diagram 3. Existing farm tracks will be used as haul roads and no new roads will be developed.

Water supply: No process water is used in the mining process.

Electricity supply: No electricity is used in the mining area.

Logistics: No infrastructure is present or will be required due to the small scale and simple mining method and the infrastructure will be shared between the two mining operations, such as the supply of electricity from a mobile genset contained in a bunded generator bay with spill prevention measures.

Waste management facilities will also be shared and a temporary storage area for used lubrication products and other hazardous chemicals is provided for the collection of the small volume of waste before it is removed to the company headquarters.

A service and wash bay are also provided for together with a bio-cell (soil farm).

A bunded fuel supply with service apron is also provided.

Diagram 1: Mine locality in relation to prospecting operation company HQ and access

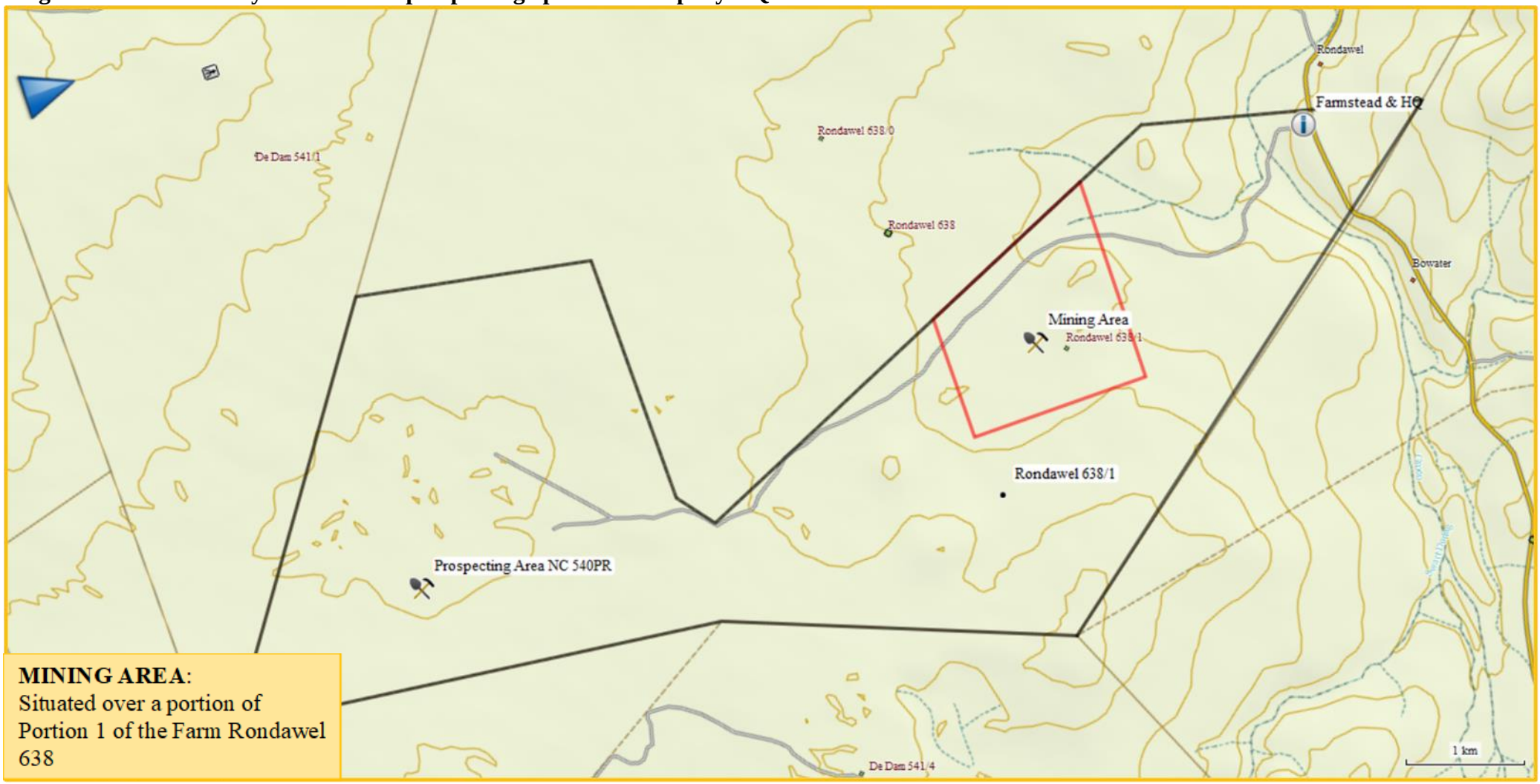
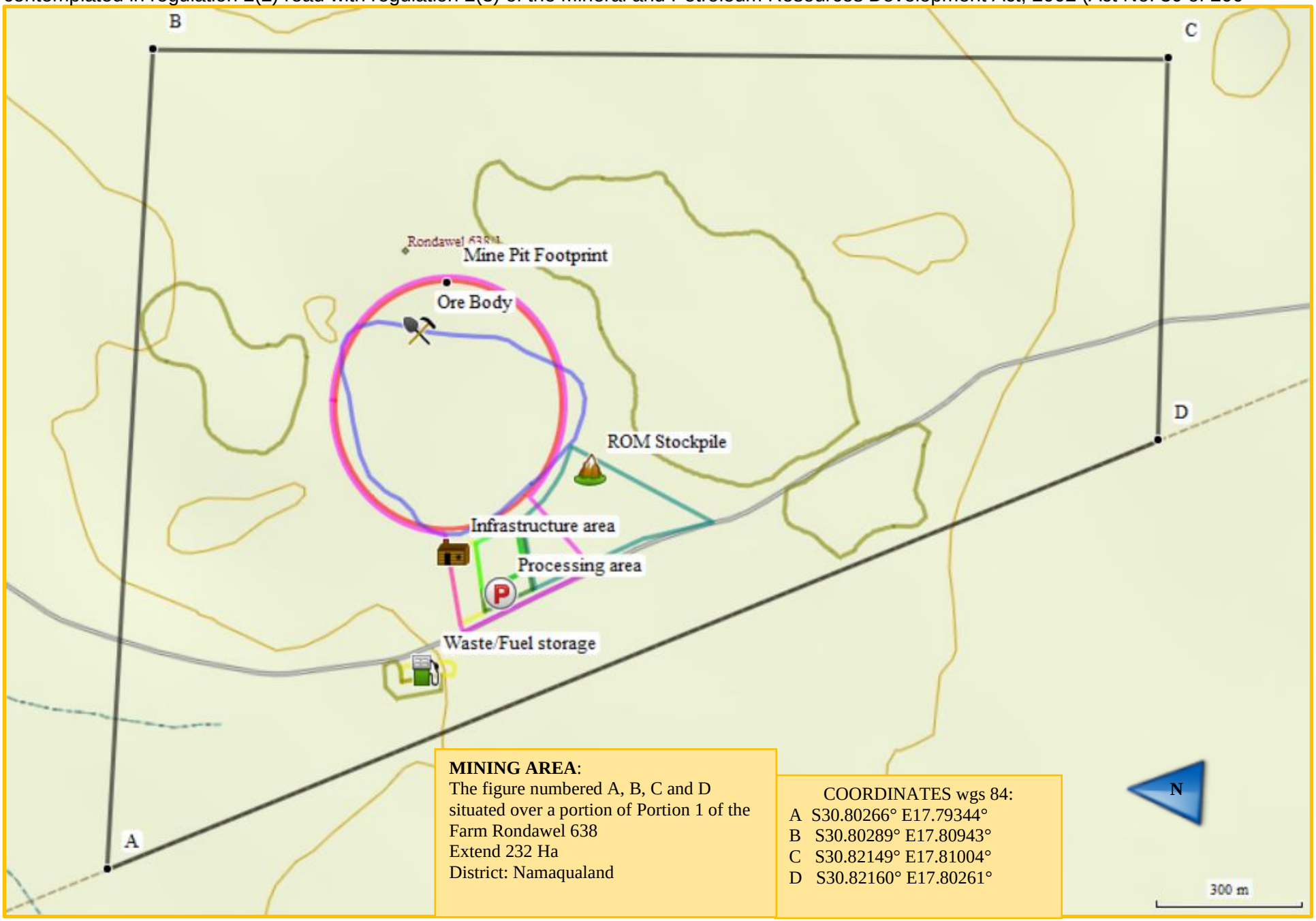


Diagram 2: Layout plan
contemplated in regulation 2(2) read with regulation 2(3) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 30 of 200



3.2.2 Operational phase

Due to the unconsolidated nature of the ore no ripping and dozing are necessary and no explosives are used. The burrow pit is mined as a truck-and-shovel operation.

Mining start with the removal of the topsoil to be dump as a safety barrier around the open pit and also to serve as a berm to prevent storm water from entering the pit and movement area. Due to a shortage of topsoil the white Kaolin will still be visible above surface after rehabilitation but with the natural movement of the dune sand will be covered naturally.

The burrow pit will be mined in benches with a maximum bench height of 3 meter (refer Diagram 3).

The Kaolin is loaded with a 25-ton excavator on haul trucks to be either dump as overburden on the existing waste dump or transport as first and second grade ore to the product stockpile are.

The ore is transported by TLB from the stockpile to the drying area where the ore are spread out to be pulverize by driving over it with a tractor and disk plough. The ore is then fed by conveyor into the processing plant that pulverises and screen the product to the required particle size, the normal particle size for kaolin is two micrometers. The screened product is then bagged in $1m^3$ and loaded on truck to be transported to the market.

The estimated footprint of the excavation is 17Ha and at final closure the sides of the excavation will be profiled to form an even depression.

No industrial or mine waste is generated during the mining process. Processing only includes the spreading of Kaolin to dry out where after is screened a bagged to be sold as a FoT product. Product stockpiles form part of the drying area that also serves as a dispatch yard.

Primary processing only includes screening by means of a “trommel screen” so no Fine Residue Dumps (FRD) will be created.

Domestic or any other waste generated during the mining operation will be stored in a temporary storage area provided as part of the waste management and services from where it will be removed to the adjacent existing mining site’s Head Quarters at the main farm building on the property.

Only minor repairs are done on site at the service bay or for emergency repair a PVC lining and drip trays are used and accidental spills are cleaned up immediately by removing of the contaminated soil. The small volume of contaminated soil will be treated in the bio-cell (soil farm) and only one excavator (TLB) and tractor trailer unit is used in the mining process that is transported to the Applicant’s headquarters for major repairs.

As part of the operational phase training of personnel in the implementation of the EMP will be done and the implementation of the environmental awareness plan as part of the EMP will be an ongoing process.

3.2.3 Decommissioning phase

Planning for closure and restoration from the beginning of an operation makes the process easier; waste can be removed as it is created, excavation can be planned so that topography restoration is less complicated, and topsoil can be re-used at shorter intervals. Site rehabilitation can make the land more valuable and attractive for resale. Additionally, establishing a closure strategy (and communicating that activity to the public) can help enhance the company’s reputation as a socially-responsible operation. The decommissioning and closure phase at the end of the life of the mine will consist of implementing this final rehabilitation, decommissioning and closure plan.

3.3 Mine design map

The different closure elements will be discussed in the next sections and the design is provided for in Diagram 3 with quantification of the closure elements discussed in section 7. Project layout

a) Infrastructure

- Access and service roads

- The secondary public road system provides excellent access to the mine HQ. The turn-off from the Garies - Groenrivier road to the mine 40km outside of Garies (Diagram 1).
- Access from the HQ to the mine workings is via existing farm tracks.
- Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite if needed.
- The service roads will remain as part of farm improvement and the mine is only responsible for the maintenance of the road.

- Services and associated infrastructure

- Potable water for the two employees at the mine is obtained from collection of rainwater from the carport roof.
- No process water is used during mining or processing operations.
- Storage consisting of two 5 000-liter plastic tank that form part of farm infrastructure and can be re-used on another location.
- Electrical supply is generated by a mobile genset to be supplied with generator bay and spill prevention measures.

- Accommodation and Logistics

- Only one Wendy house and a caravan will be available on site for the two personnel employed at the mine.
- Other infrastructure includes a carport and container for storage of plastic sheets used to cover the product stockpiles to protect it from moisture.
- The screening and milling operation is contained within a makeshift structure.
- No steel or reinforced concrete buildings and structures are present on the mining area that will require demolition.
- Workshops and secure storage infrastructure are available as part of the farm infrastructure that also doubled up as company HQ.

- Waste management facilities

- Temporary waste storage areas were developed as part of the farm infrastructure.
- Petrochemical and hazardous waste including contaminated/used spares, filters and used oil are collected and stored in special containers with spill containment measures for disposal at a registered disposal site.
- Domestic waste is collected in plastic containers and transported weekly to the company HQ refuse site.
- A small salvage yard is provided for temporary storage of scrap prior to movement to the company HQ.

- Oil/grease/diesel management systems

- Fuel storage with bund wall is provided as part of existing farm infrastructure
- The cement structures for the fuel supply including service apron/wash bay will remain as part of farm improvement and the mine will only be responsible for maintenance and waste management.

b) Burrow pit and waste dumps (Refer Table below and Diagram 3)

- Excavations

- Mining start with the removal of the topsoil to be dump as a safety barrier around the open pit that will also serve as a berm to prevent storm water from entering the pit and movement

area. The berm will be developed to 15m wide and maximum height of 1.5m to prevent sterilisation of topsoil.

- High wall will be developed in benches not exceeding 3 m high
- Large scale excavations and ore stockpiling is done with a 25-ton excavator and ADT's that is on site on an ad hoc basis.
- 63% of High- and low-grade ore will be sold as a FOT product.
- Product stockpiles form part of the drying area that also serve as a dispatch yard

• Surface disturbance (compacted areas)

- The movement area also serves as general laydown area and parking for stationary vehicles.
- Parking areas to be provided with drip trays for stationary equipment

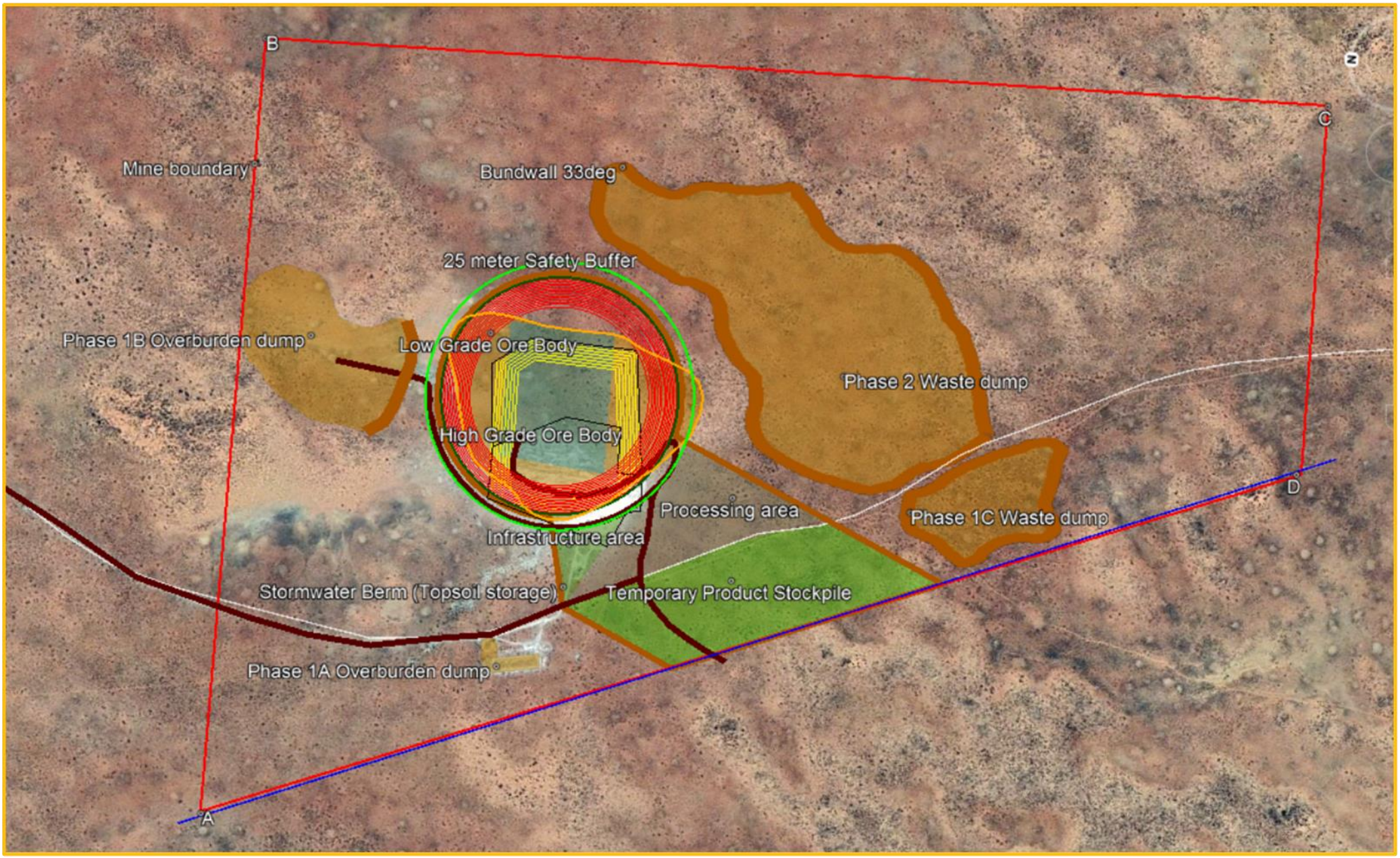
• Residue deposits overburden and spoils

Table 1: Topsoil, Overburden, Product and Spoils to be produced during the 5-year mining period

Phase 1 Mining operation under combined Mining Permits										
Level m	**Ha**	**m²**	**Depth**	**Total m³**	**H Grade m³**	**Low Grade m³**	**Overburden m³**	**Topsoil m³**	**Product**	**Waste m³**
17.5-20	5.10	51000	2.5	127500	35200	92300	0	0	80325	47175
15-17.5	5.58	55800	2.5	139500	37600	101624	276	0	87711	51513
12.5-15	6.10	61000	2.5	152500	40000	112098	403	0	95821	56276
10-12.5	6.63	66300	2.5	165750	42400	122373	978	0	103807	60966
7.5-10	7.18	71800	2.5	179500	44800	133035	1665	0	112036	65799
5-7.5	7.74	77400	2.5	193500	46000	144983	2518	0	120319	70664
2.5-5	8.29	82900	2.5	207250	47100	156648	3503	0	128361	75387
0-2.5	8.87	88700	2.5	221750	0	88700	88700	44350	55881	32819
Total	**8.87**	**88700**	**20**	**1387250**	**293100**	**951759**	**98041**	**44350**	**784261**	**460597.8**
Existing Overburden Dump Footprint 5000m² and 2.5m max height covered with 0.5m topsoil							12500	2500	0	0
Safety and storm water berm 1600m long and 15m wide and 1.5m max height around perimiter of final mine pit footprint covered with 0.5m topsoil							36000	12000	0	0
Existing excavation to be filled to 5m below surface 7000m² X-6m							42000	0	0	0
To Market							0	0	784261	0
Total Dispose							**90500**	**14500**	**784261**	**0**
Surplus to new waste dump **New waste licence application when production starts**							**7541**	**29850**	**0**	**460597.8**

- Overburden to be dumped on the existing overburden dump. This dump will not be higher than 2m to blend in with the natural topography and profiled. When final footprint is reached the waste dump will be covered with topsoil and allowed to revegetate naturally. Surplus overburden will be used to cover the new waste dump.
- Spoils generated at the processing plant (Waste) 27% of ROM will be duped in the existing excavation and the surplus will be dump in a new waste dump to be created in terms of an application for a waste license.

Diagram 3: Site Plan mining operations indicating logistical area and active mining area



4 REGULATORY REQUIREMENTS

4.1 Legal requirements

4.1.1 The annual rehabilitation plan

The annual rehabilitation plan provides for concurrent or progressive rehabilitation and contains information that defines activities on an annual basis and how these relate to the Final closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan. The objective of the annual rehabilitation plan is to─

- review concurrent rehabilitation and remediation activities already implemented;
- establish rehabilitation and remediation goals and outcomes for the forthcoming 12 months, which contribute to the gradual achievement of the post-mining land use, closure vision and objectives identified in the holder's final rehabilitation, decommissioning and mine closure plan;
- establish a plan, schedule and budget for rehabilitation for the forthcoming 12 months;
- identify and address shortcomings experienced in the preceding 12 months of rehabilitation; and
- evaluate and update the cost of rehabilitation for the 12-month period and for closure, for purposes of supplementing the financial provision guarantee or other financial provision instrument.

Taking into account the objective of the annual rehabilitation plan it is clear that it cannot form part of the eEMP to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 but will be submitted on an annual basis as part of the environmental audit report in terms of Regulation 34 (1)(b) of the NEMA EIA Regulations (2014), as amended by GN 326 of 7 April 2017.

4.1.2 Final rehabilitation, decommissioning and mine closure plan

According to the NEMA Financial Regulations the final rehabilitation, decommissioning and mine closure plan will form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme regarding opportunities for stakeholder review and comment as well as auditing.

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

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

4.1.3 Environmental risk assessment report

According to the NEMA Financial Regulations the environmental risk assessment report will also form a component of the environmental management programme to be submitted in terms of section 24N of the Act and the Environmental Impact Assessment Regulations, 2014 and will be subjected to the same requirements of the environmental management programme with regards opportunities for stakeholder review and comment as well as auditing.

The objective of the environmental risk assessment report is to—

- ensure timeous risk reduction through appropriate interventions;
- identify and quantify the potential latent environmental risks related to post closure;
- detail the approach to managing the risks;
- quantify the potential liabilities associated with the management of the risks; and
- outline monitoring, auditing and reporting requirements.

This document then fulfills the requirements of both the Final rehabilitation, decommissioning and mine closure plan and the Environmental risk assessment report

4.2 Environmental Authorisation (EA) requirements

The key closure objective described in the plans submitted as part of the EMP is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated.

The main closure objective is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. This key closure objective is divided in three closure objectives as stated below with their supported suite of key mitigating activities.

The objectives to meet the set goals as applied to the final decommissioning and mine closure can be summarised as follow:

Objective 1 - To create a safe and healthy post-mining environment

- Safe excavations
- Slope stability of remaining excavation
- No potentially dangerous areas secured if required
- Limited residual environmental impact
- Develop a landscape that reduces the requirement for long term monitoring and management
- No surface and/or groundwater contamination
- Waste management practices not creating or leaving legacies

Objective 2 - To create a stable, free draining post mining landform, which is compatible with the surrounding landscape

- Economically viable and sustainable land, as close as possible to its natural state.
- Prepare area to promote natural re-establishment of vegetation that is self-sustaining, perpetual and provides a sustainable habitat for local fauna and successive flora species
- Prevent long term changes in land use by implementing prompt rehabilitation and maintenance of disturbances when possible as part of annual rehabilitation plan.
- Stable, free draining post mining landform
- Prevent alteration or diverting natural drainage lines and reduced natural runoff.
- Prevent concentration of runoff, mixing of clean runoff with contaminated runoff and creation of large open water bodies.

Objective 3 – To provide optimal post-mining social opportunities

- Optimised benefits for the social environment
- Positive and transparent relationships with stakeholders and maintaining communication channels, providing stakeholders including government authorities with relevant information as per legislative requirements.
- Undertaking environmental management according to approved EMP and Closure plans and regular auditing of the environmental management system.
- Minimal negative aesthetic impact
- Mitigate the nuisance effects of air emissions (dust), visual intrusion and the cumulative effect of a raise in the ambient noise levels
- Prevent disturbance of archaeological sites and implement mitigating measures according to the archaeological assessment.

Concurrent or progressive rehabilitation of disturbed areas is good practice and should be undertaken as this offers a number of advantages such as limiting the mine's environmental liability and limiting costs at closure as rehabilitation is included in the operational activities of the mine.
Rehabilitation measures to be implemented include improving the visual appearance of the disturbed areas, establishing a cover to provide erosion control, improving runoff water quality by minimising silt loads and controlling dust.
Concurrent rehabilitation and remediation are provided for in the annual rehabilitation plan and contain information that defines activities on an annual basis and how these relate to the Final closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan. Annual reviews in terms of regulations 6(a) and 11(1)(a) of the NEMA Financial Regulations, that form part of the Annual Environmental Audit, assesses what closure objectives and criteria are being achieved through the implementation of the plan.

While some disturbed areas can be rehabilitated on a progressive basis during operation, others cannot be rehabilitated until mining is complete. For this reason, some rehabilitation is generally still required during and after closure. Remedial initiatives to minimize environmental impact during and after mining can be divided into three main categories:

- Firstly, the removal of surface infrastructure that cannot be used for other purposes.
- Secondly, the remediation and rehabilitation of old pits to remove the hazard they present to people and animals. Earthworks and contouring the mine area to as close as possible to the pre-mining landscape. This includes filling pits, trenches and small excavations; making pit side's safe and covering the surface area with subsoil and topsoil as necessary; and mitigation or restoration of all surface disturbances and revegetation of the pit slopes and waste dumps.
- Lastly, the removal and isolation of potential pollutants from the environment. Containment and treatment of contaminated water and correct storage and removal of hazardous materials. Waste rock present specific problems, as they are unsuitable for other uses. For this reason, all waste rock and even low-grade product produced are destined to remain in the environment.

The aims of rehabilitation should therefore look at limiting the long-term liabilities that will be borne by future generations. Where possible, natural systems will be used to control water pollution and vegetation cover should limit windblown dust pollution. Gradients will be reduced to levels where erosion is minimal, and natural revegetation is possible.

Maintenance of rehabilitated sites is often the difference between the ultimate successes or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved.
As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities.
Depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include erosion, slow recovery of vegetation, stock that has been abandoned (e.g. oil drums, scrap equipment) and old (unserviceable) structures.
The main closure objective is to hand back the rehabilitated properties in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aim therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. Aftercare and maintenance required can only be identified post decommissioning and depending on success of rehabilitation and mitigating measures.

5 FINAL DECOMMISSIONING AND CLOSURE OF MINING OPERATION

5.1 Infrastructure and Logistics area

5.1.1 Basic rehabilitation methodology

At the quarry only, satellite infrastructure will be supplied as all logistics together with waste management facilities will be supplied at the company HQ that is shared with the agricultural activities.
The main post closure objective for the infrastructure area is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required.
The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated.
The general approach adopted is the complete removal of all infrastructure and equipment and to reuse all infrastructures and equipment at another location by the company or as agricultural infrastructure.

- Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be demolished and discarded.
- All steel structures and reinforcing will be discarded or sold as scrap.
- Building rubble will be used to fill remaining excavations and covered with overburden and topsoil.
- All redundant power lines and cable associated with power supply will be removed.
- Service roads needs to be maintained and handed over to the landowner in a good state of repair and all redundant fences needs to be removed. Waste material of any description, including receptacles, scrap, rubble and tyres, will be removed entirely from the complete mining area and disposed of at the company HQ to be dealt with as part of the waste streams of the agricultural activities. No waste except building rubble will be buried and no waste will be burned on the site.

5.1.2 Risk sources

Upgrading of infrastructure and logistics including waste management facilities are still in progress. The risk sources in the context of the receiving environment within the infrastructure and logistical area are shown in diagram 3 and include the following:

- Access and Haul Roads
- Services and associated infrastructure
- Accommodation and Logistics
- Waste management
- Oil/grease/diesel management systems

5.2 Burrow Pit and waste dumps

5.2.1 Basic rehabilitation methodology

Kaolin clay to be mined is an inert material that is nontoxic. The post closure objective according to the approved EMP is to restore the land to its pre-mining land use considering the altered landform outside the mining area due to historic washing plant now used by the mine as part of logistical facilities.

- Post mining topography for the area will follows the original landform and all overburden dumps will be restricted to a height of 3 m to blend in with the natural dune landscape.
- Overburden dumps to be profiled and covered with topsoil to promote natural revegetation. Re-vegetation of the disturbed areas will follow a process of natural plant succession starting with pioneer plants

The main closure objective therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated.

The basic rehabilitation methodology will therefore only include reinstating the original profile of the natural topography by restricting dump height of all overburden and product stockpiles. Post mining topography for the area will follows the original landform shape and natural re-vegetation will be promoted by replacing of topsoil.

The compacted movement areas and dispatch yard will be screened for petrochemical spills and cleaned before it is ripped and leveled.

5.2.2 Risk sources

No underground workings will take place only quarrying and the final footprint of the burrow pit will be 17 Ha. Kaolin is non-toxic and an inert material which are not affected by weathering and Kaolin residues are typically benign from a pollution point of view.

No permanent high walls will be created as sloping or the burrow pit to form an even depression will take place as part of production. The risk sources in the context of the receiving environment with regard to the mine pit and waste dumps are shown in diagram 3 and include the following:

- Opencast workings (including final voids and ramps)
- Overburden, cover, and/or “soft" material including topsoil;
- Other non-specification waste such as sub-economic lower grade ore:
- Surface disturbance

6 RISK ASSESSMENT

6.1 Risk impact rating

Impact assessment criteria used part of EIA

ASSESSMENT CRITERIA	
NATURE	
Positive	Beneficial to the receiving environment
Negative	Harmful to the receiving environment
Neutral	Neither beneficial or harmful
EXTENT (GEOGRAPHICAL)	
Site	The impact will only affect the site
Local/ district	Will affect the local area or district
Province/region	Will affect the entire province or region
International and National	Will affect the entire country
CONSEQUENCE	
Loss/gain	The impact will result in loss or gain of resource
No loss/gain	The impact will result in no loss or no gain of resource
DURATION	
Construction period / Short term	Up to 3 years
Medium term	Up to 6 years after construction
Long term	More than 6 years after construction
PROBABILITY	
Definite	Impact will certainly occur (>75% probability of occurring)
Probable	Impact likely to occur (50 – 75% probability of occurring)
Possible	Impact may occur (25 – 50% probability of occurring)
Unlikely	Impact unlikely to occur (0 – 25% probability of occurring)
REVERSIBILITY	
Reversible	Impacts can be reversed though the implementation of mitigation measures
Irreversible	Impacts are permanent and can't be reversed by the implementation of mitigation measures
IRREPLACEABLE LOSS OF RESOURCES	
High	The impact is result in a complete loss of all resources
Medium	The impact will result in significant loss of resources
Low	The impact will result in marginal loss of resources
No Loss	The impact will not result in the loss of any resources
CUMULATIVE EFFECTS	
High	The impact would result in significant cumulative effects
Medium	The impact would result in moderate cumulative effects
Low	The impact would result in minor cumulative effects
SIGNIFICANCE RATINGS	
Very High	Major to permanent environmental change with extreme social importance.
High	Long term environmental change with great social importance.
Medium	Medium to long term environmental change with fair social importance.
Low	Short to medium term environmental change with little social importance.
Very low	Short-term environmental change with no social importance
None	No environmental change
Unknown	Due to lack of information
DEGREE TO WHICH IMPACT COULD BE AVOIDED/MANAGED/MITIGATED	
High	The impact could be significantly avoided/managed/mitigated.
Medium	The impact could be fairly avoided/managed/mitigated.
Low	The impact could be avoided/managed/mitigated to a limited degree.
Very Low	The impact could not be avoided/managed/mitigated; there are no mitigation measures that would prevent the impact from occurring.

6.2 Risk Mitigation and Closure objectives

In addition to the goals and objectives for final decommissioning and mine closure as documented above, the vision for the post closure land form is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The vision is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof and that the aesthetic value of the area will be reinstated.

For the vision to be realised the objectives and associated risk management strategies and mitigating measures described in the EMPr needs to be implemented, monitored and evaluated.

The aim with risk mitigation actions is to over time manage significant and medium risks to become insignificant, or at least medium and under control with management actions. Once achieved, a risk will continue to be monitored to confirm its insignificance rating as part of aftercare and maintenance as discussed in section 7.

The closure process involves a series of actions, executed over a number of years as indicated in the annual rehabilitation plans, with continual monitoring, review and remedial actions (if required). Identified and assessed risks feed into mitigation actions (or primary tasks) of which successful implementation result in achievement of the mine closure goals and objectives.

Financial provision is made in section 8 to deal with these mitigating measures in case of temporary closure or sudden closure during the normal operation of the project or at final planned closure.

The identified risks and their levels are listed together with their associated mitigating actions in the table below.

Impacts with Mitigating Measures (from Table 15 in the DEIR & included in the Impact Tables attched at Appendix D)

ACTIVITIES	PHASE	SIZE AND SCALE of disturbance	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION
SITE ACCESS & SITE ESTABLISHMENT	**CONSTRUCTION**	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha • Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	**Impact 1: Soil erosion & soil compaction** • After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilized areas shall be demarcated accordingly. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • Top soil shall be removed separately and stockpiled separately from other soil base layers. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Topsoil storage areas must be convex and should not exceed 2m in height. • Topsoil must be treated with care, must not be buried or in any other way be rendered unsuitable for further use (e.g. by mixing with spoil) and precautions must be taken to prevent unnecessary handling and compaction. • In particular, topsoil must not be subject to compaction greater than 1 500 kg/m² and must not be pushed by a bulldozer for more than 50 metres. Trucks may not be driven over the stockpiles. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Soil erosion and compaction on the section of access roads used by the Applicant is required to be monitored and timeously repaired. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. **Impact 2: Water resources** • Implement and follow water saving procedures and methodologies. • Place oil traps under stationary machinery, only re-fuel machines at fuelling station, construct structures to trap fuel spills at fuelling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Ensure that good housekeeping rules are applied. • Minimise storage of hazardous substances onsite during construction. • Service and refuel construction vehicles at a fit-for-purpose facility to minimise pollution risks. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling.	NEMA Section 2 Principles Environmental Authorisation	Start of activity and continuous as mining progresses over the site during construction period (site access and site establishment activities) Upon cessation of each activity where applicable. Immediately in the event of spills

			• Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • No sewage system will be required and a dry enviro loo system will be developed. • Water for dust suppression to be sourced from recycled grey water system. • Potable water to be sourced from rain collection or trucked in from outside sources. • Waste water (i.e., including process water and grey water) - By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. - Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. - Slow storm water runoff with contoured, low-gradient drains and channels. Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas.		
			Impact 3: Impact on biodiversity • Refer to **Diagrams 6A and 6b**. • Remove alien invasive vegetation if required and ensure ongoing alien vegetation clearing in the area. • No indigenous plants outside of the demarcated work areas may be damaged. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary.		
			Impact 4: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures if kept on site. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress. • Any spillages will be cleaned up immediately. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training. • Provide a bin at the site. • Regularly dispose of any solid waste at a municipal waste disposal site. • Ensure all workers comply with the requirements of the EMPr. • Provide a mobile ablution facility.		
			Impact 5: Visual Impact • The construction areas shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. • Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads.		
			Impact 6: Emissions • The Contractor shall adhere to the local by-laws and regulations regarding the noise and associated hours of operations. • The Contractor shall limit noise levels (e.g. install and maintain silencers on machinery). The provisions of SANS 1200A Sub clause 4.1 regarding "built-up" area shall apply to all areas within audible distance of residents whether in urban, peri-urban or rural areas. • Construction and demolition activities generating output of 85dB or more, shall be limited to normal working hours and not allowed during weekends to limit the impact of noise of neighbours.		

			• No amplified music shall be allowed on site. • Hauling vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Stockpiles must be maintained (covered where necessary) to avoid wind erosion of the material. • Incremental clearing of ground cover should take place to avoid unnecessary exposed surfaces.		
			Impact 7: Heritage Resources • The following recommendations are made (**Appendix C1**): • Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine. • A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (**Appendix C2**). • Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it. • These proposed mitigation measures must be included in the Environmental Management Plan for the mine. ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.		
			Impact 8: Socio-economic – creation of employment and job security during construction phase with local and regional economic spin-offs • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		
Kaolin open pit mine in operation	**OPERATION**	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha	**Impact 1: Soil erosion, soil compaction and geological sequence** The focus of topographic rehabilitation may not be obvious at the time of mine planning and must be addressed as the mine develops and the Closure Plan (**Appendix E**) must be reviewed periodically for continued relevance in the light of changed mine path or long-term plans. • Mine pit to be developed in benches not exceeding 3m in height . • At final closure the sides of the burrow pit will be sloped to form an even depression without any steep high walls. • Actions to mitigate the risk of erosion on waste dumps will be through implementation of practices such as leaving the profiling contours created by equipment tracks. • Waste dumps must be designed to meet minimum slope stability and safety standards and vegetated with reduce erosion and runoff. • The main closure objective is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required. The aim is to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The aesthetic value of the area will also be reinstated. • The basic rehabilitation methodology will therefore strive to replicate the pre-mining topography, wherever possible, or at least not to increase overall slope gradients without emplacement of adequately designed erosion control or runoff diversion structures.		

		• Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	• After clearing, the affected area shall be stabilized to prevent any erosion or sediment runoff. Stabilised areas shall be demarcated accordingly. • Incremental clearing of vegetation should take place to avoid unnecessary exposed surfaces. • Reasonable measures must be undertaken to ensure that any exposed areas are adequately protected against the wind and stormwater run-off. • The stockpile areas for topsoil are temporary as they will be re-used on a cut and fill basis. • Stockpiles should ideally be located to create the least visual impact and must be maintained to avoid erosion of the material. • Reduce drop height of material to a minimum. • Temporarily halt material handling in windy conditions. • A speed limit of 30km/hour will be displayed and enforced through a fining system. All vehicle drivers using the access road and entering the site will be informed of the speed limit. • Compacted areas that are not required for access shall be scarified after use during decommissioning and rehabilitation. • No industrial or mine waste is generated during the mining process. • Processing shall include the spreading of Kaolin to dry out where after it will be screened and bagged to be sold as a FoT product. • Product stockpiles shall form part of the drying area that shall also serve as a dispatch yard. • Primary processing shall include screening by means of a “trommel screen” provided as part of the adjacent operation so no Fine Residue Dumps (FRD) will be created.		

			Impact 2: Water Resources • Implement and follow water saving procedures and methodologies. • Place oil traps under stationary machinery, only re-fuel machines at fueling station, construct structures to trap fuel spills at fueling station, immediately clean oil and fuel spills and dispose contaminated material (soil, etc.) at licensed sites only. • Take care that temporary onsite sanitation facilities are well maintained and serviced regularly. • Draw-up and strictly enforce procedures for the storage, handling and transport of different hazardous materials. • Ensure vehicles and equipment are in good working order and drivers and operators are properly trained. • Ensure that good housekeeping rules are applied. • Minimise storage of hazardous substances onsite during construction. • Service and refuel construction vehicles at a fit-for-purpose facility to minimise pollution risks. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training and comply with the requirements of the EMPr. • No sewage system will be required and a dry enviro loo system will be developed. • Water for dust suppression to be sourced from a recycled grey water system. • Potable water to be sourced from rain collection or trucked in from outside sources. Drinking water to be brought on site as per existing practices. • **Waste water (i.e., including process water and grey water)** - By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. - A Standard French drain system will be developed for grey water disposal. - Although erosion and runoff are natural processes it should be managed by maintaining topsoil in any areas not in use and maintaining maximum existing vegetation coverage. - Slow storm water runoff with contoured, low-gradient drains and channels. - Storm water diversion and erosion control contour berms separate clean and contaminated water systems around the pit and infrastructure areas.	NEMA Section 2 Principles Environmental Authorisation	During the estimated 30 year lifespan of the mine. Start of activity and continuous as mining progresses over the site during operational period. Upon cessation of each activity where applicable. Immediately in the event of spills.
			Impact 4: Impact on biodiversity • Refer to Diagrams 6a to 6B, which show the proposed areas for mining and the existing tracks that will be used. . • The annual rehabilitation plan must be implemented. • Remove alien invasive vegetation, and ensure ongoing alien vegetation clearing should this be required. • No indigenous plants outside of the demarcated work areas may be damaged. • The noise and vibration caused by the earthmoving equipment will disturb smaller animals. These will move away whilst operations are in progress. Should any animals be encountered these should be moved away by a suitably trained nature conservation officer, if necessary. • Regular maintenance of the boundary fence is required.		
			Impact 5: Contamination & Pollution • Oils and lubricants must be stored within sealed containment structures of the demarcated areas of the adjacent mine. • Any mechanical equipment maintenance must be undertaken on drip trays or UPVC sheets to prevent spills/ leaks onto the soil. • When not in use, a drip tray must be placed beneath mechanical equipment and vehicles. • Machinery must be kept in good working order and regularly inspected for leaks. • A spill kit will be available on each site where mining activities are in progress.		

			• Any spillages will be cleaned up immediately. • Unwanted steel, sheet metal and equipment need to be stored in a demarcated salvage yard, and will need to be sold or disposed of as scrap metal. Recycling and reusing materials may reduce garbage haul fees or generate income through the sale of scrap metal and old equipment. • All equipment and other items used during the mining operation needs to be removed from the site during rehabilitation. • Waste material of any description, including receptacles, scrap, rubble and tyres, must be removed entirely from the mining area and disposed of at a recognised landfill facility. It will not be buried or burned on the site. • All temporary waste storage areas need to be cleaned out and waste removed. • Tyres to be return to supplier or a company that uses old tyres for making door mats, shoes, swings, etc. • Batteries to be return to supplier or dispose at a permitted hazardous waste facility. • Fluorescent tubes to be collected in sealed containers (stored on concrete slabs) and removed from site for disposal at a permitted hazardous waste facility. • Chemical containers to be returned to supplier or disposed of at a legal, permitted facility that is capable of disposing of the waste. (DO NOT sell chemical containers to workers or communities). • Laboratory waste (chemicals) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. • Industrial chemicals (laboratory waste) - Returned to supplier or disposed of at a permitted facility that is capable of disposing of the waste. • Used oils / hydrocarbons fuels / liquids are to be collected in sealed containers (stored on concrete slabs) and removed from site for recycling by a reputable company. • All waste in the temporary storage area for used lubrication products and other hazardous chemicals will be disposed of at a collection point from where it will be collected by a waste recycling company. • Generator bays will be constructed with the necessary pollution control measures (drip trays). • Hydrocarbon contaminated sludge (collected in oil traps) - Removed from the oil traps and removed from site for recycling (if possible) or disposal at a suitably permitted facility. • Equipment used in the mining process will be adequately maintained in the workshops of the company so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid. • By keeping contaminated and clean water separate and establishing controlled runoff washing bays, the flow and end destination of decontamination washing water will be controlled. • Oils and lubricants must be stored within sealed containment structures of the demarcated areas of the adjacent mine. • Waste materials generated on site must be stored in suitable lidded containers and removed off site to a suitable disposal facility. • Waste separation must be undertaken if practical for recycling. • Provide all workers with environmental awareness training. • In order to ensure that waste classes are kept in separate streams, communication will be passed on and people will be trained on the different waste classes. • Ensure all workers comply with the requirements of the EMPr. Training of personnel in the implementation of the Closure Plan will done and the implementation of the environmental awareness plan will be an ongoing process. • Regularly dispose of any solid waste at a municipal waste disposal site. • Provide a mobile ablution facility.		
			Impact 6: Visual landscape • Maintain the height of the stockpile areas at a maximum of 2 metres. • The site shall be kept neat and tidy at all times. Equipment must be kept in designated areas and storing/stockpiling shall be kept orderly.		

			• Restrict working hours to normal work day hours with no work over weekends when holidays occur to minimize hauling trucks along access roads. • The impact is temporary and after mining the excavations will be sloped, all oversize material and overburden will be backfilled, top soiled and allowed to re-vegetate naturally resulting in an even depression with no residual impact.		
			Impact 7: Emissions • Ensure Kaolin hauling is during normal working hours and not on weekends. • No amplified music should be allowed on site. • Existing tracks will be used as haul roads and will only be upgraded to facilitate haul trucks by applying dust suppression and/or hardening compound such as Macadamite. • On public roads the vehicles shall adhere to municipal and provincial traffic regulations including speed limits. • Vehicles used on site for the construction related activities shall be maintained and in a good working condition so as to reduce emissions. • Engines shall be turned off when the vehicle is temporarily parked or stationery for long periods. • Ensure bagged Kaolin is properly secured for hauling.		
			Impact 8: Heritage resources **The following recommendations are made (Appendix C1):** • Archaeological monitoring of the mine pit to record the presence (or not) of buried surfaces containing stone artefacts must take place when topsoil stripping reaches the buried aeolian/silcrete interface. This monitoring to take place at intervals to be agreed with the mine. • A Fossil Chance Find Protocol should be implemented in the unlikely event of fossil material being encountered (as per **Appendix C2**). • Should any archaeological material, including human burials, be accidentally exposed during the course of mining, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it. • These proposed mitigation measures must be included in the Environmental Management Plan for the mine. • ACO Associates concluded that it is their reasoned opinion that the proposed activities may be authorised. The archaeological resources are not highly significant in themselves, although their relationship to silcrete outcrops is of interest. There are no areas that need to be avoided or buffer zones that need to be implemented.		
			Impact 9: Socio-economic • Employment of local previously disadvantaged labour wherever possible, with provision of training (upskilling)		

Final Rehabilitation and removal of temporary infrastructure	DECOMMISSIONING	TOTAL EXTENT OF AREA REQUIRED FOR MINING INCLUDING PRODUCT STOCKPILES, OPEN PIT, OVERBURDEN AND WASTE DUMPS • Infrastructure & logistics = 20Ha • Overburden & waste dumps = 36.5 Ha • Mine Pit, processing plant, processing and drying area = 17.8 Ha • Stockpiles, RoM, and topsoil = 7.9 Ha Total is 82.2 Ha	• Implementation of Final Rehabilitation, Decommissioning and Mine Closure Plan (**Appendix E**). • Compacted areas shall be scarified after use during decommissioning and rehabilitation. • Any stored topsoil shall be spread over the scarified surface. • Ongoing removal of alien invasive vegetation as required. • After mining the excavations will be sloped, all oversize material and overburden will be backfilled, top soiled and allowed to re-vegetate naturally resulting in an even depression with no residual impact. • Distinguished between farming and mining infrastructure and waste, and in consultation with landowner Identify infrastructure and services to remain after closure. • The cement structures for the fuel supply including service apron/wash bay will remain as part of farm improvement and the mine will only be responsible for maintenance and waste management. • Redundant structures, buildings and civil foundations (down to one meter below surface for subsurface infrastructure) will be removed for use elsewhere or demolished and discarded. • All redundant infrastructure and services need to be demolished including ruins, buildings, foundations, footings. • Building rubble will be used as backfill in excavations or removed from site in the absence of excavations. • All steel structures and reinforcing will be discarded or sold as scrap. • Remove all power supply installations not to be retained by landowner in terms of section 44 of the MPRDA. • Excavations created by removing subsurface infrastructure needs to be filled, levelled and compacted. • Implementing screening as part of the cleaning activities before materials are moved from the mine. • The infrastructure area will be screened for petrochemical spills and cleaned. • The compacted movement areas will be screened for petrochemical spills and cleaned before it is ripped and levelled. • Decontaminate oil and diesel contaminated soils and structures with biochemical agents prior to removal. • Final walk through of complete mining lease area to ensure no mining related waste and of re-usable infrastructure remain on site. • Coarse natural material used for the construction of ramps must be removed and dumped into the excavations. • Reshaping of the mine pit to create shallow depressions. • Level the complete disturbed areas and restore the original profile to blend in with the natural topography. • On completion of mining operations, the surface of the disturbed areas especially if compacted due to hauling and dumping operations, shall be scarified to a depth of at least 300mm and the previously stored topsoil will be returned to its original depth over the area. • To ensure long-term stability, the restored soil cover should attempt to mimic the pre-mining distribution of soil texture and thickness • Unnecessary destruction of vegetation should be avoided by ensuring that traffic and personnel movement be restricted to demarcated areas. No traffic should be allowed on the rehabilitated areas. • Minimise noise disturbance: limiting earth moving to day time.	NEMA Section 2 Principles Environmental Authorisation	

Objective evidence and closure criteria

Closure objective	Document scope	Author	Success criteria (standard)
Viable and Sustainable Land use compatible with pre-mining land use	Report on the monitoring results with regard to succession tempo of total cover in comparison with virgin vegetation adjacent to mining area	Independent EAP	Total cover and species composition are comparable to that of the adjacent virgin area
	Monitoring results of erosion on steep slopes (20% gradient) and disturbed areas	Independent EAP	At the time of closure, soil loss has stabilised over the whole previously disturbed area
Limited environmental impacts during demolition activities	Summary of all complaints received during demolition activities and follow up actions	Mine SHE Head, audited by independent EAP	Nuisance levels consistently on par with legislative standards after completion of demolition activities All incidents older than 90 days investigated and feedback given to complainant

7 AFTERCARE AND MAINTENANCE

Maintenance of rehabilitated sites is often the difference between the ultimate successes or failure of rehabilitation and monitoring of rehabilitation will determine whether rehabilitation objectives and requirements are being achieved.

As the final phase in the project cycle, decommissioning may present positive environmental opportunities associated with the return of the land for alternative use and the cessation of impacts associated with operational activities. However, depending on the nature of the operational activity, the need to manage risks and potential residual impacts may remain well after operations have ceased. Examples of potential residual impacts and risks include erosion, slow recovery of vegetation, stock that has been abandoned (e.g. oil drums, scrap equipment) and old (unserviceable) structures.

The main closure objective is to hand back the rehabilitated properties to the respective landowners in a state that is fit for grazing or other agreed to landform, as close as possible to the original carrying capacity and to ensure that the affected environment is maintained in a stable condition that will not be detrimental to the safety and health of humans and animals and that will not pollute the environment or lead to the degradation thereof. The rehabilitation strategy is based on reinstating the original profile of the landscape. The aim therefore is to leave the site in as safe and self-sustaining a condition as possible and in a situation where no post-closure intervention is required.

Due to the specific nature of the mining operation no aftercare and maintenance were identified except for monitoring of erosion event over a period of 2 years.

8 ESTIMATED COST FOR REQUIREMENTS TO FULLY DECOMMISSION THE SITE

In terms of the NEMA Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations, 2015 regulation 11(1) the holder of a right or permit must ensure that a review is undertaken of the requirements for (a) annual rehabilitation, as reflected in an annual rehabilitation plan; (b) final rehabilitation, decommissioning and closure of the prospecting, exploration, mining or production operations at the end of the life of operations as reflected in a final rehabilitation, decommissioning and mine closure plan; and (c) remediation of latent or residual environmental impacts which may become known in the future, as reflected in an environmental risk assessment report.

In terms of regulation 11(2) the holder of a right or permit must, on completion of the actions contemplated in sub regulation (1), ensure that the adequacy of the financial provision is assessed and any adjustments that need to be made to the financial provision are identified within one year of the commencement of the operations authorised in the right or permit; or where the operations has commenced immediately after its financial year end that follows such commencement.

8.1 Assesment of financial provision

The assessment of the financial provision requirements for annual rehabilitation in terms reg. 6(a) is provided for as part of the annual rehabilitation plan that form part of the annual environmental audit of the implementation of the environmental authorization and closure plan in terms of the NEMA EIA regulations (2014).

No remediation of latent or residual environmental impacts which may become known in the future were identified at this stage.

Financial provision in terms of reg. 6(c) are covered by the requirements for the actual costs of implementation of the measures required for final rehabilitation, decommissioning and closure of the mining operations at the end of the life of operations as reflected in this final rehabilitation, decommissioning and mine closure plan in terms of reg. 6(b).

8.2 Quantified Closure elements

The following risk-based criteria and assumptions were used to calculate the final rehabilitation, decommissioning and closure cost:

- Return of land to its pre-mining land capability where possible
- The cement structures used as part of the waste management facilities of the mine will not form part of this final decommissioning, rehabilitation and closure plan.
- Remove all assets
- All vehicles, plant and workshop equipment will be removed for salvage or resale
- All fixed assets that can be profitably removed will be removed for salvage or resale
- Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site
- All structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level
- Inert waste, which is more than 500 mm underground, such as pipes, will be left in place
- A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the company HQ
- All services related to the operation like overhead power supply will have to be demolished
- All compacted areas due to hauling and stockpiling must be ripped to 300 mm
- All disturbed and exposed surfaces will be covered with at least 150 mm of topsoil and re-vegetation must be allowed to take place naturally
- Existing tracks will be used and new tracks must be restricted to the absolute minimum.
- The stockpile and logistics area will not exceed the planned area footprint
- It is assumed that the post-mining pit stability will be addressed as part of the operation and necessary remedial actions implemented prior to closure
- Topography to follow the original landform shape.
- Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling

8.3 Calculation of Closure cost

For each closure element, various possible combinations of required rehabilitation work were identified and costs were calculated for each of these, based on quotations obtained from independent third party suppliers for earthmovmg equipment rental and various other consumables. Rates used are from the Contractors Plant Hire Association. Refer diagram 3 for footprint of closure elements.

Table 7 Cost per closure element

Earth Moving Equipment	Rental Rate /hour	Fuel Cost & Delivery	Total Cost /hour
Front End Loader - 30 Ton	R755.70	R528.00	R1 283.70
Bulldozer Cat D9R	R1 236.55	R528.00	R1 764.55
Excavator - 45 Ton	R755.70	R528.00	R1 283.70
Excavator - 30 Ton	R431.20	R352.00	R783.20
Excavator - 20 Ton	R354.20	R288.00	R642.20
Cat 14 H Grader	R498.30	R288.00	R786.30
Articulated Dump Truck - 30 Ton	R431.20	R224.00	R655.20
Tipper Truck 6m³	R280.50	R192.00	R472.50
Tipper Truck 10m³	R339.90	R224.00	R563.90
Manual Labour /hour	R50.00		

Cost Factor	Closure Element	Cost calculation				
1	**Demolish and remove Buildings/Infrastructure including subsurface structures and bunded fuel storage - Salvage useable material, break structure and dispose in waste dump**	**Cost/h**	**Service hours**	**Labour**	**Total**	
	Tipper Truck 10m³ transport building rubble to excavation	R563.90	4.00	0	R2 255.60	
	Excavator -30 Ton Demolish concrete and loading	R783.20	8.00	0	R6 265.60	
	Cleanup	R50.00	8.00	4	R1 600.00	
	Total				**R10 121.20**	
2	**Remove waste from temporary storage and scrap from salvage yard**	**Cost/h**	**Service hours**	**Labour**	**Total**	
	Tipper Truck 10m³ transport to waste disposal site	R563.90	8.00	0	R4 511.20	
	Treat petrochemical in oil seperator - washbay	R0.00	1.00	R2 500.00	R2 500.00	
	Treat petrochemical in oil seperator - fuel storage & apron washbay	R0.00	1.00	R2 500.00	R2 500.00	
	Cleanup	R50.00	8.00	2	R800.00	
	Total				**R10 311.20**	
3	**Final cleanup - remove all mining related waste walk through with landowner**	**Cost/h**	**Service hours**	**Labour**	**Total**	
	Tipper Truck 10m³ transport to waste disposal site	R563.90	8.00	0	R4 511.20	
	Cleanup	R50.00	8.00	2	R800.00	
	Total				**R5 311.20**	
4	**Loading and transport of overburden and product stockpile for backfill > 80m**	**Load Vol m³**	**Loads/h**	**m³/h**	**R/h**	**R/m³**
	Excavator cycle	1.2	120	144	R783.20	R5.44
	ADT cycle	17	7	119	R655.20	R5.51
	Total cost/m³					**R10.94**
5	**Backfill and profiling pit slope 18° by means of dozing <80m**	**m²/h**		**Cost/h**	**R/m²**	**R/Ha**
	Bulldozer Cat D9R	160		1764.55	R11.03	R19 460.32
	Total cost/Ha					**R19 460.32**
6	**Spreading topsoil level area**	**m³/h**	**m²hour**	**R/m³**	**R/m²**	**R/Ha**
	Loading and transport of topsoil		5	R10.94	R2.19	R2 188.95
	Shaping Grader 140 K	160	480	R4.91	R1.64	R16 381.25
	Total cost/Ha				**R3.83**	**R18 570.20**
7	**Ripping and levelling**	**Speed**	**Ripper/Blade**	**h/Ha**	**R/h**	**R/Ha**
	Grader 140 K	8	3.5	0.36	R786.30	R280.82
	Total cost/Ha					**R280.82**

8.4 Total estimated cost for requirements to fully decommissioned the mining site at final closure

Mining/Sampling Area	Unit	No Units	Unit Cost	Cost per Element
Cost Factor 1				
Demolish and remove Buildings/Infrastructure including subsurface structures and bunded fuel storage - Salvage useable material, break structure and dispose in waste dump				
Risk based criteria and assumptions with regard to rehabilitation				
The cement structures used as part of the waste management facilities of the mine will not form part of this final decommissioning, rehabilitation and closure plan. All other structures will be demolished and terracing and foundations removed to the lesser of 500 mm below the original ground level. Inert waste, which is more than 500 mm underground, such as pipes, will be left in place All services related to the mining operation, water supply lines and storage on site will have to be demolished				
Logistical facilities 0.5 Ha	Areas	1.00	R10 121.20	**R10 121.20**
Processing plant 0.5 Ha	Areas	1.00	R10 121.20	**R10 121.20**
			Sub-Total	**R20 242.40**
Cost Factor 2				
Remove waste from temporary storage and scrap from salvage yard				
Risk based criteria and assumptions with regard to rehabilitation				
A hazardous disposal site will not be constructed and all hazardous waste will be removed from site and transported to the nearest licensed facility. Waste will be dispose/recycled every 3 month and there will never be more than 3 month worth of waste in the temporary storage areas				
Salvage Yard	Areas	1.00	R10 311.20	**R10 311.20**
Temporary waste storage area	Areas	1.00	R10 311.20	**R10 311.20**
			Sub-Total	**R20 622.40**
Cost Factor 3				
Final cleanup - remove all mining related waste walk through with landowner				
Risk based criteria and assumptions with regard to rehabilitation				
Removal of all structures and infrastructure not to be retain by the landowner in terms of section 44 of the MPRDA. All fixed assets that can be profitably removed will be removed for salvage or resale. Any item that has no salvage value to the mine, but could be of value to individuals, will be sold (zero salvage assumed in cost estimation) and the remaining treated as waste and removed from site.				
Areas les than 10 Ha	Areas	1.00	R5 311.20	**R5 311.20**
			Sub-Total	**R5 311.20**
Cost Factor 4				
Loading and transport of overburden and product stockpile for backfill > 80m				
Risk based criteria and assumptions with regard to rehabilitation				
Return of land to its pre-mining land capability where possible It is assumed that the post-mining pit stability and profile will be addressed as part of the operation and necessary remedial actions implemented prior to closure. Backfilling of leftover product to be done at final closure				
Leftover Product or low grade product & safety berm	m^3	2 000.00	R10.94	**R21 889.54**
			Sub-Total	**R21 889.54**
Cost Factor 5				
Profiling pit slope 18° by means of dozing <80m				
Risk based criteria and assumptions with regard to rehabilitation				
Mine pit to be developed in benches not exceeding 3m in height. Bench high waals to be sloped at final closure to create even depression				
Profiling pit slope	Ha	1.00	R9 648.98	**R9 648.98**
			Sub-Total	**R9 648.98**

Cost Factor 6				
Spreading topsoil level area and profile waste dumps				
Risk based criteria and assumptions with regard to rehabilitation				
All disturbed and exposed surfaces will be covered with at least 300 mm of topsoil and re-vegetation must be allowed to take place naturally It is assume that overburden and spoils will be dumped in the designated areas and profiled on a continuous basis as indicated in table 3. Provision is only made for partial replacement of topsoil still outstanding at final closure Where topsoil is not available, the cost for in-situ remediation will be the same as the estimate for top soiling				
Product drying, Stockpile and Dispatch Yard	Ha	0.50	R18 570.20	**R9 285.10**
Laydown and movement area	Ha	0.50	R18 570.20	**R9 285.10**
Overburden dumps	Ha	5.00	R18 570.20	**R92 851.02**
			Sub-Total	**R111 421.23**
Cost Factor 7				
Ripping and levelling Roads and all compacted areas				
Risk based criteria and assumptions with regard to rehabilitation				
All compacted areas due to hauling and stockpiling must be ripped to 300 mm Existing tracks will be used and no new roads will be developed. The stockpile and logistics area will not exceed the planned footprint.				
Product drying, Stockpile and Dispatch Yard	Ha	0.50	R280.82	**R140.41**
Laydown and movement area	Ha	0.50	R280.82	**R140.41**
Salvage Yard	Ha	0.50	R280.82	**R140.41**
			Sub-Total	**R421.23**
Total estimated cost to fully decommissioned the mining site at final closure				**R189 556.98**

Financial provision for the above are in place with DMR as follow:

Cash deposit dated 08 May 2018	R100 000.00
Financial Guarantee G0657/314253/GLO FNB dated 14 September 2015	R 50 250.00
Addendum to Financial Guarantee G0657/314253/GLO to increase it to R100 000.00	

9 THE PUBLIC PARTICIPATION PROCESS

9.1 Principles and Objectives

The Public Participation Process (PPP) was designed to fulfil the requirements of several pieces of legislation applicable to mine closure. It forms an integral component of the mine closure process by affording Interested and Affected Parties (l&AP) the opportunity to identify environmental issues and concerns relating to the proposed closure, which they feel should be addressed. This is consistent with the provisions of the National Environmental Management Act (Act No. 107 of 1998), Section 2(4) (f), which states that "the participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured".

The objective of the operation is to develop a working PPP that informs key stakeholders', I&APs and the general public about mine closure objectives and activities during the life of the mine. The PPP was designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

- Identify issues of concern, and provide suggestions for enhanced benefits and alternatives associated with mine closure,
- Identify risks not yet identified during the risk assessment exercise,
- Identify risks associated with mine closure and rehabilitation,
- Contribute local knowledge and experience,
- Verify that their issues have been considered.

- Comment on the Risk Assessment and Mine Closure Plan at the time of final decommissioning of the project, including the significance of potential risks that have been identified and associated impacts,
- Play an oversight role in the monitoring and evaluation of mine closure.

9.2 Stakeholder Identification and Project Data Base

Existing data bases were used to inform the list of stakeholders. Special consideration was given to ensure that organizations and individuals that had expressed interest in the activities of the operation, and those who are potentially affected by mine closure, were included on the data base. The following are principles which governed the PPP:

- Key stakeholder groups and the general public comprised the target audience in the development of the PPP.
- Providing information to lay people to allow them to contribute to and participate meaningfully in the process.
- Stakeholder participation is most effective when the proponent and the practitioner recognise, acknowledge and validate stakeholder values when designing a PPP (i.e. there should be no underestimation of the technical and professional competence of citizens).
- The recognition that in the current political climate of South Africa, consultation, empowerment and capacity building is particularly important.

The process of involving stakeholders had three main objectives:

- Steps should be taken to ensure that stakeholder input into the project is relevant and representative.
- Stakeholders should be made aware of their objectives and role in the process,
- An efficient communication and feedback mechanism should be developed during the process to ensure that all stakeholders are kept informed of progress.

Stakeholders were drawn from the sectors outlined below:

- National (DWAS, DMR), Provincial (DENC, DALR) and Local Government (Local and District Municipalities)
- Industry (commercial farmers)
- Corporations and businesses (service providers to operation)
- Operations staff

The operation set up a database of I&APs using existing project databases as a starting point. Names of persons and organisations will be added to or deleted from the database where appropriate.

10 MECHANISMS FOR MONITORING COMPLIANCE WITH AND PERFORMANCE ASSESSMENT AGAINST THE ENVIRONMENTAL MANAGEMENT PROGRAMME AND REPORTING

IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
All commitments contained in the BA Report and accompanying EMPr.	Ensure commitments made within the approved BAR and EMPr are being adhered to.	Site Manager and EAP.	**Annual** Undertake and submit an environmental performance audit to DMR
Visual inspection of soil erosion and/or compaction	All exposed areas, access roads and soil stockpiles must be monitored for erosion on a regular basis, specifically after rainfall events.	Site Manager and Independent EAP	**Weekly, and after rain-fall events** Weekly monitoring reports to be signed-off by the Site Manager Corrective action to be confirmed and signed-off by the Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted to the Site Manager.
Visual inspection of biodiversity impacts Visual inspection of soil Visual inspection of waste management, housekeeping and maintenance.	Visual inspection of mining activities and other possible secondary impacts • Control and prevent the development of new access tracks. • Control and prevent growth of alien vegetation in cleared areas and on stockpiles. • Standard waste management practices must be implemented to prevent contamination and littering. • All spill incidents will be reported and corrective action taken in accordance with an established spill response procedure.	Site Manager & Contractor (or sub-contractors)	**Daily** Weekly monitoring reports to be signed-off by the Site Manager. Corrective action to be confirmed and signed-off by the Project Site Manager. Consolidated monthly monitoring reports (including confirmation of corrective action taken, with photographic evidence) to be submitted. Report incidents in terms of the relevant legislation, including the MPRDA, NWA and NEMA.
Re-vegetation; stability; profile; Soil erosion; Alien invasive species	Inspection of all rehabilitated areas to assess whether soil erosion is occurring and to implement corrective action where required.	Site Manager	**Bi-Annual** A final audit report for site closure must be submitted to the DMR for approval.

11 WAY FORWARD

This final Rehabilitation, Decommissioning and Mine Closure Plan will be reviewed on an annual basis to align such approved financial provision set out in regulations 9 and 11, of the NEMA Financial Regulations. Concurrent rehabilitation and remediation will be provided for in the annual rehabilitation plan and will contain information that defines activities on an annual basis and how these relate to the closure vision, as detailed in this final rehabilitation, decommissioning and mine closure plan.

When final planned closure is applied for the operation will submit a final environmental performance audit report to DMR as lead agent for final perusal with the objective to issue a closure certificate. At that point, the closure process, and associated public participation program, will close.