mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED).

PREPARED FOR THE FOLLOWING APPLICANT:

Great Wall Mining (Pty) Ltd

DMRE REF. NO: MP 30/5/1/1/3/ 13240 MP

Gold ore

Lithium ore

Jade(gemstone)

Quartz(gemstone)

IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended), the Minister must grant a prospecting or mining right if among others the mining "will not result in unacceptable pollution, ecological degradation or damage to the environment".

Unless an Environmental Authorisation can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of section 16(3) (b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an environmental authorisation for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the Environmental Authorisation being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

- **Objective of the basic assessment process**

The objective of the basic assessment process is to, through a consultative process—

(a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;

(b) identify the alternatives considered, including the activity, location, and technology alternatives;

(c) describe the need and desirability of the proposed alternatives,

(d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage , and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine:

(i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

(ii) the degree to which these impacts— (aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

EXECUTIVE SUMMARY

Malac Waste and Environmental Services (Pty) Ltd was appointed by Great Wall Mining (Pty) Ltd to undertake Environmental Impact Assessment (EIA) process for the proposed 5 Ha mining permit application situated on a portion of the remaining extent of the farm Kalverkraal 8 IU Magisterial District of Eerstehoek in the Mpumalanga Province,

The proposed mining operation requires authorisations in terms of the MPRDA and NEMA. The following applications have been made (Ref no: **MP 30/5/1/1/3/ 13240 MP**.

A mining permit application in terms of the provisions of the Mineral and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA) regulated by the Department of Mineral Resources (DMR);

Environmental Authorisation application in terms of Section 24 of the National Environmental Management Act No 107 of 1998 (NEMA) and associated regulations, including the Environmental Impact Assessment Regulations of 2014 regulated by the DMR for listed activities triggered in terms of GNR 983. Should the application be successful the mining permit including Environmental Authorisation will be granted by the DMR

Due to the non-hazardous nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining operation and the already disturbed condition of the application area (due to historical farming and mining activities) there are no potential impacts with a high significance rating post mitigation. This report will show that the significance of most of the potential environmental impacts is moderate to low. Furthermore, the potential impacts of the operation can be reduced through the mitigation and careful management measures recommended in this report. The EMPr and commitment made in this report must be adhered to by mine management at all times. Annual audit must be conducted by an external auditor and the reports submitted to the competent authority for review.

The supply of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) will assist the ongoing development of the socio economic structure in the area and the potential biophysical impacts of the proposed operation can be managed to a large extend. Based on the above reasoning it is the opinion of the EAP that the activity may be authorised.

Contents

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

1. Details of the EAP and Applicant

Details of the Environmental Assessment Practitioner

Company Name: Malac Waste and Environmental Services
Contact Person: Ms. Pheladi Mphahlele (EAPASA reg)
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Cell: 071 686 1777/ 079 539 2140

Details of the Applicant

Great Wall Mining
Contact Person : Mr. Mthobisi Zulu
78 Die Heuwel Estate, Die heuwel, Emalahleni, 1035
Email: Mthobisizulu241@gmail.com
Cell: 079 155 7781

Qualification and Expertise of Environmental Assessment Practitioner

Ms. Pheladi Mphahlele obtained a Bachelor of Earth Science in Mining and Environmental Geology (BESMEG) in September 2017 from University of Venda as well as a Certificate in from VBK Business Venture in January 2015. She obtained knowledge in storm water management projects while working on community project in 2015 (2 months) in the construction sector. She also worked on research project while completing her honors in BESMEG. She has 4 years working experience with Environmental Impact Assessment and currently registered with EAPASA (2021/ 4112) as an EAP.

Project Experience

- Environmental Assessment for the proposed sand mining permit on portion of portion 39 of the farm Haakdoornboom 267 JR, within City of Tshwane Metropolitan Municipality, Gauteng Province, May 2019.

- Environmental Assessment for the proposed prospecting right of coal on portion of portion 41 and 42 of farm Rietvalei 140 HU, within the jurisdiction of Abaqulusi Local Municipality, Zululand District of Kwa-Zulu Natal Province, July 2019.

- Environmental Assessment for proposed mining permit of gold ore on farm on the remaining extent of farm kameelspoort 563 JU, within the jurisdiction of Mbombela Local Municipality, Ehlanzeni District of Mpumalanga Province, October 2021.

2. Location of the overall Activity

Table 1: Location of the activity

Property description:	A portion of the remaining extent of farm Kalverkraal 8 IU
Application area (Ha)	5 Ha
Magisterial district:	Eerstehoek
Distance and direction from nearest town	Approximately 47Km south east of Pampoen
21 digit Surveyor General Code for each farm portion	T0IU00000000000080000

1.1 Project Description

The proposed application for a mining permit will cover 5 Ha area. The open cast mining method will be utilised to extract the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) reserves that occur within the proposed mining permit boundary. A moderate Blasting will take place. Excavators will be used to extract commodities and transported to the stockpile area.

The application area has been disturbed through post-mining and farming activities. The area is under little to no indigenous vegetation remain. The topography of the area is categorised as mountainous.

1.2 Application Area Description

The applicant intends to mine gold ore, lithium ore, jade(gemstone) and quartz(gemstone) on the remaining extent of farm Kalverkraal 8 IU. The site is situated approximately 47km south east of Pampoen within the jurisdiction of Chief Albert Luthuli Local Municipality, Gert Sibande District in Mpumalanga Province.

The Application area can be described as open veld and Mountainous. It appears that some of the land previously cultivated, has been left fallow or have recently been planted to pastures. The area also comprised of Thorn trees, grasslands, maintained gravel road,

greenstone rocks as per the observation during the site visit. Please see attached site photographs.

1.3 Surrounding Land Uses

The proposed site is situated adjacent to the Mololotja Nature reserve and boundary line of Eswatini and South Africa on the western side, There is a Kalverkraal village and Ebhusini Tourism Centre on the south west of the site. Vast majority of the surrounding land comprises of livestock incorporated and other fodder during the post-harvest period. Crops produced. There are also existing post-mining activities as there are old mines and diggings.

1.4 Service Infrastructure and Servitudes

No surface infrastructure exists on the application area.

1.5 Description of the scope of the proposed overall activity

The typical open cast mining method will be utilised to extract the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) that is existing within the proposed mining boundary.

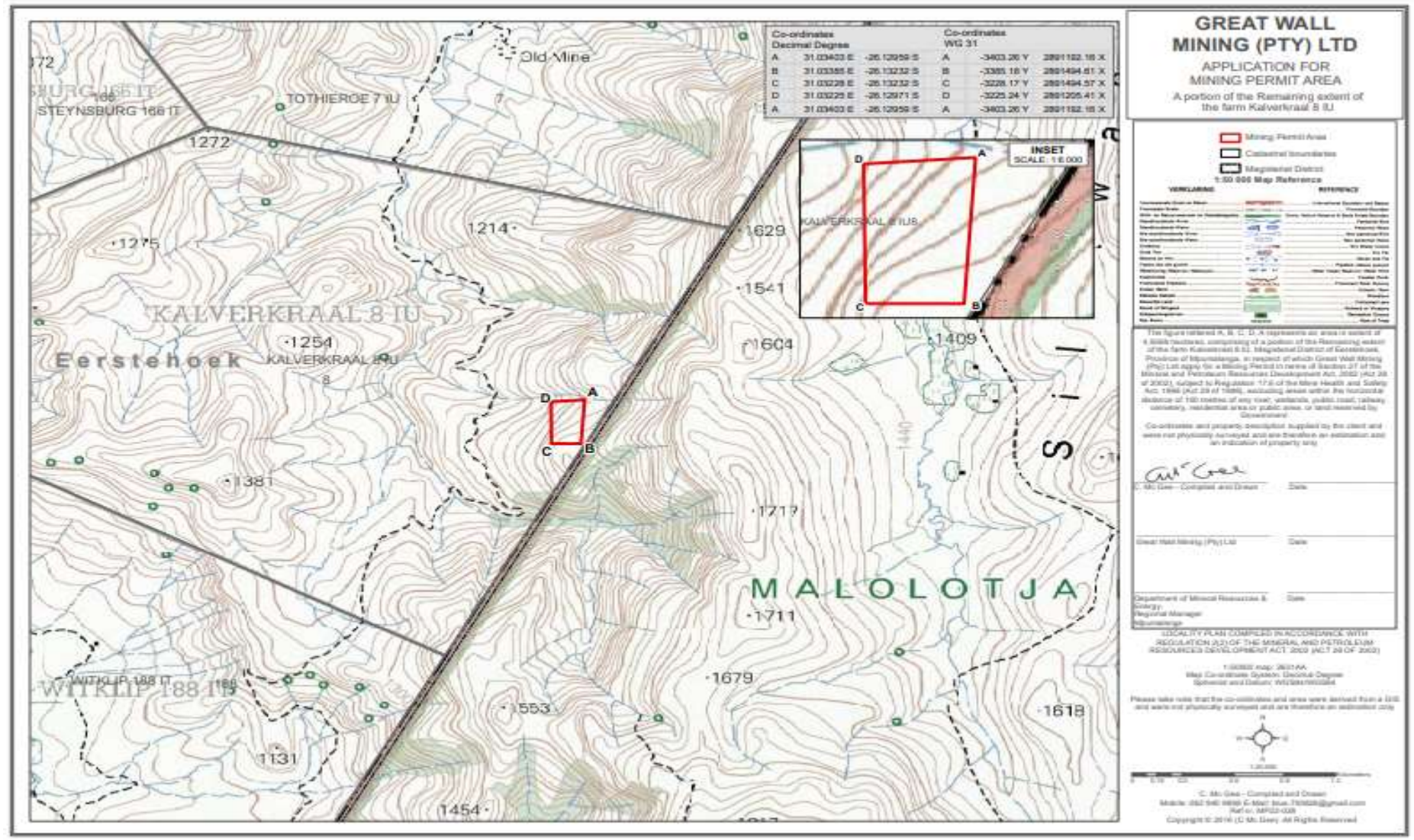

Figure 1.2: Regulation 2.2

3. Listed and specified activities

The proposed Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining operation requires authorisations in terms of the MPRDA and NEMA. The following applications have been made:

- A mining permit application in terms of Section 27 of the Mineral and Petroleum Resources Development Act (Act No.28 of 2002) (MPRDA) regulated by the Department of Mineral Resources (DMR);
- Environmental Authorisation application in terms of Section 24 of the National Environmental Management Act No 107 of 1998 (NEMA) and associated regulations, including the Environmental Impact Assessment Regulations of 2014 regulated by the DMR. The proposed mining operation triggers the following listed activity identified in terms of NEMA EIA Regulations, 2014 GN983.

Activity 21: Any activity including the operation of that activity which requires a mining permit in terms of Section 27 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), including associated infrastructure, structures and earthworks directly related to extraction of a mineral resource, including activities for which an exemption has been issued in terms of section 106 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

Table 2: List of activities planned associated with the mining operation

NAME OF ACTIVITY	Aerial extent of the Activity Ha or m²	LISTED ACTIVITY	APPLICABLE LISTING NOTICE GNR 983
Mining Site	5ha	21	GNR 983
Blasting, Crushing and Excavation	4.5 ha	21	GNR 983
Maintaining of an existing access road to and from site.	200m	Not listed	N/A

Establishment of infrastructure including, container offices, mobile and chemical toilets.	100m2	21	GNR 983
Hauling and Screening	2500m2	21	GNR 983
Raw material and product stockpiling	2000m2	21	GNR 983
Waste Rock dump	2500m2	21	GNR 983
Topsoil Dump	1700m2	21	GNR 983
Pollution Control Dam	50m2	21	GNR 983
Stormwater and in-pit drainage	4200m2	21	GNR 983

4. Description of the activities to be undertaken

The proposed open cast mining method can be divided into four phases namely, construction, operation, decommissioning and closure. The activities proposed during each of these phases are listed below.

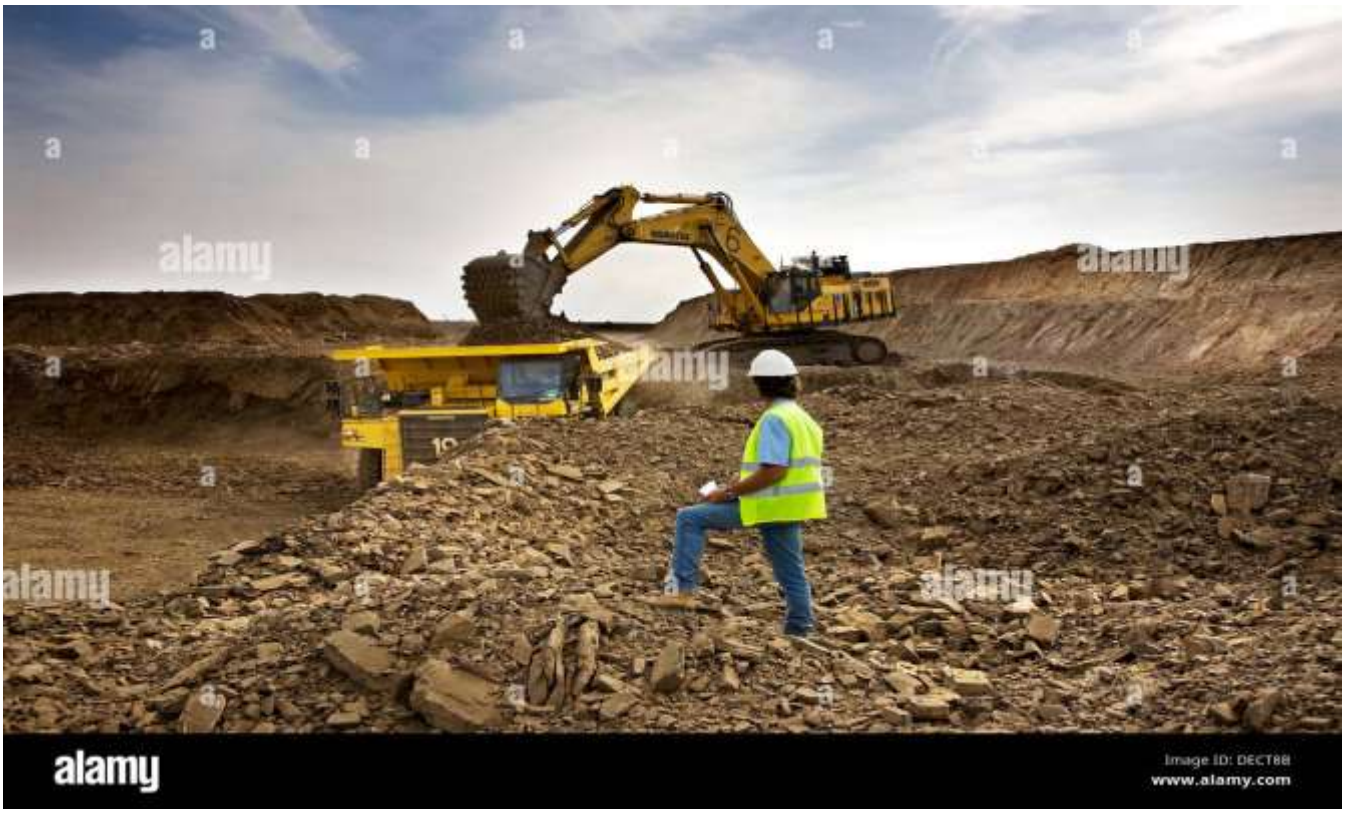

Figure 3.1: Open cast Mining Method

3.1 Construction Phase

The following activities are planned for the construction phase:

3.1.1 Stripping and stockpiling of topsoil

Stripping and stockpiling of soil in areas designated for surface infrastructure, stockpile areas, and the initial box cut will be aligned with EMPr in order to effectively manage the topsoil for rehabilitation purposes by the Applicant in the future. Topsoil will be stripped through a truck and shovel stripping procedure. Over areas of deep excavation where the majority or all of the soil profile is to be impacted) strip all usable soil (approx. 750mm) and stockpile as berms or low, terraced dumps. Alluvial soils should be stockpiled separately from the colluvial (shallower) and in-situ derived materials, which in turn should be stored separately from any ferricrete material, while the soft overburden is stored as a separate unit, as a defined dump of less than 15m in height preferably. The limited height is important to preserve aerobic conditions in the topsoil thereby preventing future reclamation problems. The height will also impact on dust during windy conditions.

Over areas planned for less invasive structures (container offices etc.) and any material stockpile or storage, strip the top 500 mm of usable soil over all affected areas including terraces and strip remaining usable soil and ferricrete (if present in profile) where founding conditions require further soil removal.

Stripping and stockpiling the topsoil first will ensure that the source of post mining rehabilitation nutrients and seeds are retained.

3.1.2 Landscaping activities

Landscaping activities will involve the levelling of ground where surface infrastructure is planned and the presence of construction vehicles on site.

The following infrastructure will be established on site:

- Weighbridge
- Mobile crushing and screening plant;
- Container offices and change houses;
- Security gate;
- Chemical toilets.

Waste handling

General and hazardous waste as defined under National Environmental Management: Waste Act will be generated during the construction phase. General waste may comprise concrete, rubble, glass, plastics and recyclable metals and hazardous waste could include used oils, oily rags, paint and chemicals containers etc.

Domestic and hazardous waste generated by the project will be collected, handled and temporarily stored on site before being removed on a regular basis for disposal at appropriately licenced facilities.

3.2 Operational Phase

The operational phase will include the excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) from the proposed area. The commodity will be excavated, stockpiled and loaded onto haulage trucks and transported to the desired location. No washing will occur on site. The only process water required will be for dust suppression and it will be sourced from the contract miner will brought onto site via a water tanker. The main activities planned for the operational phase are:

3.2.1 Stripping and stockpiling of topsoil

As per the construction phase, the soils excavated will be separately pre-stripped as topsoil or subsoil and stockpiled separately as stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure/rehabilitation purposes. Hydromorphic (wet) soils must be stockpiled separately from the dry materials, and the "ferricrete" separately from all other materials. Topsoil stockpiles will be vegetated and shaped to allow adequate drainage of storm water to prevent erosion and contamination. Subsoil stripping and stockpiling should follow a similar truck and shovel stripping procedure than the method used in the stripping of topsoil.

- Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) raw product is required in order to reach the desired size accepted by the existing markets.
- Raw material and product stockpiling. The raw material product will be road hauled to the product stockpile area on site.
- Transportation of the raw product to the desired location using the existing access road.
- Generation and handling of general and hazardous waste (oil, diesel, chemical toilets)

General and hazardous waste as defined under National Environmental Management: Waste Act will be generated at the proposed mine operation. General waste will comprise concrete, rubble, glass, plastics and recyclable metals and hazardous waste will include used oils, oily rags, paint and etc. Temporary waste storage facilities will be constructed for hazardous and general waste within the mine infrastructure area. A facility for the bailing and sorting of waste will be provided for within the temporary storage areas. No disposal of general or hazardous waste will take place at the mine; such waste will be transported offsite for disposal at suitably licenced facilities. A chemical toilet will be maintained on site and emptied on a regular basis by a suitable service provider at a registered waste site.

- Storm water management.

Clean and dirty water will be separated through berms. Water falling onto the operational area will be contained inside the pit. The water accumulating in the pit will then be used for dust suppression inside the mining area.

- Presence of operational vehicles on site

The activities listed above will involve the operation of trucks, excavators and pick-ups.

- Concurrent rehabilitation.

Concurrent rehabilitation will occur during the operational phase by means of the roll over method.

3.3 Decommissioning Phase

Rehabilitation of the mining area will run parallel with the mining operation. The topsoil and overburden form the first box-cut will be placed at the end of the mining area. The first box-cut will be filled and rehabilitated with the stripped overburden and topsoil from the second mining window. This process will continue in the same manner as explained above (ongoing rehabilitation). Once the final mining window has been mined, the void will be filled with the topsoil and overburden from the first box-cut. The Rehabilitation Programme would include ongoing monitoring and annual audits to ensure that objectives are met.

3.3.1 The decommissioning phase will comprise of the following activities:

- Dismantling and removal of all infrastructure in meeting the closure objectives; Mining infrastructure such as site offices, change houses, fences, haul roads etc. will be removed from site. The roads will be ripped and reseeded with indigenous vegetation.

- Ripping, landscaping and re-vegetation of all disturbed areas.

  The operational area will be landscaped and re-vegetated to emulate the pre mining environment as close as practically possible.

- Replacement of soils and backfilling of the pit;

  During decommissioning, replace soil to appropriate soil depths, and over disturbed areas and in appropriate topographic position to achieve predevelopment land capability and land form where possible. The pre-stripped, top soil will be replaced over the remaining landscaped area. Activities associated with the decommissioning phase will aim at rehabilitation of the site and associated soil to the extent that the site can revert back to agricultural use post mining. The topsoil and subsoil from the initial box cut will be used to backfill the final void.

- Maintenance of all re-vegetated areas up until such areas initiate succession and create a sustainable cover;

  The re-vegetated areas will be encouraged to grow and weeds removed on a regular basis.

- Retrench and/or retraining of employees.

  Mine closure will result in the retrenchment of a number of employees. Only employees and contractors involved in the decommissioning activities will remain employed.

3.4 Closure Phase

The aftercare programme will continue for two years after decommissioning and include six-monthly site inspection and annual audit reports in which the monitoring results will be reported to the DMR. The potential residual impact is subsidence of the mined out area due to the removal of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ layer during the operational phase.

3.4.1 The post-closure phase will include the following activities:

- Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas; and
- Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.

5. Policy and Legislative Context

Please refer to Table 4 below for a summary of the relevant policies and legislation:

Table 4: Summary of relevant Policies and Legislation

APPLICABLE LEGISLATION AND GUIDELINES USED TO COMPILE THE REPORT	REFERENCE WHERE APPLIED	HOW DOES THIS DEVELOPMENT COMPLIY WITH AND RESPOND TO THE LEGISLATION AND POLICY CONTEXT.

MPRDA, 2002 (Act 28 of 2002) MPRDA, 2002 (Act 28 of 2002): MPRDA Regulations, 2004	S.27 Mining permit application.	A Mining Permit application was lodged on the DMR SAMRAD system. The application reference number is **13240MP**

NEMA, 1998 (Act 107 of 1998) NEMA EIA Regulations of 2014.	This BA Report and EMPr is to obtain Environmental Authorisation.	An application for Environmental Authorisation has been submitted with the Mining Permit application to the DMR as the competent authority for triggering listed activities 21 of GNR 983.
National Environmental Management: Biodiversity Act, 2004.	Check presence of endangered species.	The Applicant committed not to remove any sensitive/ endangered species. However the EMP will require the Applicant to apply for a tree removal permit prior to the removal of sensitive/endangered species.
NWA, 1998 (Act 36 of 1998)	The mining operation does not require a Water Use License because it is a dry process and Stone Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ is not considered as a hazardous material. Water will be required for dust suppression purposes.	The operation must implement storm water management features to divert clean water away from the operational area. During concurrent rehabilitation the rehabilitated area must be shaped to allow free drainage.

Mining and Biodiversity Guideline (DEA et al, 2013)	The guideline distinguish between four biodiversity priority areas where biodiversity may limit the potential for mining: • Legally Protected Areas • Highest Biodiversity Importance • High Biodiversity Importance • Moderate Biodiversity Importance	The project area does not fall within any biodiversity priority area identified by the Mining and Biodiversity Guideline

6. NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

In previous years, the economic benefits of the mining sector were often concentrated in the hands of small elite and not deployed optimally to further the development agenda of the area concerned, although recent years have seen a fundamental shift towards recognising the importance of sustainable business, which entails contributing to the socio-economic strategies of the area concerned.

Mineral resources, such as Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone), should be seen as part of the natural endowment of any province/country, and their extraction presents a finite opportunity for local and provincial governments to benefit from their wealth. If the financial benefits form mining are correctly invested in education, health care, the facilitation of secondary or service industries, and the diversification of the economy away from dependence on natural resources, the financial benefits can yield developmental benefits far exceeding the life of any mine as there mostly used in jewellery,

dentistry and medicines, batteries, ceramics and glass, primary aluminium production, ornaments and urns, vases, watches and clock.

The socio-economically depressed and geographically marginalised communities would benefit directly from the proposed operation of the mine because the mine will employ 6-20 people. Where possible, the employees will be sourced locally. All staff will be further trained, which will also uplift the community. The activities will provide employment for locals and support services, as well as empowerment and skills transfer opportunities. Seen in the light of the current economic environment, having an income has a high impact on the quality of life of families, creating a positive effect. This can therefore be considered a significant benefit. Indirectly, the operation will also be creating jobs by employing contractors for security, operation of the weighbridge and undertaking administration.

It is however necessary to highlight the sustainability of mining compared to agriculture (previous land use). mining is not a sustainable activity because it is restricted to the extent of the reserve and the life of mine. Agriculture on the other hand can be sustainable if correctly practiced. Through fertilizers and crop maintenance the production of maize for example can be sustainable for many decades. Therefore although mining can generate more gross income over a shorter period, it is less sustainable than good agricultural practices. In terms of this application the study area is currently used for agricultural practises. Therefor the sustainable issue must be overcome, by rehabilitating the area sufficiently in order to recover the area as close as possible to its natural state and to gain the necessary permits for closure purposes.

A maintenance period of 2-3 years must be incorporated into the closure cost, therefore sufficient financial provision will be available for the rehabilitation and maintenance of the disturbed area. Depending on the land and the population growth in the affected region, it could be sold back as agricultural land or for either game farming purposes or for other industrial applications.

6. Motivation for the overall preferred site, activities and technology alternative

6.1 Site Activity Alternatives

Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining is the only activity that will be conducted on site.

6.2 Technology alternatives

Blasting is required to loosen the deposit due to the cementation of the mining areas rock. From there excavators will be used to remove the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) from the pit and transported to the stockpile.

7. Full description of the process followed to reach the proposed preferred alternatives within the site.

The DEA Guidelines Series notes the consideration of alternatives as one of the most critical elements of the environmental assessment process. Its role is to provide a framework for sound decision-making based on the principles of sustainable development. The search for alternatives should be well documented, and should take into account the views of stakeholders. Key criteria for consideration when identifying alternatives are that they should be: "practicable", "feasible", "relevant", "reasonable" and "viable". The Guideline further notes that although a range of alternatives may exist for a project, they are not all necessarily appropriate for each project under consideration and that the range of categories of alternatives to be evaluated should be considered along with the "no-go" alternative.

Assessment of alternatives should include a comprehensive comparison of all potential impacts, direct, indirect and cumulative, on the environment. The goal of evaluating alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, or through reducing or avoiding potentially significant negative impacts.

Consideration of alternative activities is a critical element of both EIAs and SEAs. Identification should take place during the scoping phase and should facilitate input from all stakeholders. Evaluation should focus on a few preferred alternatives and should include a comprehensive comparison of all potential impacts, including biophysical, social and economic aspects.
Key issues to consider when identifying alternatives are that:

- Alternatives to most proposals exist;
- The need for and purpose of a development activity must be clearly identified to facilitate the identification of appropriate and feasible alternatives;
- The appropriate development response is identified from a range of possible options;
- The selection is based on a comprehensive and participatory assessment of the full range of options;
- Social and environmental aspects are accorded the same significance as economic and financial factors in the assessment process; and

- The assessment and evaluation of alternatives continues through all stages of the project.

In order to give effect to the general objectives of integrated environmental management laid down in Chapter 5 of the National Environment Management Act 107 of 1998 (NEMA), the potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority. The procedures for the investigation, assessment and communication of the potential impact of activities must, inter alia, include with respect to every application for an Environmental Authorisation –

(a) An investigation of the environment likely to be significantly affected by the proposed activity and alternatives thereto.
(b) An investigation of the potential impact of the activity and its alternatives on the environment and assessment of the significance of that potential impact.
(c) An investigation of mitigation measures to keep adverse impacts to a minimum, as well as the option of not implementing the activity.

It is clear from the above that the consideration of alternatives is an integral part of the EIA process.

7.1 The type of activity to be undertaken

Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining is the only activity planned by the Applicant.

7.2 The design or layout of the activity;

The infrastructure that will be established on site is limited to a security gate, weighbridge, haul roads, chemical toilets and container offices. The location of these will be determined based on the direction of mining permit application.

7.3 The technology to be used in the activity;

The mining method proposed is the excavation and loading of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) onto trucks. Blasting is required to loosen the deposit due to the cementation of the mining areas rock. From there the preferred alternative is to use excavators to remove Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) from the pit. Other open pit excavation methods are to use power shovels, draglines and bucket wheel excavators. Using excavators to remove the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) is the most practical means of winning the commodities especially in such a small mining area. It has been successfully used for the past few years by the Applicant in other operation and is thus a proven method.

7.4 The operational aspects of the activity;

The operational aspects of the mine and potential alternatives are discussed below:

7.4.1 Water Supply

Limited water is required for operational purposes because it is a dry operation. Water will be sourced out by the contract miner and brought onto site via a water tanker. Storm water accumulating in the open pit can be used for dust suppression on the operational area.

A number of alternative options in terms of water supply exists; a borehole can be drilled (subject to the approval from DWS), water can be sourced off-site from adjacent landowner's farm dam (if an agreement can be reached) or the municipality. The alternative water source options will however require the Applicant to apply for a Water Use License which will delay the operation.

8. Details of the Public Participation Process Followed

Public Participation is a legal requirement, where the potential exists for individuals and/or parties to be affected by a proposed activity. According to the principles of Integrated Environmental Management (IEM), these individuals and/or parties should be involved in the decision-making process from an early stage in the project, with regard to any relevant issues and concerns complementing the information on which the Regulating Authorities would base their decision.

The decision would entail one of the following:

- proceeding to the next phase in the project, or
- supplementing inadequate information, or
- not approving the project.

"Stakeholders" and "the Public"

"Stakeholders" refers to all individual(s) and institutions that are (potentially) directly associated with the project including:

- The Applicant, namely Great Wall Mining (Pty) Ltd;
- Regulating ("Competent") Authorities namely DMR (Mpumalanga region), "Commenting Department of Water and Sanitation (DWS), "Commenting" Authorities, namely Department of Agriculture and Environmental Affairs, Chief Albert Luthuli Local Municipality;
- Mpumalanga Tourism and Parks Agency
- South Africa Heritage Resources Authority

- Kalverkraal Community
- Landowner (Department of Rural Development, tribal Authority adjacent landowners;

The following steps were taken to inform the landowner, adjacent landowner, key stakeholders and relevant authorities about the proposed project:

8.1 Site Notice and Newspaper advertisement

- Site notice was placed on the **17 August 2022** in the application area and at the access point. Refer to the photographs on the Appendix 4 for proof of placement.

Figure8.1: Site notice Pictures

- A newspaper advertisement was booked and published on the **19th August 2022 on the Khanyisa Newspaper**.

8.2 Personal Notification

The key stakeholders namely the landowner, adjacent landowners and relevant authorities were personally notified by emails about the application by forwarding them draft BAR together with attachments for their consents and comments regarding the proposed application.

Refer to the title deeds and table below showing the landowner and I and Aps consulted.

8.3 List of I and Aps and Summary of issues raised

Interested and Affected parties List the names of persons consulted in this column Mark with an X where who must be consulted were in fact consulted		Date comments received	Issued raised	Eap 's response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues or responses were incorporated
Affected parties					
Landowner/s	X				
Tribal Authority DALRRD			Still waiting for comments		Appendix D
Lawful occupier/s of the land					
	X				
Landowners or lawful occupiers of adjacent properties					
N/A					

Municipal Councillor					
			Still waiting for response		
Municipality					
Chief Albert Luthuli Municipality	X		Still waiting for response		**Appendix D**
Organ of state(Responsible for infrastructure that may be affected Roads department, Eskom, Telkom, DWA					
Department of Water and Sanitation	X		Still waiting for response		**Appendix D**
Communities					
N/A					
Department of Land Affairs					
Department of Rural Development and Land Reform	X		Still waiting for response		**Appendix D**

Traditional Leaders					
N/A	X				
Department of Environmental Affairs					
Department of Economic Development, Environmental and Tourism	X		Still waiting for response		**Appendix D**
Other Competent authorities affected	N/A				
Other affected parties					
SAHRA	X		Still waiting for response		
MTPA			Still waiting for response		
Interested parties	N/A				

9. Impact Assessment and Mitigation Measures

Table 9: The main activities along with each activities impacts and mitigation measures are presented below.

ACTIVITIES	PHASE	SIZE AND SCALE	TYPICAL MITIGATION MEASURES	COMPLIANCE WITH STANDARDS
Soil stripping and vegetation clearing.	Pre-construction Operational	5 ha	Management of topsoil to prevent soil loss through erosion and excessive wind;	National Environmental Management: Biodiversity Act, 2004 (NEMBA). The EMP will require the Applicant to apply for a plant removal permit prior

			Avoid areas with sensitive vegetation species; Restrict vegetation clearance to construction areas; Salvage indigenous vegetation for re-planting during post-construction rehabilitation; Implement dust suppression;	to the removal of sensitive/endangered species. Mining and Biodiversity Guideline (DEA et al, 2013) The project area does not fall within any biodiversity priority area identified by the Mining and Biodiversity Guideline. NEMA, 1998 (Act 107 of 1998) NEMA EIA Regulations of 2014 GN983.
Site Establishment	Construction	200m^2 Container office and	Dust Suppression; No removal of vegetation outside demarcated areas;	Remain within the NEMAQA, 2004. Dust Regulation Guidelines for rural communities.

		chemical toilets	Retain topsoil integrity for the reuse during rehabilitation; Noise control; Domestic waste management	Remain within the designated area demarcated for mining activities
Maintaining of the access road	Construction Operational Decommissioning	200m	Dust from the access road will be suppressed with water and/or a dust inhibitor; Roads should have adequate drainage to remove storm water as rapidly as possible;	Remain within the NEMAQA, 2004. Dust Regulation Guidelines for rural communities. NEMA, 1998 (Act 107 of 1998) NEMA EIA Regulations of 2014 GN983.

			Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria.	
Raw material and product stockpiling	Operational	2000m2	Limit the heights of the stockpiles as far as possible. Clean up any spills immediately and dispose of the soil at a registered waste site. Apply dust suppression techniques.	NWA, 1998 (Act 36 of 1998). National Environmental Management: Waste Act, 2008. NEMA, 1998 (Act 107 of 1998) NEMA EIA Regulations of 2014 GN983.

			Storm water management – separating clean water from dirty water through berms and trenches.	
Apply to the standards of the National Environmental Management: Waste Act, 2008.	Construction Operational Decommissioning	Not known at this stage	Clean up any spills immediately and disposed of the soil at a registered waste site. Minimise dirty water area and contain dirty water; Prevent run-off of water with high suspended solid content;	

			Waste should be removed off-site by specialist contractors for disposal; Domestic waste will be disposed of at an appropriately authorised landfill facility to reduce the risk of it affecting the water resources; Use local contractors as far as possible.	
Lithium ore, Gold ore, Jade(gemstone),	Operational	N/A	Defining routes for the circulation of heavy machinery and vehicles; Implement dust	Occupational Health and Safety Act (85 of 1993). All future employees must undergo health and safety

and Quartz(gemstone) Product Transportation			suppression spraying on access roads and the operational area; Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Transport powdered materials in covered trucks. Trucks should adhere to the required speed limits to avoid unnecessary injury or death to animals.	training. Mining must be conducted according to these regulations.

Concurrent rehabilitation	Operational Decommissioning Closure		The area will be shaped to emulate the pre-mining topography; Emphasis must be on ensuring that the area is safe, stable and free draining; Topsoil will be replaced over the area to complement the growth medium (subsoil) in order to meet the two primary criteria, namely:	NEMA, 1998 (Act 107 of 1998). GN 940 Regulations pertaining to the Financial Provision for the Rehabilitation, Closure and Post Closure for Mining, Exploration, Mining or Production Operations. Rehabilitation must will be conducted according to these guidelines.

			- topography management (stability) and water management (free- drainage) The indigenous flora will be encouraged to re-established itself over time as part of the maintenance programme; Implement weed eradication program	

10. The Environmental attributes associated with the alternatives. (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

The application area consists mainly of mining activities for the same commodity. The description of the baseline environment and surrounding areas were obtained by using a desktop study.

10.1 Type of environment affected by the proposed activity.

Climate, Hydrology and drainage

The study area is characterised by open high hills or ridges. The area is located on undulating landscape with intermittent hills. The intensity of the undulating increases from west to east in the direction of the Drakensberg escarpment and Swaziland. The area receives a mean annual rainfall of between 601mm and 800mm, a mean maximum temperature of between 19.1oC and 31oC, and a mean minimum temperature of between 14 0C and 26oC. The Komatiriver is not far from the proposed site but it doesn't fall within the activity boundaries.

Geology and Mineral Potential

The occurrence of minerals in Chief Albert Luthuli local municipality is very high in comparison to the other local municipalities within the Gert Sibande District. The Barberton Greenstone Belt is situated on the eastern edge of Kaapvaal Craton in South Africa. It is known for its gold mineralization and for its komatites, an unusual type of ultramafic volcanic rock named after the Komati River that flows through the belt. Some of the oldest exposed rocks are located in the Barberton greenstone belt of the Swaziland-Barberton areas. The belt consists of a sequence of mafic to ultramafic lavas and metasedimentary rocks emplaced and deposited between 3.5 and 3.2 Ga. The granitoid rocks were emplaced over a 500 million-year time span and can be divided into two suites: the tonaliti-trondhjemite-granodiorite (TTG) suite, and the granite-monzogranite- granite (GMS) suite.

The GMS suite are found over large parts of the Kaapvaal Craton and their emplacement coincides with the first stabilisation of the central parts of the craton. The GMS suite in the Barberton granite-greenstone terrane shows very different internal and external characteristics from the earlier TTG suite. Individual plutons may cover several thousand square kilometres and these composite granitoid bodies have traditionally been referred to as batholiths, alluding to their compositionally and texturally heterogeneous nature and enormous areal extent.

Generally, the soil and geological formations is characterised in a mountainous structure thus does not hinder mining development around the area. The study is characterised by the Barberton supergroup associated with grey to white medium to coarse-grained biotite granite and coarse-grained quartz and sandstone. The farm area is situated along the Barberton greenstone belt.

Air Quality

Sources of emissions that occur in the region include Eskom power stations, industrial emissions, blasting operations at mines and spontaneous combustion of discard at gold mines, veld burning, vehicle exhaust emissions and household fuel burning.

Various local and far-a-field sources are expected to contribute to the suspended fine particulate concentrations in the region. Local sources include wind erosion from exposed areas, fugitive dust from agricultural and mining operations, particulate releases from industrial operations, vehicle entrainment from roadways and veld burning. Household fuel burning also constitutes a significant local source of low-level emissions.

Noise

The application area is located in a district where the character of ambient noise is to some extent determined by economic activity which over time has resulted in an increase in the background ambient level. It should be noted that from the perspective of noise-sensitive recipients in area, the character of the noise environment has not been affected only by external factors such as industrial and mining activity. The character is also affected and the background ambient level elevated by noises produced by farming activity, which is the principle land-use activity exercised by noise-sensitive recipients in the area. The sources of noise currently contributing to the ambient level area:

- General and small-scale mining activities scattered over the area which contribute to machinery, truck and road traffic noise;
- Agricultural activities where the main sources of audible noise are tractor diesel engines.

Noise in the area is restricted to traffic from the district dirt road and normal routine vehicle noises from the farming that is practiced in the area. Agricultural activities such as the cultivation of lands and harvesting of crops also contribute a low scale source of noise to the ambient level. Potential receptors which might be affected by the proposed operation are the farmers and the local residents of the neighbouring farms and the farm workers. The residential areas are not located in vicinity of the proposed activities and they are thus too far from the operation to be regarded as a receptor.

Visual Aspects (Aesthetics)

The study area is associated with grasslands and agricultural activities. There are no residential areas in close vicinity.

Heritage

No heritage resources were identified inside the application area during the site visit conducted. The EAP has consulted with SAHRA utilizing the sahris portal in order to advise if a heritage impact assessment should be conducted or not, we still waiting for response.

Screening Tool Report

According to the Screening Tool Report, the site comprises of the very high sensitivity of aquatic biodiversity and terrestrial biodiversity theme, high sensitivity in animal species, medium sensitivity in Agriculture, civil aviation, palaeontology and plant species and low sensitivity in archaeological and Defence theme hence, an Ecological Assessment and surface water assessment was deemed unnecessary because according to the EAP's observation during the site inspection, the area is a disturbed land whereby mining activities took place and a water resources outside the proposed site, on the northern side which is approximately 120m therefore, it will not be affected by the proposed mining activities and there are still remains of the diggings from the previously mining. In addition, the site is vacant, contains of grasslands and few thorn trees. No water resources exist within or close to the proposed. The EAP has advised the applicant to avoid sensitive's areas e.g the water resources and valley and ensure that animals are moved away safely from the mining activities as far as possible.

11. Description of the current land uses

Most of the area is characterised by mountainous laying topography, valley and grasslands. The large portions of the farm is covered by mountains and greenstone outcrops, but will not be directly affected by the operation. The applicant intends to prevent impacts sensitive areas such as a valley on the northern side, as we have assessed and identified species and habitats that will be potentially impacted by the proposed activities. Mining operations will be conducted on the remaining extent of the farm Kalverkraal 8 IU. Flora and fauna (African grass-owl) species that may be impacted by the proposed mining activity will be buffered.

Figure 11.1: Overview of the proposed site

12. Description of specific environmental features and infrastructure on the site

The vegetation distribution of the Ka-ngwane Montane Grasslands within veld type supports livestock such cattle, sheep for grazing. The Ka-ngwane Montane grassland is the dominant vegetation type in the region, and covers most part of the farm. The eastern mountainous areas are covered with the Ka-ngwane Montane grassland up to the western side. As far as Soil Types are concerned, the mountainous areas comprise of surface outcrop of ancient volcanic (ultramafic) and sedimentary rocks which have associates with the greenstone belt giving rise to soils with high magnesium, calcium ratios and high concentration of heavy metals such as nickel and chromium.

Figure 12.1: Aerial Map

13. Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed

The table below indicates the environmental aspects and the specific impact that each of the proposed activities will have on this aspect. The table further assesses the duration, probability and level of significance of the impact pre-mitigation. It is also indicated whether the impact is reversible or if it will lead to an irreplaceable loss of resource. Lastly it shows whether the impact can be avoided, managed or mitigated. The methodology used as described in Section 8.6 below was used to complete the Impact Assessment. Please refer to Table 12 for the Impact Assessment Variables definitions

Please note the full impact assessment which shows the determination of the level of significance is included in this report.

Table 13.1: Table indicating possible impacts and whether or not it can be reversed

Aspect	Impact	Cause / Activity	Duration	Probability	Level of Significance (Pre mitigation	Reversible	Irreplaceable loss of Resource	Can be avoided, managed or mitigated
Construction Phase								
Geology	Disturbance of geological profile.	Blasting – Opening of initial cut.	Long term	Possible	Low	Reversible over time	Unlikely	Can be avoided.
Topography	Alteration of the natural topography.	Landscaping activities • Levelling off the ground level; • Presence of vehicles on site.	Medium term	Definite	Medium	Reversible over time	Unlikely	Can be managed.
Soils	Loss of soil resource (soils covered or removed) due to sedimentation and erosion (wind and/or water).	Stripping and stockpiling of topsoil;	Medium term	Probable	Medium	Reversible beyond project lifespan	Possible	Can be mitigated.

	Compaction of soils.	Landscaping activities • Levelling off the ground level; • Presence of vehicles on site. Construction/upgrading of access road.	Medium term	Definite	Medium	Reversible beyond project lifespan	Unlikely	Can be managed.
	Contamination due to spillage.	Waste handling – spillages from vehicles.	Short term	Possible	Medium	Quickly reversible	Unlikely	Can be avoided.
Land Capability	Loss in agricultural potential.	Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure.	Medium term	Probable	Medium	Reversible beyond project lifespan	Probable	Can be mitigated.
Land use	Loss of agricultural land, change of land use from Agriculture to Mining	Establishment of additional infrastructure including: • Weighbridge; Mobile screening plant; • Container offices and change houses; Security gate; Chemical toilets.	Medium term	Probable	Medium	Reversible beyond project lifespan	Probable	Can be mitigated.

		Blasting – Opening of initial cut.						

Vegetation (Flora)	Loss and degradation of vegetation. Disturbance of ecological functioning.	Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure;	Medium term	Definite	Medium	Reversible over time	Unlikely	Can be managed.
	Dust outfall on flora outside the development footprint area.	Landscaping activities • Levelling off the ground level; • Presence of vehicles on site. Construction/upgrading of access road.	Short term	Possible	Medium	Quickly reversible	Unlikely	Can be mitigated.

Fauna (Mammals)	Destruction of natural habitat affecting the animal life.	Landscaping activities • Levelling off the ground level; • Presence of vehicles on site;	Medium term	Probable	Medium	Reversible over time	Unlikely	Can be managed.

	Harm to Fauna.	Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure.	Short term	Possible	Low	Quickly reversible	Unlikely	Can be avoided.
Surface water	Increased in Surface Water Runoff.	Landscaping activities Levelling off the ground level. Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure.	Medium term	Possible	Low	Quickly reversible	Unlikely	Can be mitigated.
	Siltation of surface water due to erosion of exposed surfaces.	Stripping and stockpiling of topsoil;	Medium term	Possible	Medium	Reversible over time	Possible	Can be managed.
	Deterioration in Surface Water Quality.	Waste handling – spillages from vehicles.	Short term	Possible	Medium	Reversible over time	Unlikely	Can be avoided.

Groundwater	Potential risk of fracturing shallow aquifers and depletion of aquifer. Removal of vegetation and top soil decreases the recharge of aquifers.	Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure; Blasting – Opening of initial cut;	Medium term	Possible	Medium	Reversible beyond project lifespan.	Possible	Can be avoided.
	Contamination of the underlying aquifer.	Waste handling – spillages from vehicles.	Medium term	Possible	Medium	Non reversible.	Unlikely	Can be avoided.
Air Quality	Reduction in air ambient quality. Dust form is likely to settle on vegetation and other operational areas as dust concentrations increase on the mine premises.	Construction/upgrading of access road. Stripping and stockpiling of topsoil; Landscaping activities • Levelling off the ground level; • Presence of vehicles on site;	Short term	Probable	Medium	Quickly reversible	N/A	Can be mitigated.

Noise	Increase in ambient noise levels.	Blasting – Opening of initial cut. Landscaping activities • Levelling off the ground level; • Presence of vehicles on site;	Short term	Definite	Medium	Quickly reversible	N/A	Can be managed.
Visual Aspects	Visual intrusion. Disturbance to the sense of place.	Establishment of additional infrastructure including: • Weighbridge; • Mobile screening plant; • Container offices and change houses; Security gate; Chemical toilets. Stripping and stockpiling of topsoil. Landscaping activities • Levelling off the ground level; • Presence of	Medium term	Definite	Medium	Reversible over time	N/A	Can be managed.

		vehicles on site;						

Socio Economic	The existing status quo of the local economy will be affected by the introduction of relatively higher paying (assumed) but short term employment opportunities.	Establishment of additional infrastructure including: • Weighbridge; • Mobile screening plant; • Container offices and change houses; Security gate; Chemical toilets.	Short term	Probable	Low (Positive)	Quickly reversible	N/A	Can be managed.

Health and safety	Increased potential for accidents.	Landscaping activities Presence of Vehicles on site. Construction/upgrading of access road.	Short term	Unlikely	Medium	Not reversible	N/A	Can be avoided.
Archaeology and Cultural Heritage	Degradation of heritage resources.	Blasting – Opening of initial cut.	Long term	Unlikely	Medium	Not reversible	Possible	Can be avoided.

Operational Phase								
Geology	Disturbance of geological profile.	Blasting to loosen the deposit.	Medium term	Probable	Medium	Not reversible	Unlikely	Can be avoided.
Topography	Alteration of the natural topography	Raw material and product stockpiling.	Short term	Definite	Medium	Reversible over time	Unlikely	Can be managed.
Soils	Loss of resource due to erosion.	Stripping and stockpiling of topsoil. Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators.	Long term	Probable	High	Reversible over time	Possible	Can be mitigated.
	Loss of resource due to cracking from poorly consolidated rehabilitation at surface.	Concurrent rehabilitation.	Long term	Probable	High	Reversible beyond project lifespan	Possible	Can be managed.
	Sterilisation of footprint area through compaction and stockpiling.	Presence of haulage trucks on site. Transportation of products to desired	Long term	Definite	High	Reversible beyond project lifespan	Possible	Can be mitigated.

		location. Raw material and product stockpiling.						

	Contamination of soils	Waste Management (Domestic as well as hazardous wastes) including chemical toilets.	Short term	Possible	Medium	Reversible over time	Unlikely	Can be avoided.
Land Capability	Disruption of ecosystems and potential loss of agricultural land, land capability being reduced to mining.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators.	Long term	Definite	High	Reversible over time	Possible	Can be managed.
Land use	Disruption of ecosystems and potential loss of agricultural land, land use being reduced to mining.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators.	Long term	Definite	High	Reversible beyond project lifespan	Possible	Can be managed.

Vegetation (Flora)	Changes in vegetation dynamics, potential disturbance and loss of sensitive flora. Potential alteration of ecosystem functioning due to increased human activities.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators.	Long term	Probable	Medium	Reversible beyond project lifespan	Possible	Can be mitigated.

	Potential invasion of alien plants on disturbed areas.	Concurrent rehabilitation. Stripping and stockpiling of topsoil;	Short term	Possible	Low	Quickly reversible	Unlikely	Can be mitigated.
	Dust outfall on flora outside the development footprint area.	Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) product to the desired location.	Short term	Possible	Low	Quickly reversible	Unlikely	Can be mitigated.

Fauna	Displacement of indigenous faunal species. This could possibly lead to a modest decline in population numbers, but not to local extinction.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators. Presence of haulage trucks on site; Blasting to loosen deposit.	Short term	Possible	Low	Reversible over time	Unlikely	Can be managed.
	Fatalities in terrestrial mammals.	Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location.	Short term	Unlikely	Low	Not reversible	Unlikely	Can be avoided.

Surface water	Decrease in surface water quantity	Storm water management.	Medium term	Definite	Medium	Reversible over time	Unlikely	Can be managed.

	Surface water contamination through oil or diesel spills.	Presence of haulage trucks on site; Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location.	Short term	Possible	Medium	Reversible over time	Unlikely	Can be avoided.
	Surface water contamination due to increased sediment load.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators. Stripping and stockpiling of topsoil; Raw material and product stockpiling.	Long term	Probable	Medium	Reversible over time	Unlikely	Can be managed.
	Potential contamination of surface water by	Blasting to loosen deposit.	Long term	Possible	Medium	Reversible over time	Unlikely	Can be managed.

	nitrates released from explosions.							
Groundwater	Reduction in groundwater yield.	Blasting to loosen deposit.	Long term	Possible	Medium	Reversible beyond project lifespan	Possible	Can be avoided.

	Potential of seepage from hazardous waste.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators. Presence of haulage trucks on site; Generation and handling of domestic and hazardous waste.	Long term	Possible	High	Reversible over time	Possible	Can be avoided.

Air Quality	Reduction in air ambient quality.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators; Dry screening; Presence of haulage trucks on site; Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location.	Short term	Probable	Medium	Quickly reversible	N/A	Can be mitigated.
	Increased “fly rock”	Blasting to loosen deposit.	Short term	Probable	Medium	Quickly reversible	N/A	Can be mitigated.
Noise	Increase in the ambient noise level.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators;	Short term	Probable	Medium	Quickly reversible	N/A	Can be managed.

		Blasting to loosen deposit. Presence of haulage trucks on site; Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location.						
Visual	Disturbance to the sense of place.	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators. Dry screening; Presence of haulage trucks on site; Transportation of Lithium ore, Gold ore,	Medium term	Definite	High	Reversible beyond lifespan of the project	N/A	Can be mitigated.

		Jade(gemstone), and Quartz(gemstone) product to the desired location.						
Regional Socioeconomic Structure	Additional employment opportunities.	All activities conducted as part of the operational phase.	Medium term	Definite	Medium	N/A	N/A	Can be managed.

	The local and regional road transport network will suffer additional pressure from the haulage trucks.	Transportation of product to the desired location.	Medium term	Definite	High	Reversible over time	N/A	Can be managed.
	Health and Safety of community.	Transportation of product to the desired location.	Short term	Unlikely	Medium	Not reversible	Unlikely	Can be avoided.
	Damage to surrounding houses and infrastructure.	Blasting to loosen the deposit.	Medium term	Possible	Medium	Reversible over time	N/A	Can be avoided.

Archaeology and Cultural Heritage	Degradation of heritage and cultural sites	Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators; Blasting to loosen the deposit.	Long term	Unlikely	Medium	Not reversible	Possible	Can be avoided.
Decommissioning Phase								
Geology	No further impact is expected as geology will remain intact.	Replacement of soils and backfilling of the pit.	N/A	N/A	N/A	N/A	N/A	N/A
Topography	Altering the established topography by reshaping it to emulate pre-mining environment.	Dismantling and removal of all infrastructure in meeting the closure objectives;	Short term	Definite	Low	Reversible over time	Unlikely	Can be managed.

		Ripping, landscaping and re-vegetation of all disturbed areas.						

Soils	Minimisation of erosion.	Ripping, landscaping and re-vegetation of all disturbed areas;	Short term	Possible	Medium (Positive)	Reversible over time	Unlikely	Can be managed.
	Contamination of soils.	Waste generation and disposal (hazardous and domestic).	Short term	Possible	Medium	Quickly Reversible	Unlikely	Can be managed
Land capability	Slow positive impact on areas requiring rehabilitation and transforming mining to a state of post-mining, engineered agricultural and wilderness areas.	Maintenance of all revegetated areas up until such areas initiate succession and create a sustainable cover.	Medium term	Possible	Medium (Positive)	N/A	Unlikely	Can be managed.
Land use	Land use will change from mining back to agriculture and wilderness areas.	Maintenance of all revegetated areas up until such areas initiate succession and create a sustainable cover.	Medium term	Possible	Medium (Positive)	N/A	Unlikely	Can be managed.
Vegetation	Establishment of pastures for livestock grazing.	Ripping, landscaping and re-vegetation of all disturbed areas;	Medium term	Possible	Medium (Positive)	N/A	Unlikely	Can be managed.

	Improvement in erosion control of rehabilitated areas.	Maintenance of all revegetated areas up until such areas initiate succession and create a sustainable cover;						
	The introduction of species not naturally occurring (nurse grass species) could encourage the growth of invader species.	Ripping, landscaping and re-vegetation of all disturbed areas;	Long term	Probable	Medium	Quickly reversible	Unlikely	Can be managed.
Fauna (Mammals)	Positive impact of livestock breeding and naturally assisting the transformation back to natural state.	Maintenance of all revegetated areas up until such areas initiate succession and create a sustainable cover;	Medium term	Possible	Medium (Positive)	Not reversible	N/A	Can be managed.
Surface water	Free drainage and natural surface water patterns stabilisation.	Ripping, landscaping and re-vegetation of all disturbed areas. Replacement of soils and backfilling of the pit;	Short term	Possible	Medium (Positive)	N/A	Unlikely	Can be managed.

	Contamination of surface water.	Waste generation and disposal (hazardous and domestic).	Short term	Possible	Medium	Quickly reversible	Unlikely	Can be avoided.
Groundwater	No further impact expected.	Replacement of soils and backfilling of the pit.	N/A	N/A	N/A	N/A	N/A	N/A
Air Quality	Increase dust levels for a short period.	Dismantling and removal of all infrastructure in meeting the closure objectives; Ripping, landscaping and re-vegetation of all disturbed areas.	Short term	Probable	Medium	Quickly reversible	N/A	Can be managed.
Noise	Increase noise levels for a short period.	Dismantling and removal of all infrastructure in meeting the closure objectives;	Short term	Definite	Medium	Quickly reversible	N/A	Can be managed.
Visual Aspects	Ongoing rehabilitation will improve the visual aesthetic of the project site, thus decreasing the visual impact.	Dismantling and removal of all infrastructure in meeting the closure objectives;	Medium term	Possible	Medium (Positive)	Reversible over time	N/A	Can be managed.

		Ripping, landscaping and re-vegetation of all disturbed areas.						
Regional Socioeconomic Structure	Loss of jobs.	Retrench and/or retraining of employees.	Long term	Definite	Medium	Non reversible	N/A	Can be managed.
	Short term employment opportunities.	Dismantling and removal of all infrastructure in meeting the closure objectives;	Short term	Probable	Low (Positive)	N/A	N/A	Can be managed.
Archaeology and Cultural Heritage	No further impact is expected.	Decommissioning.	N/A	N/A	N/A	N/A	N/A	N/A
Post Closure								
Geology	No further impact as geology will remain intact and have a stable geological foundation.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Topography	Subsidence of mining area.	Removal of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ layer	Long term	Probable	High	Reversible beyond project lifespan	Possible	Can be managed.

		during the operational phase.						

Soil	Subsidence could result in the loss of the soil resources. Ponding on areas due to subsidence and lack of compaction.	Removal of the topsoil layer during the operational phase.	Long term	Probable	High	Reversible beyond project lifespan	Possible	Can be managed.
	Cracking to surface from areas of unconsolidated rehabilitation.	Poor maintenance of landscaped/re-vegetated areas.	Long term	Probable	High	Reversible beyond project lifespan	Possible	Can be managed.

	Recovery of topsoil that will ensure a good growth medium.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas. Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.	Long term	Possible	Medium (Positive)	N/A	N/A	Can be managed.

Land capability	Return to pre-mining state.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas. Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.	Long term	Possible	Medium (Positive)	N/A	N/A	Can be managed.
Land use	Return to agricultural grazing land.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas. Weed management after closure, limited to areas disturbed by mining or included as	Long term	Possible	Medium (Positive)	N/A	N/A	Can be managed.

		infrastructure related to the mine						

Vegetation	Pioneer species should return to natural state.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas. Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.	Medium term	Possible	Medium (Positive)	N/A	N/A	Can be managed.

Animal Life (mammals, avifauna and herpetofauna)	Recovery of area suitable for livestock and wildlife.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas. Weed management after closure, limited to areas disturbed by mining or included as infrastructure related to the mine.	Medium term	Possible	Medium (Positive)	N/A	N/A	Can be managed.

Surface Water	Free drainage and natural surface water patterns stabilisation;	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas.	Medium term	Possible	Medium (Positive)	N/A	N/A	Can be managed.
Ground Water	No residual impacts are expected once mining operations cease.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Air Quality	No residual impacts are expected once mining operations cease. Air quality will be ambient levels.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Noise	No residual impacts are expected once mining operations cease. Noise will be at ambient levels.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Visual Aspects	The visual aesthetics of the area will continue to improve after closure as the rehabilitated areas become more natural.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas.	Medium term	Probable	Medium (Positive)	N/A	N/A	Can be managed.
Regional Socioeconomic Structure	The area will return to grazing wilderness.	Monitoring of key environmental variables (i.e. soils, vegetation, groundwater and surface water) in order to demonstrate stability of rehabilitated areas	Medium term	Probable	Medium (Positive)	N/A	N/A	Can be managed.

Archaeology and Cultural Heritage	No further impact.	N/A	N/A	N/A	N/A	N/A	N/A	N/A

14. Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

The methodology assesses environmental and social impacts by evaluating the consequence (spatial extent, duration, and severity of the impact) and likelihood (probability and frequency of the impact occurring) of each impact and providing a numerical score for each. The significance of each impact is determined by ranking the total score of the consequence with the likelihood of each impact using a matrix. The risk class for each impact is determined through a separate matrix ranking the severity with the probability of the impact occurring.

The definitions of terms used within the methodology are described below, followed by stepped approach to the explanation of the methodology used.

Definitions
Aspect – a facet of the social or biophysical environment upon/within which impacts can occur.
Impact – is defined as any change to the environment, whether positive or negative, resulting from a facility/project/development's products, development, and activities.
Cause/Activity – the precipitating factor resulting in a perceived impact.
Mitigation Measures – identified actions and requirements designed to be instituted to reduce the undesirable effects of a perceived impact.
Significance Level – the degree of importance of the impact on the social and/or biophysical environment; a proxy for the degree to which the impact is reversible and may cause irreplaceable loss of a resource. The approach used to determine significance makes use of value judgements to determine the degree of change on the social and/or biophysical environment, after which the consequence and likelihood of the impact are ranked to provide a significance level.
Extent – the spatial scope of the perceived impact. (How large an area will be impacted).
Duration – the temporal scope of the perceived impact, or the period of time during which the social and/or biophysical environment is changed by the impact. (How long the impact will last).

Severity – the degree to which the natural, cultural, and/or social functions and processes of an environment may be affected or altered by a perceived impact. (How extreme/harsh the impact will be. The degree of disturbance).

Probability – the possibility or likelihood of the impact occurring or manifesting.

Frequency – how often the impact is expected to take place/occur/manifest.

Risk – is defined as a function of the probability of an impact occurring and its severity.

Risk Class – grouping of the perceived risk of the impact occurring into categories (low, medium, high, and very high) according to the function of the impact's severity and probability of occurrence.

Step 1: The potential aspects and activities are identified along with the associated social and biophysical impacts which may occur during the construction, operation, and decommissioning phases of the project.
Step 2: The consequence and likelihood of each impact identified in the preceding step is evaluated and a rating score given for each variable following Table 13.
Step 3: The total score of the consequence and likelihood of each impact is ranked in the matrix (Table 14), and the significance category determined.
Step 4: Mitigation measures for each impact are determined, and step 2 and 3 are repeated to determine the significance of each impact post-mitigation.
Step 5: The risk class of each impact identified is calculated as a function of the severity and probability of the impact, and by using a matrix (Table 15) the risk class category is determined.

Table 14.1: Impact Assessment Variables with each Category Score

CONSEQUENCE		Extent (Magnitude) of the Impact	
	Small	Limited to part of the project area	1
	Medium	Limited to the project area	2
	Large	Extends beyond the project area (local area)	3
	Extensive	Widespread, far beyond the project area (regional or greater area)	4
		Duration of the Impact	

	Short term	Quickly reversible, less than project lifespan	1
	Medium	Reversible over time, over lifespan of the project	2
	Long term	Permanent, beyond lifespan of the project (decommissioning & rehabilitation)	3
		Severity of the Impact	
	Low	Disturbance of degraded areas with little conservation value. Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are not affected.	1
	Medium	Disturbance of areas with potential conservation or resource use value. Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are altered.	3
	High	Disturbance of pristine areas with important conservation value. Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	5
LIKELIHOOD		Probability of the Impact Occurring	
	Unlikely	The possibility of the impact materializing is very low either because of design or historic experience.	1
	Possible	There is a distinct possibility that the impact will occur.	2
	Probable	It is most likely (probable) that the impact will occur.	3
	Definite	The impact will occur or has already occurred.	4
		Frequency of the Activity potentially causing the Impact	

	Once off	The activity occurs once off or it already happened	1
	Seldom / Infrequent	The activity occurs at least once in 3 months.	2
	Often / Regularly	The activity occurs at least once a week or monthly.	3
	Daily	The activity occurs on a daily basis.	4

Table 13: Impact Significance Ranking Matrix and Significance Level Categories

	Consequence										
		3	4	5	6	7	8	9	10	11	12
	2	5	6	7	8	9	10	11	12	13	14
	3	6	7	8	9	10	11	12	13	14	15
	4	7	8	9	10	11	12	13	14	15	16
	5	8	9	10	11	12	13	14	15	16	17
	6	9	10	11	12	13	14	15	16	17	18
	7	10	11	12	13	14	15	16	17	18	19
Likelihood	8	11	12	13	14	15	16	17	18	19	20

Table 14: Extent Definitions

Low	Where there will not be a significant influence on the environment. Management measures can be proposed to ensure that the significance does not increase.	5-10
Medium	Where the impact could have a low to significant influence on the environment unless it is mitigated and/or managed. More easily reversible.	11-14

High	Where the impact would have a significant influence on the environment unless mitigated and/or managed. Difficult to reverse.	15-17
Very High	Where the impact would have a significant permanent influence on the environment regardless of any possible mitigation, or mitigation is not feasible, and hence must either be avoided or managed.	18-20

The risk ranking of the impact is determined through the function of the probability (chance of the impact occurring) and severity.

Table 15: Impact Risk Ranking Matrix and Risk Class Categories

Probability	Severity			
		1	3	5
	1	1	3	5
	2	2	6	10
	3	3	9	15
	4	4	12	20

Table 16: Risk Extent Definitions

Level	Definitions	Likelihood
Low	Impact not expected to occur, but conceivable; 10% to 30% chance of occurrence; and Circumstances rarely encountered.	1-2
Medium	• Impact may occur sometimes; • 31 – 60% chance of occurrence; • Circumstances occasionally encountered.	3-6
High	• Impact will probably occur; • 61 – 90% chance of occurrence; • Circumstances frequently encountered;	9-10
Very High	• Impact will almost definitely occur; • 91 -100% chance of occurrence;	12-20

15. The positive and negative impacts that the proposed activity (in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected

Due to the fact that this proposed activity will take part on the specific area that was permitted by the DMR, no alternative area is assessed as part of this specific application. The impacts have been discussed below in terms of the construction, operation, decommissioning and closure phases.

15.1 Construction Phase

The environmental and socio economic aspects that will be impacted on during the construction phase of the proposed mine have been described below. A description of the impact has been provided along with a discussion in terms of advantages and disadvantages of the initial site layout.

15.1.1 Geology

The geology of the site will be altered by the blasting activities during the opening of the initial cut. As the Applicant plans to mine to a depth of approximately 10 -15m, the low lying geology will be altered. The disturbance will be limited to part of the project area.

Discussion

The fact that this is an application for a mining permit and the Applicant will only be allowed to mine within the 5ha boundary the location of the initial cut will not have a significant impact because the whole 5ha area will be mined within the two years. The more significant impact will be the indirect impact that blasting could have on the groundwater quantity should an aquifer be breached in the process.

15.1.2 Topography

The topography will be levelled during the landscaping activities specifically in areas designated for the establishment of surface infrastructure. The disturbance will be limited to part of the project area, it is reversible in the long term (> 2 years) as the post mining topography will be landscaped to emulate the pre-mining topography but the impact will definitely happen.

15.1.3 Soils

Topsoil and subsoil will be disturbed during the construction phase when the footprint areas for surface infrastructure are stripped. The topsoil and subsoil will be stockpiled for use during rehabilitation upon closure of the mine. The soil in the areas to be disturbed that is

suitable for use as a growth medium will be excavated (pre-stripped) and stockpiled for use during rehabilitation (decommissioning phase). The pre-stripping and stockpiling of the soil will result in both physical and chemical changes in the soil due to the disturbance, increased aeration and absence of vegetative cover.

This action on the soil will result in a breakdown of the macro- and micro-soil structure, especially when excessively wet and with duplicate handling. As only the topsoil and subsoil will be stockpiled, the mixing of the soil from the lower horizons with the bed rock would alter the characteristics of the conglomerate as far as chemistry and water retention capacity is concerned. The stockpiled topsoil and subsoil will be exposed to contamination (such as oils lubricants) and erosion agents such as water and wind during the construction phase.

During construction there is the probability of sheet erosion occurring on the areas cleared of vegetation. The extent of the cleared area is however relatively small and will only involve portions of the mining area. As these sites will be actively managed (or be covered by temporary structures) the duration will be long term. The probability of gully erosion will be limited to the concentrated flow of collected water points or concentrated flow points (such as culverts) around the planned activities. However proper berm construction and erosion control measures will ensure that the intensity will be greatly reduced.

Discussion

The impact on the soils during the construction phase will be negative and is unavoidable. However the soils can be used in a positive manner such as for berm construction. The proposed mining area is currently used for grazing purposes therefor it is assumed that the soil is of good quality. Based on this assumption it is important that the topsoil is correctly managed from the construction phase to decommissioning phase to ensure that it retains its characteristics. When this happen the positive impact of stripping the soils will occur during the rehabilitation phase when topsoil containing a gene bank of seeds of indigenous species can be spread over the rehabilitated area. A loss of topsoil (through sterilisation, erosion or contamination) would generally result in a decrease in the rehabilitation and future land use potential of any land that is disturbed by the construction of the proposed infrastructure and mining activities.

15.1.4 Land Capability

Land capability will be compromised in the vicinity of the operational areas that are planned to be pre-stripped of topsoil and growth medium material (for later re-use). The disturbance will be limited to a relatively small part of the project area.

Where the land capability is grazing or wilderness, the post mining capability will not be compromised and the impact is reversible in the long term (> 2 years) and will definitely happen. However large parts of the proposed mining area is under crop production therefor the land capability of the mining area will definitely be compromised during the construction phase of the planned activities. This is mainly due to the impact that the construction activities will have on the topsoil of the site.

Discussion

No alternative mining sites are being considered as part of this application therefore the topsoil must be managed from the construction phase to decommissioning phase to ensure that it retains its characteristics. When this happen the positive impact of stripping the soils will occur during the rehabilitation phase when topsoil containing a gene bank of seeds of indigenous species can be spread over the rehabilitated area. This will give the area the best chance of returning back to the pre-mining land capability.

15.1.5 Land Use

The land use will change from agriculture to mining during the construction phase. Due to the small nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation adjacent land uses should not be impacted on during the construction phase. The land use of the proposed site will definitely change but it can be reversed in the long term.

Discussion

The site is currently used for agriculture (crop production) and post-mining activities purposes. The negative impact is that the land use of the mining area will change from agriculture to mining. The positive impact will be on the socio economic side for the Applicant in terms of requiring the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ resource to supply to the growing building industry in the area. The land use must be given the best chance to return to the pre-mining state through the correct implementation of the EMP.

15.1.6 Flora

The construction activities will lead to loss of indigenous vegetation on the property. The losses will come about mainly through site clearance activities specifically on area designated for infrastructure establishment. Natural ecological processes will be disrupted and there is a strong probability that alien weed species such as Wattle (Acacia mearnsii) will become more prolific. The removal of flora will definitely occur but the impact is reversible

in the long term. By implementing a weed eradication program the probability of alien species colonising the area can be decreased significantly.

The flora on adjacent properties could also be impacted on through dust fallout created by the construction and transportation activities.

Discussion

The clearing of vegetation is unavoidable and necessary for the project. The impact is considered negative but not highly significant seeing that the area has been used for agriculture and it is not expected to find much indigenous or sensitive species within the 5ha.

15.1.7 Fauna/Avifauna/Herpetofauna

The terrestrial fauna at the site is already very severely depleted with many of the original species, especially the larger mammals, now being locally extinct due to agricultural activities. However, with the further degradation of the area as a result of the mine development, further losses will take place. Affected groups will include the mammals, birds, reptiles, amphibians, and a wide variety of invertebrate groups with the insects being the most obvious. Several species of conservation have already been lost from the area as a result of human activities.

The disturbance and consequent habitat destruction will comprise part of the mining permit area during construction. It is estimated that the zone of influence would be temporary in the long term and will happen. The associated loss of habitat, disturbance in the area in terms of noise and dust pollution associated with construction activities will possibly have a negative cumulative impact on the fauna in the surrounding area in the long term.

Discussion

Only part of the mining permit area will be disturbed during the construction phase but as the operation continues the disturbed area will increase. However due to the small size of the permit area (5ha) and the fact that the area has been used for crop production over the last few years the impact on animal life is assessed to be of low significance.

15.1,8 Surface Water

Spillage from chemical toilets, oil spills and construction dumping may be picked up by runoff and will contaminate the downstream watercourses. Sedimentation of the water

resources could occur from exposed surface during periods of high rainfall. Increased sediment movement off the construction sites will add to the cumulative impact of increased sediment loads in the watercourses down gradient of the site.
In order to prevent surface water contamination storm water falling within the construction site will be contained and guided into the pit by the means of strategically placed berms. This water will be prohibited from entering the drainage lines and will therefore affect the quantity of surface water runoff negative.
Discussion
The containment of storm water within the construction area will decrease the surface water runoff into the surrounding surface water resources. Thereby affecting the quantity of water in these resources negatively. On the other hand the positive impact will be that it will contain potentially contaminated water and decrease the risk of surface water pollution.

15.1.8 Groundwater

The opening of the initial cut through blasting could fracture the impermeable rock layers and result in the depletion of the aquifer.

Spillage from chemical toilets, oil spills and construction dumping may infiltrate the groundwater system and contaminate the groundwater resources. Dirty storm water collecting in the pit has the potential to leach into the groundwater.

Discussion
The landowner and surrounding landowners is dependent on groundwater for their farming activities as well as domestic use. The potential of the depletion of the groundwater aquifer during the opening of the initial cut is considered a highly significant negative impact. Due to the non-hazardous nature of the proposed Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mine the potential of groundwater being contaminated is unlikely. It could occur from oil or diesel spillages but this can easily be avoided by implementing strict management measures.

15.1.9 Air Quality

During the construction phase of the planned activities dust will mainly be produced by site establishment operations, including stripping of topsoil and grading of access roads. The carbon-dioxide emissions associated with the diesel machines are of such a small quantity that the impact thereof on the air quality is considered to be of a low significance. The impact on air quality is considered to be definite but of a low significance and it can be reversed quickly. Dust suppression by water tanker will be employed to mitigate the release of dust which will lower the significance rating of the impact.

Blasting will result in an increase in dust and possible “fly-rock”. Construction and operational activities in the area associated with development and mining activities will probably have a cumulative impact on the air quality of the area if mitigation measures are not implemented.

Discussion

The ambient air quality will definitely be negatively impacted on during the construction phase but should the necessary mitigation measures be applied the impact will be of low significance. The main source of dust will be from the access road however most of the construction vehicles will remain on site during the construction phase thereby limiting the amount of dust generation in the surrounding area.

15.1.10 Noise

The main cause of an increase in the ambient noise level will be during the blasting activities to open the initial cut. Haulage trucks and other machinery associated with site establishment will also contribute to the increase in noise levels. The reverse sirens of the construction vehicles and general diesel engine running noise will add to the industrial noise of the site, which will be in stark contrast to the natural noise character that the site currently has. The construction noise will extend from the site boundaries and will definitely contribute to the existing noise levels.

Discussion

The increase in noise level cannot be avoided but measures can be put in place to decrease the significance of the impact especially on the surrounding agricultural operations (chicken farming). Construction activities should be limited to the day time only.

15.1.11 Visual Aspects

Of the planned activities, the vegetation stripping, soil stockpiling and infrastructure establishment will have an impact on the visual character of the area. There are no residential areas in the vicinity.

The new presence of mining equipment (mobile screening plant) will change the aesthetics and “sense-of-place” of the area. Dust from the construction activities will also cause a visual disturbance that is temporary.

Discussion

The visual impact of the construction activities will be negative and can't be avoided. The impact will occur from the construction to the decommissioning phase. Due to the small nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation there won't be high overburden or soil stockpiles on site therefore the visual impact will not extend far beyond the application area.

15.1.15 Socio Economic

This project will ensure employment of personnel associated with the construction of the mine, albeit on a temporary basis.

There will be an opportunity for a permanent employment framework, but this is covered under the section below, operational phase.

Due to the small and non-hazardous nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation it should not have a negative impact upon the value of surrounding land. This is a subjective issue, (in that it would largely be determined by market forces), and has not been quantified. The overall, residual impacts as determined by this assessment are such that it is unlikely that a significant, long-term depreciation in land value would result.

Additional heavy motor vehicle traffic will contribute to the road degradation of the surrounding roads. However, it is not foreseen that the construction phase will contribute significantly to the road infrastructure degradation as the construction vehicles will remain on site during the construction period and will not travel on the surrounding district roads frequently.

Discussion

The effect of the construction phase on the regional and socio-economic structure will extend beyond the project area and will be temporary (short term <6 months). It will have a low to moderate level of significance, both negative and positive. The biophysical negative impacts will mainly be felt by the landowner in terms of land use and capability and the positive impacts by the unemployed people in the surrounding area in terms of job opportunities.

15.1.13 Health and Safety

The increase of heavy vehicles movement on the district roads and surrounding farm roads will result in a higher probability of accidents occurring. Unfortunately this can't be

completely avoided but strict measures can be implemented to decrease the probability of accidents occurring significantly.

The commuting of workers onto neighbouring properties may pose safety risks as well.

Discussion

The risk of accident occurring can significantly be decreased if the construction vehicles remain on site thereby decreasing the amount of traffic on the district road.

15.1.14 Archaeology and Cultural Aspects (Heritage)

The opening of the initial cut and levelling of the site has the potential to impact heritage resources.

Discussion

Damage to heritage resources is considered a highly significant negative impact, which can't be reversed and must be avoided at all cost. The protection of archaeological features, specifically graves is emphasised.

15.2 Operational Phase

The environmental and socio economic aspects that will be impacted on during the operational phase of the proposed mine have been described below. A description of the impact has been provided along with a discussion in terms of advantages and disadvantages of the initial site layout.

15.2.1 Soils

As per the construction phase, the soils excavated will be separately pre-stripped as topsoil or subsoil and stockpiled separately in a designated area for use during rehabilitation. During the stripping operation of the soil, soil layers will be mixed when removed, transported and stockpiled by the bulldozers. Seeds and roots within these layers will be uprooted and may be exposed to the open air elements which could damage and kill them. This will render the topsoil less fertile. Further stockpiling of the soil will expose the soil to elements of erosion such as wind and water as well as risking the occurrence of compaction.

The probability of gully erosion will be limited to the concentrated flow of collected water points or concentrated flow points (such as culverts) around the mining area. However, proper berm construction and erosion control measures will ensure that the intensity will be greatly reduced. The impact on the soils of the area, due to erosion will therefore have a low level of significance.

Sterilisation of footprint area could occur through compaction, stockpiling and operational vehicle movement. As these sites will be actively managed (or be covered by temporary structures) the duration will be long term.

The potential for soil contamination exists through oil or diesel spillages from operational vehicles.

Concurrent rehabilitation will take place during the operational phase. The probability exists that sheet erosion could occur on these areas if it is not revegetated and managed correctly.

Discussion

The negative impacts on the soils are definite but can be limited to the project area. The potential of erosion and contamination of soils can be significantly reduced by implementing sufficient mitigation and management measures. The topsoil should be returned to the land as soon as possible and not stored for prolonged periods. If possible, take the topsoil that is removed from the section that is opened for mining and place it directly on the one that is being rehabilitated. This will reduce the time of exposure.

Topsoil should be placed in the two separate layers: the bottom 700mm and the top 400mm. Apply fertilizers and rip the soil to a depth of 1, 6 meters and at 1, 5 meter intervals along the contour. This action will ensure that there is a bond between the top and subsoil and that infiltration of water, whether from rain or irrigation will take place. The topsoil must be managed from construction through to decommissioning to enable the mine to rehabilitate the area as close as possible to the pre-mining state. The positive impact of stripping the soils will occur during concurrent rehabilitation when the topsoil containing a gene bank of seeds of indigenous species can be spread over the rehabilitated area.

15.2.2 Land Capability

The land capability will continue to be impacted on by the activities associated with mining.

Discussion

The negative impact on the land capability during the operational phase cannot be avoided but is reversible over a long period (>3 years). The impact on the infrastructure (access road) will be less significant.

15.2.3 Land Use

The land use will remain as mining. There would be no further impact during the operational phase as the land use was already changed to mining in the 5ha area during the construction phase.

Discussion

As with the land capability the negative impact during the operational phase on the proposed site is unavoidable but can be reversed over a long period (>3 years). Due to the non-hazardous nature of the proposed activity the land use of the surrounding areas will not be impacted on significantly.

15.2.4 Flora

The removal of vegetation as the mining pit extends over the 5ha area will change the vegetation dynamics. The grassland will be impacted upon by the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning. The seed bank of indigenous vegetation that occurs in the topsoil will be used throughout the full area being rehabilitated, and would thus become “diluted”.

Alien invader species may further establish on the disturbed areas if a weed eradication plan is not set in place.

Operational activities especially the screening of the raw Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ and transport of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location, will produce dust which may impact vegetation surrounding the operational areas.

Discussion

Impacts on the vegetation will be on-going from the construction phase. The severity of the impact will increase as the open pit increase in size. Large areas of the site’s vegetation has already been disturbed by agricultural activities therefore little indigenous vegetation remain on site.

15.1.5 Surface Water

Slight contamination of surface water will result from the area being free of vegetation and the soil being disturbed. The potential for hydrocarbon pollution also exists due to spillages from vehicles and heavy machinery. The closest watercourse to the application area is situated approximately …km from the 5ha boundary therefor the risk of surface water resources being polluted is low.

Storm water will be contained within the mining area and diverted to the open pit via strategically placed berms. The will result in the reduction of storm water runoff.

Discussion

Surface water in the area is essential to sustain agricultural activities and for domestic purposes. Due to the non-hazardous nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation as well as the application area's distance from the nearest surface water resources (500m) the risk of surface water resources being polluted is low.

The main negative impact that the operation will have on the surface water will be in terms of storm water runoff. By containing all the water falling onto the operational area during operations the runoff within the natural draining lines will be reduced.

15.2.6 Groundwater

The mining activities have the potential to impact on the groundwater in the following ways:

- Blasting could fracture the weathered aquifer leading to the reduction in groundwater yield in the regional area.
- The potential exists that oil/diesel spills can seep through and contaminate the underlying aquifer.

Discussion

The negative impact on groundwater quantity is considered to be a highly significant risk during the operation of the mine. In terms of groundwater quality during the operational phase of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning project, groundwater will seep into the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning area. However due to the non-hazardous and shallow nature of this operation the impact is not considered to be significant.

15.2.7 Air Quality

The operation of the mine will continue to contribute to the reduction in air ambient quality through excavation activities, dry screening and movement of the haulage trucks. Dust will be created from the localised operational area and the untarred access and district roads during the operational phase from the haulage trucks. Dust suppression by water tanker will be employed to mitigate the release of dust which will lower the significance rating of the impact.

Blasting will result in an increase in dust and possible "fly-rock".

Discussion

The ambient air quality will definitely be negatively impacted on during the operational phase but should the necessary mitigation measures be applied the impact will be of low significance.

The main source of dust will be the dry screening activities and transport activities on the access road. Operational activities in the area associated with the mine will probably have a cumulative impact on the air quality along with the other industrial operation and farming activities.

15.2.8 Noise

Noise will be created on a daily basis by the haulage trucks, excavation and loading machinery as well as their reverse sirens. Occasional blasting will also contribute to the noise pollution of the area.

Discussion

The disturbance would extend beyond the project area due to the haulage trucks and sirens; it would be a temporary disturbance but it will happen. The increase in noise level cannot be avoided but measures can be put in place to decrease the severity of the impact especially on the surrounding agricultural operations which is sensitive to noise such as chicken farming. These measures include erecting noise barriers near the noise source, between the noise source and receptors.

15.2.9 Visual Aspects

The visual impact will result from the raw material and Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product stockpiles as well as the mobile screening plant. Dust created during the transportation of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product to the desired location will also contribute to the negative impact on the visual character of the area.

Discussion

The visual impact is definite and can't be avoided. This is an impact that will continue from the construction through to the decommissioning phase but will not increase by a great magnitude as it is really only applicable to the specific operational area and not the entire area at one time.

15.2.10 Socio Economic

The operational phase of the mine will have both positive and negative impacts on the socio economic conditions of the surrounding area. The positive impacts include:

- Additional employment opportunities for local people;
- The supply of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ will assist the ongoing development of the socio economic structure;

The negative impacts include:

- The local and regional road transport network will suffer additional pressure from the haulage trucks;
- Damage to surrounding houses and infrastructure caused by blasting of overburden material;
- Decrease in agricultural potential of the application area.

Discussion

The associated sustainable employment opportunities will be a low positive impact on the economic structures of the area due to the small size of the proposed operation. The negative impacts will mainly be felt by people using the local and regional transport network.

16. The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

The table below lists the mitigation measures that could be applied to mitigate the potential impacts per each activity during the construction, operation, decommissioning and closure phases of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ winning operation.

Table 16.1: Possible Mitigation Measures

Activity	Potential Impact	Mitigation Type	Potential for Residual Risk
Construction Phase			

Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure.	Land Capability Loss in agricultural potential. Vegetation Loss and degradation of vegetation. Animal life Harm to Fauna. Groundwater Removal of vegetation and top soil decreases the recharge of aquifers.	Restrict vegetation clearance to construction areas. Maintain the best possible indigenous vegetation cover so as to provide habitat for the animals. Remove vegetation during periods of low rainfall or dry periods. Construct berms downslope of the cleared site to trap debris. Salvage indigenous vegetation for replanting during post-construction rehabilitation.	Unlikely
		Avoid disturbance of the habitat outside of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning area. The construction vehicles must remain on	

		site as far as possible during the construction period. Prohibit workers from capturing or handling any animals.	

Stripping and stockpiling of topsoil.	Soils Loss of soil resource (soils covered or removed) due to sedimentation and erosion (wind and/or water). Surface water Siltation of surface water due to erosion of exposed surfaces. Air Quality Reduction in air ambient quality. Visual Aspects Visual intrusion. Disturbance to the sense of place.	Over areas of deep excavation (Open Pit Mining) where the majority or all of the soil profile is to be impacted) strip all usable soil (approx. 750mm) and stockpile as berms or low, terraced dumps. Store the soil in stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure rehabilitation purposes. The gradient of the sidewalls must be such as to prevent excessive wash during storms. Stockpile hydromorphic (wet) soils separately from the dry materials, and the “ferricrete” separately from all other materials. The viability of the soils needs to be maintained for future rehabilitation purposes.	Unlikely

		Protect all stockpiles from water and wind erosion (loss of materials) and contamination by dust and runoff water. Clad stockpiles with larger rock or vegetate the stored materials. Suppress dust with water during soil stripping and stockpiling. Work in such a way with the topsoil stockpiles so as to create the impression of an ordered, visually pleasing pit, and construct berms along strategic lines to mitigate the visual impact of the operation.	
Landscaping activities: Levelling off the ground level; Presence of vehicles on site.	Topography Alteration of the natural topography. Soils Compaction of soils. Vegetation Dust outfall on flora outside the development footprint area.	The disturbed area must be kept to the minimum needed for the mining operation. During the levelling of the site ensure that the surface water flow is directed away from the construction area towards the surrounding surface water resources.	Unlikely

	Animal life Destruction of natural habitat affecting the animal life.	Control of the area disturbed during the construction phase to ensure no unplanned (and/or unauthorised) expansion, with a direct effect on land use.	

	Surface water Increased in Surface Water Runoff. Air Quality Dust form is likely to settle on vegetation and other operational areas as dust concentrations increase on the mine premises. Noise Increase in ambient noise levels. Visual Aspects Visual intrusion. Disturbance to the sense of place. Health and Safety Increased potential for accidents.	Remove any oil or diesel spills as soon as it occurs and dispose of it at a registered waste site. Dust from the internal roads and working areas will be suppressed with water and/or a dust inhibitor; Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Follow the equipment's operation and maintenance procedures and all vehicles must undergo periodic maintenance and inspection. The construction vehicles must remain on site as far as possible during the construction period.	

Blasting – Opening of initial cut.	Geology Disturbance of geological profile. Land Use Loss of agricultural land, change of land use from Agriculture to Mining.	The location of the initial cut will be outside the 1:100 year flood line or 100m from a watercourse whichever is greatest. Blasting must be controlled to prevent spillage of explosions;	Possible
	Groundwater Potential risk of fracturing shallow aquifers and depletion of aquifer. Air Quality Dust form is likely to settle on vegetation and other operational areas as dust concentrations increase on the mine premises. Noise Increase in ambient noise levels. Archaeology and Cultural Heritage Degradation of heritage resources.	Blasting should be carried during normal working hours (07:00 – 17:00) or according to applicable legal criteria; Apply blasting techniques to reduce shock waves; Commit to provide adequate compensation to affected households if required. Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease. Suppress dust with water during blasting activities.	

		Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria.	
\Construction/upgrading of the access road	Soils Compaction of soils. Vegetation Dust outfall on flora outside development footprint. Air Quality Reduction in air ambient quality. Health and Safety Increased potential for accidents.	Define routes for the circulation of heavy machinery and vehicles and restrict machines' movement to the necessary areas; Dust from the access road will be suppressed with water and/or a dust inhibitor; Clearly demarcate the construction footprint area and prohibit movement of workers outside the footprint as well as capturing or handling any animals; No bed and banks of any watercourse must not be altered unless authorised by DWS.	Unlikely

		Roads should have adequate drainage to remove storm water as rapidly as possible;	

Establishment of additional infrastructure including the mobile screening plant.	Land Use Loss of agricultural land, change of land use from Agriculture to Mining. Visual Aspects Visual intrusion. Disturbance to the sense of place. Socio Economic Short term employment opportunities	Restrict the area of impact to that which will be used for Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning. Use should be made of down-lighting and directional lighting. Employ local works as far as possible.	Unlikely
Waste handling (domestic and hazardous).	Groundwater Contamination of the underlying aquifer.	Remove any oil or diesel spills as soon as it occurs and dispose of it at a registered waste site.	Unlikely

	Surface water Deterioration in Surface Water Quality. Soils Contamination due to spillage.	Clean up any spills immediately and disposed of the soil at a registered waste site. Prevent run-off of water with high suspended solid content; Waste should be removed off-site by specialist contractors for disposal; Domestic waste will be disposed of at an appropriately authorised landfill facility to reduce the risk of it affecting the water resources; Use local contractors as far as possible.	
Operational Phase			
Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ using excavators.	Soils Loss of soil resource. Land Capability Disruption of ecosystems and potential loss of agricultural land, land capability being reduced to mining.	Construct berms downslope of the mining pit to trap sediment. Maintain a vegetation layer on the berms;	Possible

	Land Use Disruption of ecosystems and potential.	Restrict the area of impact to that which will be used for Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning.	

	loss of agricultural land, land use being reduced to mining. Vegetation Changes in vegetation dynamics, potential disturbance and loss of sensitive flora. Potential alteration of eco-system functioning due to increased human activities. Fauna Displacement of indigenous faunal species. Surface water Surface water contamination due to increased sediment load. Groundwater Potential of seepage from hazardous waste. Air Quality Reduction in air ambient quality.	Clean up any oil/diesel spills immediately and disposed of the soil at a registered waste site. Dust suppression will be implemented on roads. Use local workers as far as possible; No mining activities can be conducted within the 1:100 year flood line or 100m from a watercourse whichever is greatest. Clearly demarcate the mining area within which operational activities may take place; Construct berms along strategic lines to mitigate the visual impact of the operation. Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria.	

	Noise Increase in the ambient noise level.	Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease.	

	Visual Disturbance to the sense of place. Socio Economic Additional employment opportunities Archaeology and Cultural Heritage Degradation of heritage resources.		
Blasting to loosen the deposit	Geology Disturbance of geological profile. Fauna Displacement of indigenous faunal species. Surface water Potential contamination of surface water by nitrates released from explosions. Groundwater Reduction in groundwater yield. Air Quality Increase in 'fly rock'. Noise Increase in the ambient noise level.	Blasting must be controlled to prevent spillage of explosions; Blasting should be carried during normal working hours (07:00 – 17:00) or according to applicable legal criteria; Apply blasting techniques to reduce shock waves; Commit to provide adequate compensation to affected households if required. Dust suppression will be implemented on roads. Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease.	Possible

	Visual Disturbance to the sense of place. Socio Economic Damage to surrounding houses and infrastructure. Archaeology and Cultural Heritage Degradation of heritage resources.		
Dry screening	Vegetation Dust outfall on flora outside the development footprint area. Air quality Reduction in air ambient quality. Visual Disturbance to the sense of place.	Implement dust suppression. Limit height of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product stockpiles.	Unlikely
Raw material and Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product stockpiling.	Topography Alteration of the natural topography. Soils Surface water Surface water contamination due to increased sediment load.	Limit the height of the stockpiles as far as possible; Construct berms downslope of the stockpile areas to trap sediment.	Unlikely

Stripping and stockpiling of topsoil.	Soils Loss of resource due to erosion. Vegetation Potential invasion of alien plants on disturbed areas. Surface water Surface water contamination due to increased sediment load.	Over areas of deep excavation (Open Pit Mining) where the majority or all of the soil profile is to be impacted) strip all usable soil (approx.750mm) and stockpile as berms or low, terraced dumps. Store the soil in stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure rehabilitation purposes. The gradient of the sidewalls must be such as to prevent excessive wash during storms. Stockpile hydromorphic (wet) soils separately from the dry materials, and the “ferricrete” separately from all other materials. Work in such a way with the topsoil stockpiles so as to create the impression of an ordered, visually pleasing pit.	Unlikely

		The topsoil must be stockpiled separately and used for the construction of berms; The berms must be grassed and managed to prevent soil loss through erosion and excessive dust;	

		Maintain a vegetation layer on the berms; Implement weed eradication program on soil stockpiles; Implement dust suppression. Limit the height of the soil stockpiles.	
Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product from the mining area to the desired location.	Soils Sterilisation of footprint area through compaction and stockpiling. Vegetation Dust outfall on flora outside the development footprint area. Animal life Fatalities in terrestrial mammals. Surface water Surface water contamination through oil or diesel spills. Air quality Reduction in air ambient quality. Noise	Defining routes for the circulation of heavy machinery and vehicles; Implement dust suppression spraying on access roads and the operational area; Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Trucks should adhere to the required speed limits to avoid unnecessary injury or death. One route option must be selected and the road maintained by the mine.	Unlikely

		Use local workers as far as possible;	

	Increase in the ambient noise level. Visual Disturbance to the sense of place. Socio Economic The local and regional road transport network will suffer additional pressure		

	from the haulage trucks; Health and safety.		
Storm water management.	Surface water Decrease in surface water quantity.	Divert clean water away from the mining area and prevent damming of storm water. Recycle water contained in the pit and use for dust suppression on site.	Unlikely
Waste Management (Domestic as well as hazardous wastes) including chemical toilets.	Soils Contamination of soils. Surface water Surface water contamination through oil or diesel spills. Groundwater Potential of seepage from hazardous waste.	Clean up any spills immediately and disposed of the soil at a registered waste site. Minimise dirty water area and contain dirty water; Prevent run-off of water with high suspended solid content;	Unlikely

		Waste should be removed off-site by specialist contractors for disposal; Domestic waste will be disposed of at an appropriately authorised landfill facility to reduce the risk of it affecting the water resources; Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Inspect the chemical toilets for leaks on a regular basis.	
Presence of operational vehicles on site.	Soils Sterilisation of footprint area through compaction. Animal life Displacement of indigenous faunal species. Surface water Surface water contamination through oil or diesel spills. Groundwater	Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Clean up any spills immediately and disposed of the soil at a registered waste site. Defining routes for the circulation of heavy machinery and vehicles;	Possible

	Potential of seepage from hazardous waste.	Implement dust suppression spraying on access roads and the operational area;	

	Air quality Reduction in air ambient quality. Noise Increase in the ambient noise level. Visual Disturbance to the sense of place.	Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Follow the equipment's operation and maintenance procedures and all vehicles must undergo periodic maintenance and inspection.	
Concurrent rehabilitation.	Soil Loss of resource due to cracking from poorly consolidated rehabilitation at surface. Vegetation Potential invasion of alien plants on disturbed areas.	The topsoil should be returned to the land as soon as possible and not stored for prolonged periods. If possible, take the topsoil that is removed from the section that is opened for mining and place it directly on the one that is being rehabilitated. After replacing the soils allow the soil to settle for two rainy seasons. Level the soil profile to rectify differential settlement and rip the area after applying the topsoil.	Possible

		The area will be shaped to emulate the pre-mining topography and to allow free drainage of storm water;	

		Emphasis must be on ensuring that the area is safe, stable and free draining; Topsoil will be replaced over the area to complement the growth medium (subsoil) in order to meet the two primary criteria, namely: • topography management (stability) and • water management (free-draining). The indigenous flora will be encouraged to re -establish itself over time as part of the maintenance programme;	

		Implement weed eradication program.	
Decommissioning Phase			
Replacement of soils and backfilling of the pit.	Geology and Groundwater No further impact is expected. Surface water Free drainage and natural surface water patterns stabilisation.	Replace the soft overburden followed by the ferricrete, compact followed by the soil to appropriate soil depths, and cover areas to achieve an appropriate topographic aspect and attitude to achieve a free draining landscape as close as possible the premining/construction land capability rating. The area will be shaped (where possible) to emulate the premining topography;	Possible

		Emphasis must be on ensuring that the area is safe, stable and free draining; Control the mining to remain within the agreed parameters of safety (during mining) and stability (after mining); Replanting should take place even though the topsoil will contain grass seeds.	

Dismantling and removal of all infrastructure in meeting the closure objectives. Ripping, landscaping and re-vegetation of all disturbed areas.	Topography Altering the established topography by reshaping it to emulate pre-mining environment. Air quality Increase in dust levels. Noise Increase in the ambient noise level. Visual Improvement of the visual aesthetic of the project site. Socio Economic Short term employment opportunities. Topography Altering the established topography by	Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Employ local works as far as possible. Follow the equipment's operation and maintenance procedures; Implement dust suppression during dry and windy conditions. All vehicles must undergo periodic maintenance and inspection; Appoint local contractors where possible. Topsoil must be replaced over the area to complement the growth medium (subsoil).	Unlikely Possible
	reshaping it to emulate pre-mining environment. Soils Minimisation of erosion. Vegetation Establishment of pastures for livestock grazing.	The indigenous flora will be encouraged to re -establish itself over time as part of the maintenance programme; Unrequired roads must be ripped to correct any compaction created by the heavy traffic utilized during the mining	

	Growth of invader species. Surface water Free drainage and natural surface water patterns stabilisation. Air quality Increase in dust levels. Visual Improvement of the visual aesthetic of the project site.	operation and rehabilitated with the addition of appropriate fertilizers, lime and grass seed mixes. Implement dust suppression techniques during replacement of overburden and topsoil and after replacement on bare surfaces.	

Waste generation and disposal (hazardous and domestic).	Soils Contamination of soils. Surface water Surface water contamination through oil or diesel spills.	Ensure that waste is managed correctly throughout the life of the mine. Waste should be removed off-site by specialist contractors for disposal. In the event of spillage, the spilled must be cleaned as soon as possible. Waste will be reduced during decommissioning and eventually no domestic or hazardous waste will be produced.	Unlikely

Maintenance of all re-vegetated areas.	Land Capability Slow positive impact on areas requiring rehabilitation and transforming mining to a state of post-mining, engineered agricultural and wilderness areas. Land Use Land use will change from mining back to agriculture and wilderness areas. Vegetation Improvement in erosion control of rehabilitated areas. Animal life Positive impact of livestock breeding and naturally assisting the transformation back to natural state. Visual Improvement of the visual aesthetic of the project site.	The pastures will be grazed and maintained according to a formal pasture management programme. The land should be protected from overgrazing. Implement weed eradication program. Traffic over the rehabilitated ground should be limited where possible while the vegetation is establishing itself.	Unlikely

Retrench and/or retraining of employees.	Socio Economic Loss of jobs.	Implement training programs throughout the life of the mine in order to promote long term sustainability of employees.	Unlikely

Post Closure Phase			
Residual impact due to the removal of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ layer during the operational phase.	Topography Subsidence of mining area. Soils Loss of the soil resources. Ponding on areas due to subsidence and lack of compaction.	Monitor vegetative growth. Monitor stability of surface to identify areas that require corrective actions.	Possible
Poor maintenance of landscaped/revegetated areas.	Soils Cracking to surface from areas of unconsolidated rehabilitation.	Soil samples should be taken and analysed in order to identify problem areas that require corrective action.	Possible

Weed management after closure.	Soils Recovery of topsoil that will ensure a good growth medium. Land capability Return to pre-mining state. Land use Return to agricultural/grazing land. Vegetation Pioneer species should return to natural state. Animal life Recovery of area suitable for livestock and wildlife.	Implement weed eradication program biannually. Establish commercial species on site to help the site to become stable.	Possible

Monitoring of key environmental variables (i.e. soils, vegetation, and surface water) in order to demonstrate stability of rehabilitated areas.	Soils Recovery of topsoil that will ensure a good growth medium. Land capability Return to pre-mining state. Land use Return to agricultural/grazing land. Vegetation Pioneer species should return to natural state. Animal life Recovery of area suitable for livestock and wildlife. Surface water Free drainage and natural surface water patterns stabilisation;	Re-evaluate the nutrient status of the soils at regular intervals to determine the possibility of needing additional fertilizer applications. All domestic animals kept off the area until the vegetation is self-sustaining. Newly seeded/planted areas must be protected against compaction and erosion. Repair any damage caused by erosion.	Possible
	Socio Economic The area will return to grazing wilderness. Visual		

	Improvement of the visual aesthetic of the project site.		

17. Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site (In respect of the final site layout plan) through the life of the activity.

(Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures.)

The following steps were taken in order to identify the potential impacts of the proposed mining activity:

- A detailed desktop study was undertaken to determine the biophysical and socio economic characteristics of the application area and adjacent properties. These reports were mainly used to determine the biophysical, socio economic and cultural features on site along with other tools such as GIS, SANBI, Protected Area Maps and Google earth.
- Site visits was conducted by trained consultants in order to identify specific environmental features on site that require mitigation and/or avoidance. The site visits was utilized to ensure that the information gathered as part of the desktop study reflects the current status of the application area.
- The public participation process is currently undertaken in an interactive manner providing the key stakeholders the opportunity to raise their issues and concerns and point out specific environmental features on site that might not have been identified during the desktop study and site visits. All comments and concerns are captured and addressed as part of the BA and EMPr.
- Potential impacts and risks have been identified based on previous experience with Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operations. During the site assessments, risks and impacts associated with the specific environment was identified and is assessed in the report.

The methodology that will be used to rank the impacts assesses environmental and social impacts by evaluating the consequence (spatial extent, duration, and severity of the impact) and likelihood (probability and frequency of the impact occurring) of each impact and providing a numerical score for each. The significance of each impact is determined by ranking the total score of the consequence with the likelihood of each impact using a matrix. The risk class for each impact is determined through a separate matrix ranking the severity with the probability of the impact occurring. Refer to a full description of the impact assessment methodology in Section 8.4 above.

18. Assessment of each identified potentially significant impact and risk

The table below describes the significance and risk of the potential impacts per activity.

Table 18: Impact Assessment

NAME OF ACTIVITY	POTENTIAL IMPACTS	ENVIRONMENTAL ASPECTS AFFECTED	SIGNIFICANCE if not mitigated	MITIGATION TYPE	SIGNIFICANCE if mitigated	RISK (SEVERITY X PROBABILITY)
Construction Phase						
Preparation of footprint areas through the clearing of vegetation in areas designated for surface infrastructure.	Loss in agricultural potential. Loss and degradation of vegetation. Harm to Fauna. Removal of vegetation and top soil decreases the recharge of aquifers.	Agricultural land capability; Vegetative growth; Animal life; Groundwater Quantity.	Medium	Restrict the potential impacts as follows: Limit the size of the disturbed area as far as possible Activities must remain inside the mining permit boundary at all times; Keep construction vehicles on site during construction; Maintain the best possible indigenous vegetation cover inside the mine boundary; Prevent employees from moving outside permitted areas.	Low	Low

Stripping and stockpiling of topsoil.	Loss of soil resource (soils covered or removed) due to sedimentation and erosion (wind and/or water). Siltation of surface water due to erosion of exposed surfaces. Reduction in air ambient quality. Visual intrusion. Disturbance to the sense of place.	Soil characteristics; Surface water quality; Dust pollution; Sense of place.	Medium	Minimize the potential impacts as follows: Over areas of deep excavation (Open Pit Mining) where the majority or all of the soil profile is to be impacted) strip all usable soil (approx.750mm) and stockpile as berms or low, terraced dumps. Store the soil in stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure rehabilitation purposes. The gradient of the sidewalls must be such as to prevent excessive wash during storms. Stockpile hydromorphic (wet) soils separately from the dry materials, and	Low	Low

				the “ferricrete” separately from all other materials. Protect all stockpiles from water and wind erosion (loss of materials) and contamination by dust and runoff water. Clad stockpiles with larger rock or vegetate the stored materials. The topsoil must be stockpiled separately and used for the construction of berms: the gradient of the sidewalls must be such as to prevent excessive wash during storms. The viability of the soils needs to be maintained for future rehabilitation purposes. Suppress dust with water during soil stripping and stockpiling. Work in such a way with the topsoil stockpiles so as to create the impression of an ordered, visually pleasing pit, and construct berms along strategic lines to mitigate the visual impact of the operation.		

Landscaping activities: Levelling off the ground level; Presence of vehicles on site. 	Alteration of the natural topography. Compaction of soils. Dust outfall on flora outside the development footprint area. Destruction of natural habitat affecting the animal life. Increased in Surface Water Runoff. Dust form is likely to settle on vegetation and other operational areas as dust concentrations increase on the mine premises. Increase in ambient noise levels.	Stability of the area; Soil characteristics; Vegetative growth; Ecological functioning; Surface water quantity; Dust pollution; Noise pollution; Sense of place; Health and Safety.	Medium	Avoid and minimize the potential impacts as follows: The disturbed area must be kept to the minimum needed for the mining operation. During the levelling of the site ensure that the surface water flow is directed away from the construction area towards the surrounding surface water resources. Control of the area disturbed during the construction phase to ensure no unplanned (and/or unauthorised) expansion, with a direct effect on land use.	Medium	Medium
	Visual intrusion. Disturbance to the sense of place. Increased potential for accidents.			Remove any oil or diesel spills as soon as it occurs and dispose of it at a registered waste site. Dust from the internal roads and working areas will be suppressed with water and/or a dust inhibitor; Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Follow the equipment's operation and maintenance procedures and all vehicles must undergo periodic maintenance and inspection.		

				The construction vehicles must remain on site as far as possible during the construction period.		

Blasting – Opening of initial cut.	Disturbance of geological profile. Loss of agricultural land, change of land use from Agriculture to Mining. Potential risk of fracturing shallow aquifers and depletion of aquifer. Dust form is likely to settle on vegetation and other operational areas as dust concentrations increase on the mine premises. Increase in ambient noise levels. Degradation of heritage resources.	Geotechnical stability; Agricultural farmland; Groundwater quantity; Dust pollution; Noise pollution; Graves and sites of cultural importance.	Medium	Minimize the potential impacts as follows: The location of the initial cut will be outside the 1:100 year flood line or 100m from a watercourse whichever is greatest. Blasting must be controlled to prevent spillage of explosions; Blasting should be carried during normal working hours (07:00 – 17:00) or according to applicable legal criteria; Apply blasting techniques to reduce shock waves; Commit to provide adequate compensation to affected households if required. Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease. Suppress dust with water during blasting activities. Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria.	Low	Medium

Construction/Upgrading of the access road.	Compaction of soils. Dust outfall on flora outside development footprint. Reduction in air ambient quality. Increased potential for accidents.	Soil characteristics; Vegetative growth; Ecological functioning; Dust pollution; Health and Safety.	Medium	Prevent the potential impacts as follows: Define routes for the circulation of heavy machinery and vehicles and restrict machines' movement to the necessary areas; Dust from the access road will be suppressed with water and/or a dust inhibitor; Clearly demarcate the construction footprint area and prohibit movement of workers outside the footprint as well as capturing or handling any animals; No bed and banks of any watercourse must not be altered unless authorised by DWS. Roads should have adequate drainage to remove storm water as rapidly as possible.	Low	Low
Establishment of additional infrastructure including the mobile screening plant.	Loss of agricultural land, change of land use from Agriculture to Mining. Visual intrusion. Disturbance to the sense of place. Short term employment opportunities	Agricultural farmland; Sense of place; Local economy.	Low	Avoid the potential impacts as follows: Restrict the area of impact to that which will be used for Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning. Use should be made of down-lighting and directional lighting. Employ local works as far as possible.	Low	Low
Waste handling (domestic and hazardous).	Contamination of the underlying aquifer. Deterioration in the quality of surrounding water resources.	Groundwater quality; Surface water quality;	High	Prevent the potential impacts as follows:	Medium	Medium

				Remove any oil or diesel spills as soon as it occurs and dispose of it at a registered		
	Contamination of soils due to spillage.	Soil quality.		waste site. Clean up any spills immediately and disposed of the soil at a registered waste site. Prevent run-off of water with high suspended solid content; Waste should be removed off-site by specialist contractors for disposal; Domestic waste will be disposed of at an appropriately authorised landfill facility to reduce the risk of it affecting the water resources; Use local contractors as far as possible.		
Operational Phase						

Excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) using excavators.	Loss of soil resource. Disruption of ecosystems and potential loss of agricultural land, land capability being reduced to mining. Disruption of ecosystems and potential loss of agricultural land, land use being reduced to mining. Changes in vegetation dynamics, potential disturbance and loss of sensitive flora. Potential alteration of eco-system functioning due to increased human activities. Displacement of indigenous faunal species. Surface water contamination due to increased sediment load. Potential of seepage from hazardous waste. Reduction in air ambient quality. Increase in the ambient noise level. Disturbance to the sense of place.	Soil characteristics; Agricultural land capability; Vegetative growth; Ecological functioning; Surface water quality; Groundwater quality; Dust pollution; Noise pollution; Sense of place; Local economy; Graves and sites of cultural importance.	High	Minimise the potential impacts as follows: Construct berms downslope of the mining pit to trap sediment. Maintain a vegetation layer on the berms; Restrict the area of impact to that which will be used for Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning. Clean up any oil/diesel spills immediately and disposed of the soil at a registered waste site. Dust suppression will be implemented on roads. Use local workers as far as possible; No mining activities can be conducted within the 1:100 year flood line or 100m from a watercourse whichever is greatest. Clearly demarcate the mining area within which operational activities may take place;	Medium	High

	Additional employment opportunities Degradation of heritage resources.			Construct berms along strategic lines to mitigate the visual impact of the operation. Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease.		
Blasting to loosen the deposit.	Disturbance of geological profile. Displacement of indigenous faunal species. Potential contamination of surface water by nitrates released from explosions. Reduction in groundwater yield. Increase in 'fly rock'. Increase in the ambient noise level. Disturbance to the sense of place. Damage to surrounding houses and infrastructure. Degradation of heritage resources.	Geotechnical stability; Ecological functioning; Surface water quality; Groundwater quantity; Surrounding infrastructure; Noise pollution; Sense of place; Graves and sites of cultural importance; Health and safety;	Medium	Minimise the potential impacts as follows: Impact on geology and groundwater quantity is unavoidable and cannot be mitigated; Blasting must be controlled to prevent spillage of explosions; Blasting should be carried during normal working hours (07:00 – 17:00) or according to applicable legal criteria; Apply blasting techniques to reduce shock waves; Commit to provide adequate compensation to affected households if required. Dust suppression will be implemented on roads.	Medium	High

				Should a heritage resource be identified all activities within a radius of at least 20m of the indicator should cease.		
Dry Screening	Dust outfall on flora outside the development footprint area. Reduction in air ambient quality. Disturbance to the sense of place.	Vegetative growth Dust pollution Sense of place	Medium	Minimise the potential impacts as follows: Implement dust suppression. Limit height of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product stockpiles.	Low	Low

Raw material and product stockpiling.	Alteration of the natural topography. Sterilisation of footprint area through compaction. Surface water contamination due to increased sediment load.	Stability of the area; Soil characteristics; Surface water quality Sense of place;	Low	Prevent the potential impacts as follows: Limit the height of the overburden and product stockpiles as far as possible; Construct berms downslope of the stockpile areas to trap sediment.	Low	Low
Stripping and stockpiling of topsoil.		Soil characteristics and stability; Vegetation diversity; Surface water quality.	Medium	Minimise the potential impacts as follows: Over areas of deep excavation (Open Pit Mining) where the majority or all of the soil profile is to be impacted) strip all usable soil (approx.750mm) and stockpile as berms or low, terraced dumps. Store the soil in stockpiles or berms of not more than 1.5 m around infrastructure area ready for closure rehabilitation purposes. The gradient of the sidewalls must be such as to prevent excessive wash during storms. Stockpile hydromorphic (wet) soils separately from the dry materials, and the “ferricrete” separately from all other materials. Work in such a way with the topsoil stockpiles so as to create the impression of an ordered, visually pleasing pit.	Medium	Medium

				The berms must be grassed and managed to prevent soil loss through erosion and excessive dust; Maintain a vegetation layer on the berms; Implement weed eradication program on soil stockpiles; Implement dust suppression. Limit the height of the soil stockpiles.		

Transportation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) from the mining area to the desired location.	Sterilisation of footprint area through compaction and stockpiling. Dust outfall on flora outside the development footprint area. Fatalities in terrestrial mammals. Surface water contamination through oil or diesel spills. Reduction in air ambient quality. Increase in the ambient noise level. Disturbance to the sense of place. The local and regional road transport network will suffer additional pressure from the haulage trucks; Health and safety.	Soil characteristics; Vegetative growth; Ecological functioning; Surface water quality; Dust pollution; Noise pollution; Sense of place; Local road infrastructure.	High	Prevent the potential impacts as follows: Defining routes for the circulation of heavy machinery and vehicles; Implement dust suppression spraying on access roads and the operational area; Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Trucks should adhere to the required speed limits to avoid unnecessary injury or death. One route option must be selected and the road maintained by the mine. Use local workers as far as possible;	Medium	Medium
Storm water management.	Decrease in surface water quantity.	Surface water quantity.	Medium	Minimise potential impacts as follows: Divert clean water away from the mining area and prevent damming of storm water. Recycle water contained in the pit and use for dust suppression on site.	Low	Low

Waste Management (Domestic as well as hazardous wastes) including chemical toilets.	Contamination of soils. Surface water contamination through oil or diesel spills. Potential of seepage from hazardous waste.	Groundwater quality; Surface water quality; Soil quality.	Medium	Prevent potential impacts as follows: Clean up any spills immediately and disposed of the soil at a registered waste site. Minimise dirty water area and contain dirty water; Prevent run-off of water with high suspended solid content; Waste should be removed off-site by specialist contractors for disposal; Domestic waste will be disposed of at an appropriately authorised landfill facility to reduce the risk of it affecting the water resources; Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Inspect the chemical toilets for leaks on a regular basis.	Medium	Medium

Presence of operational vehicles on site.	Sterilisation of footprint area through compaction. Displacement of indigenous faunal species. Surface water contamination through oil or diesel spills. Potential of seepage from hazardous waste. Reduction in air ambient quality. Increase in the ambient noise level. Disturbance to the sense of place.	Soil characteristics; Vegetative growth; Ecological functioning; Surface water quality; Groundwater quality; Dust pollution; Noise pollution; Sense of place; Local road infrastructure.	High	Minimise potential impacts as follows: Regular maintenance of the operational vehicles and machinery to avoid leaks and spillages; Clean up any spills immediately and disposed of the soil at a registered waste site. Defining routes for the circulation of heavy machinery and vehicles; Implement dust suppression spraying on access roads and the operational area; Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Follow the equipment's operation and maintenance procedures and all vehicles must undergo periodic maintenance and inspection.	Medium	Low
Concurrent rehabilitation.	Loss of resource due to cracking from poorly consolidated rehabilitation at surface. Potential invasion of alien plants on disturbed areas.	Soil stability and characteristics; Vegetation diversity;	Medium	Manage potential impacts as follows: The topsoil should be returned to the land as soon as possible and not stored for prolonged periods. If possible, take	Low	Low

		Agricultural land capability.		the topsoil that is removed from the section that is opened for mining and place it directly on the one that is being rehabilitated. After replacing the soils allow the soil to settle for two rainy seasons. Level the soil profile to rectify differential settlement and rip the area after applying the topsoil. The area will be shaped to emulate the pre-mining topography; Emphasis must be on ensuring that the area is safe, stable and free draining; Topsoil will be replaced over the area to complement the growth medium (subsoil) in order to meet the two primary criteria, namely: • topography management (stability) and • water management (freedraining). The indigenous flora will be encouraged to re –establish itself over time as part of the maintenance programme; Implement weed eradication program.		

Decommissioning Phase						
Replacement of soils and backfilling of the pit.	Free drainage and natural surface water patterns stabilisation.	Surface water quantity; Surface stability.	Medium (Positive)	Enhance positive impacts as follows: Replace the soft overburden followed by the ferricrete, compact followed by the soil to appropriate soil depths, and cover areas to achieve an appropriate topographic aspect and attitude to achieve a free draining landscape as close as possible the	Medium (Positive)	N/A. Positive impact

				premining/construction land capability rating.		
				The area will be shaped to emulate the pre-mining topography; Emphasis must be on ensuring that the area is safe, stable and free draining; Control the mining to remain within the agreed parameters of safety (during mining) and stability (after mining);		

Dismantling and removal of all infrastructure in meeting the closure objectives.	Altering the established topography by reshaping it to emulate pre-mining environment. Increase in dust levels. Increase in the ambient noise level. Improvement of the visual aesthetic of the project site. Short term employment opportunities.	Surface stability; Dust levels; Noise levels; Sense of place; Local Economy.	Low	Mitigate the potential impacts as follows: Carry out the noisiest labours as quickly as possible and during normal working hours (07:00 – 17:00) or according to applicable legal criteria. Employ local works as far as possible. Follow the equipment's operation and maintenance procedures; Implement dust suppression during dry and windy conditions. All vehicles must undergo periodic maintenance and inspection; Appoint local contractors where possible.	Low	Low
Ripping, landscaping and re-vegetation of all disturbed areas.	Altering the established topography by reshaping it to emulate pre-mining environment. Free drainage and natural surface water patterns stabilisation. Increase in dust levels. Improvement of the visual aesthetic of the project site. Minimisation of erosion. Establishment of pastures for livestock grazing. Growth of invader species.	Surface stability; Soil characteristics; Vegetation growth and diversity; Surface water quantity; Dust levels; Sense of place.	Medium (Positive)	Enhance positive impacts as follows: Topsoil must be replaced over the area to complement the growth medium (subsoil). The indigenous flora will be encouraged to re –establish itself over time as part of the maintenance programme; Unrequired roads must be ripped to correct any compaction created by the heavy traffic utilized during the mining operation and rehabilitated with the addition of appropriate fertilizers, lime and grass seed mixes.	Medium (Positive)	N/A. Positive impact

				Implement dust suppression techniques during replacement of overburden and topsoil and after replacement on bare surfaces.		
Waste generation and disposal (hazardous and domestic).	Contamination of soils. Surface water contamination through oil or diesel spills.	Soil quality; Surface water quality.	Medium	Avoid potential impacts as follows: Ensure that waste is managed correctly throughout the life of the mine. Waste should be removed off-site by specialist contractors for disposal. In the event of spillage, the spilled must be cleaned as soon as possible. Waste will be reduced during decommissioning and eventually no domestic or hazardous waste will be produced.	Low	Low

Maintenance of all re-vegetated areas.	Slow positive impact on areas requiring rehabilitation and transforming mining to a state of post-mining, engineered agricultural and wilderness areas. Land use will change from mining back to agriculture and wilderness areas. Improvement in erosion control of rehabilitated areas. Positive impact of livestock breeding and naturally assisting the transformation back to natural state. Improvement of the visual aesthetic of the project site.	Agricultural potential; Surface stability; Vegetative growth; Ecological functioning; Sense of place.	Medium (Positive)	The pastures will be grazed and maintained according to a formal pasture management programme. Protect the area against overgrazing. Implement weed eradication program. Traffic over the rehabilitated ground should be limited where possible while the vegetation is establishing itself.	Medium (Positive)	N/A. Positive impact.
Retrench and/or retraining of employees.	Loss of jobs.	Local Economy	Low	Minimize potential impact as follows: Implement training programs throughout the life of the mine in order to promote long term sustainability of employees.	Low	N/A.
Post Closure Phase						
Residual impact due to the removal of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ layer during the operational phase.	Subsidence of mining area. Loss of the soil resources. Ponding on areas due to subsidence and lack of compaction.	Surface stability; Soil characteristics; Agricultural potential;	High	Manage potential impacts as follows: Monitor vegetative growth.	Medium	Medium
				Monitor stability of surface to identify areas that require corrective actions.		
Poor maintenance of landscaped/re-vegetated areas.	Soils Cracking to surface from areas of unconsolidated rehabilitation.	Surface stability; Soil characteristics; Agricultural potential.	High	Manage potential impacts as follows: Soil samples should be taken and analysed in order to identify problem areas that require corrective action.	Medium	High

Weed management after closure.	Recovery of topsoil that will ensure a good growth medium. Return to pre-mining state. Return to agricultural/grazing land. Pioneer species should return to natural state. Recovery of area suitable for livestock and wildlife.	Surface stability; Soil characteristics; Agricultural potential; Vegetative growth and diversity; Ecological functioning.	Low (Positive)	Minimize potential impacts as follows: Implement weed eradication program biannually. Establish commercial species on site to help the site to become stable.	Low (Positive)	N/A. Positive impact.
Monitoring of key environmental variables (i.e. soils, vegetation, and surface water) in order to demonstrate stability of rehabilitated areas.	Recovery of topsoil that will ensure a good growth medium. Return to pre-mining state. Return to agricultural/grazing land. Pioneer species should return to natural state. Recovery of area suitable for livestock and wildlife. Free drainage and natural surface water patterns stabilisation; The area will return to grazing wilderness. Improvement of the visual aesthetic of the project site.	Surface stability; Soil characteristics; Agricultural potential; Vegetative growth and diversity; Ecological functioning; Surface water quantity; Sense of place.	Medium (Positive)	Manage potential impacts as follows: Re-evaluate the nutrient status of the soils at regular intervals to determine the possibility of needing additional fertilizer applications. All domestic animals kept off the area until the vegetation is self-sustaining. Newly seeded/planted areas must be protected against compaction and erosion. Repair any damage caused by erosion.	Medium (Positive)	N/A. Positive impact.

19. Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form):-

Table 19.1: List of specialist studies conducted

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
N/A	N/A	N/A	N/A

No specialist studies were undertaken, as this application is only for Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining which is not considered to be a hazardous substance, and the site has already been disturbed through post mining activities.

20. Environmental impact statement

Summary of the key findings of the environmental impact assessment;
The key findings of the environmental impact assessment have been described below per phase of the proposed mining operation.

20.1 Construction Phase

Due to the nature and the small scale of the proposed mining operation the construction phase will not be of long duration and the impacts will be limited to the areas designated for surface infrastructure as well as the location of the initial pit. The only activities that could cause impacts with a significance rating of medium post mitigation are site establishment and waste handling. The impacts during site establishment have been assessed to have a medium significance rating after mitigation mainly because these impacts will definitely occur and can only be minimized by implementing mitigation measures. In terms of waste handling there is only a possibility of the potential impacts occurring but due to the hazardous nature of oil/diesel spills the impacts could have significant negative effects on the soil and water resources.

20.2 Operational Phase

The size of the operational area cannot exceed 5ha because this is only a mining permit application. The operational phase will result in the change of land use from agriculture to mining. The land capability will be affected during the mining operation but should the rehabilitation measures be implemented correctly it has a good chance to return to the pre-mining state due to the non-hazardous nature and depth of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ winning operation. There are no impacts assessed to have a high significance rating after mitigation. The potential impacts on the soils during the extraction of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ has a medium significance rating after mitigation because it will definitely occur over the entire operational area (5ha) and could result in residual impacts if the topsoil is not managed correctly. The potential also exists that oil or diesel spills from the operational vehicles could pollute the surrounding water resources but this impact can be minimised or even avoided by implementing the mitigation measures mentioned in this report. Finally the dry screening process will have a cumulative impact on dust pollution in the area along with the transportation activities. Transportation of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ product will also contribute to the degradation of the local road network.

20.3 DECOMMISSIONING

The decommissioning phase will be of short duration because most of the infrastructure on site will be temporary structures. The main activities during the decommissioning phase will

involve the backfilling of the final pit, ripping of the compacted areas and spreading of the topsoil over the disturbed area. The impacts during the decommissioning phase will mainly be positive because the aim of this phase is to rehabilitate the environment so that it can again be used for agricultural activities after mining. The success of the decommissioning phase will mainly depend on how the topsoil was managed during the construction and operational phases of the mine.

20.4 Post Closure Phase

The post closure phase will involve the monitoring of the rehabilitated area and the impacts that could occur during this phase will be as a result of poor rehabilitation. Therefor the impacts post closure can be avoided by managing the topsoil correctly during the construction and operational phases and by implementing the correct rehabilitation measures during the decommissioning phase. The activities during the post closure phase will identify areas that need to be rectified before applying for closure.

21. Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Any mining operation will have negative impacts on the biophysical aspects of the environment. However due to the non-hazardous nature and small scale of the proposed Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mine these impacts are much less significant compared to a large coal mine for instance? The following negative impacts have been identified during the environmental impact assessment:

- Ground and surface water pollution from hydrocarbon spills or diesel spills during the construction and operational phase;
- Potential decrease in the groundwater quantity if an aquifer gets breached during blasting;
- Surface water contamination from increased sediment load;
- Soil pollution resulting from hydrocarbon spills;
- Loss of soil resource due to compaction, excavation and erosion.
- Increase dust levels in and around the application area and access road will have a cumulative impact on the ambient air quality of the surrounding area.

In terms of positive impacts the proposed Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation will contribute to the local economy but again due to the small size and short life of mine the impacts will not be felt by a large number of people. The following positive impacts have been identified:

- Additional employment opportunities for local people;
- The supply of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ will assist the ongoing development of the socio economic structure in the area.

In terms of risks the proposed Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ mining operation is classified as a Category C Mine but it does still pose some risks to the biophysical and socio economic environment. These have been listed below:

- Cracking and or subsidence to surface from areas of unconsolidated rehabilitation will decrease the agricultural land capability and could result in the change of land use;
- Breaching of an aquifer during blasting and excavation of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ will result in the depletion of groundwater resources in and around the application area; Surface or groundwater pollution from hazardous waste spillages.

22. Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

The following goals and objectives have been set as targets for the effective mitigation of impacts caused by the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)-winning operation. These goals and objectives will be measured through the monitoring programme.

- The entire operational area will be managed as a disturbed area for the duration of the project.
- The viability of the soils needs to be maintained for future rehabilitation purposes. The goal is to prevent erosion and loss of top soil in order to ensure effective rehabilitation. The objective is to separate growth medium to facilitate the re-establishment of vegetation post closure.
- Minimise the impact of the change in land use from agriculture to Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/ winning by ensuring that an acceptable post closure land capability is achieved.
- Minimise the proliferation of weeds and alien invaders of which the invasion of wattle is the biggest threat. The objective is to control these species throughout the life of mine so that there is no need for a prolonged control of weeds during the maintenance period.
- Do not disturb the habitat outside of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone)/-winning area.
- Minimise the amount of water used during the mining operation and minimise negative impacts on rain water runoff by preventing pooling of water.
- Surface water quality will be maintained by limiting contamination through oils, greases etc. This is achieved by collecting and maintaining the used grease and oil in drums which are collected by registered used oil contractors.
- Water from off site will be brought onto site to be used for domestic purposes.
- Minimise dust generation such that this will not cause a visual disturbance on the adjacent tar road nor an unacceptable air quality. The objective is to

maintain an acceptable dust level. (Total suppression of dust during excavation, screening and loading will not be possible).

- Work in such a way with the topsoil stockpiles so as to create the impression of an ordered, visually pleasing pit, and to construct berms along strategic lines to mitigate the visual impact of the operation.
- No mitigation of operational noise will be undertaken due to the absence of neighbours within the zone of influence for noise (except for vehicles passing along the tar road).
- Issues raised by the IAP's will be dealt with as they arise.

23. Aspects for inclusion as conditions of Authorisation.

Any aspects which must be made conditions of the Environmental Authorisation

The following conditions should be included into the authorisation:

- A final layout plan showing the locations of infrastructure and mining area must be provided;
- A site specific storm water management plan must be developed;
- No mining activities can occur within 100m of surface water resources and 500m of wetlands unless authorised by DWS;
- No mining activities can occur within 100m of residential buildings and/or grave sites.
- No mining activities will be allowed outside the 5ha boundary.
- Blasting and handling of explosive must be done according to the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and GN109 Explosive Regulations (2003).

24. Reasoned opinion as to whether the proposed activity should or should not be authorised

Reasons why the activity should be authorized or not.

Not proceeding with the operation would have a direct consequence in that the potential Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) reserve will not be utilised. The supply of Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) will assist the on-going development of the socio economic

structure in the area and the potential biophysical impacts of the proposed operation can be managed to a large extend. Due to the non-hazardous nature of the Lithium ore, Gold ore, Jade(gemstone), and Quartz(gemstone) mining operation and the already disturbed condition of the application area (due to agricultural activities) there are no potential impacts with a high significance rating post mitigation. Based on the above reasoning it is the opinion of the EAP that the activity may be authorised.

25. Period for which the Environmental Authorisation is required.

According to the MPRDA Section 27 a mining permit is valid for two years and may be renewed for three periods which may not exceed one year. The Environmental Authorisation should therefore allow for the five years of mining taking into account the potential renewal periods.

26. Financial Provision

The total amount required to manage and rehabilitate the environment in respect of rehabilitation is **R 307 901,63**

27. Has a water use licence has been applied for?

No. Limited water is required for operational purposes because it is a dry operation. Water usage will be on average 308m^3 per month with a maximum 616m^3. The water will be sourced from the contract miner. The water sourced can be considered clean water based on the results provided therefore a Water Use License will not be required in terms of Section 21 (g) to use this water for dust suppression purposes.

No activities will take place within 100m of a watercourse or wetland.

28. EMERGENCY PREPAREDNESS AND RESPONSE

The company shall establish, implement and maintain a procedure(s):

- To identify the potential for emergency situations;
- Through consultation with the workforce and the Mines Risk Management Programme
- To respond to such emergency situations.
- To draft and train all employees on the responses of the emergency situations.

The company shall respond to actual emergency situations and prevent or mitigate associated adverse SHE consequences. In planning its emergency response, the company shall take account of the needs of relevant interested parties, e.g. emergency services and neighbours.
The company shall also periodically test its procedure(s) to respond to emergency situations, where practicable, involving relevant interested parties as appropriate. The company shall periodically review and, where necessary, revise its emergency preparedness and response procedure(s), in particular, after periodical testing and after the occurrence of emergency situations.

How Can We Plan?

What must the industry do to properly meet the threats presented by unplanned, emergency incidents? What processes, equipment, emergency teams and materials must be available? We need to focus on practical preparation methods, and some common codes and regulatory requirements. We will refer to codes and requirements that will apply to most of our readers, realising those jurisdictional requirements are so varied. There are a few basic requirements of an emergency plan that apply to virtually all types of emergencies. These requirements are shown in Figure A
Emergency planning requirements fall into three distinct categories; Pre-Incident Planning, Incident Response and Post-Incident Action.

Pre-Incident Planning

Identify Emergency Scenarios – This activity requires a group effort to ensure all possible emergencies are considered. Engineers, environmentalists, operators, maintenance, office staff, managers and janitors, all have a role to play in this process. Each member of the group brings a unique perspective to bear on the potential

emergencies that occur at the plant. Using a questionnaire that stimulates consideration of what might happen, can make identifying these scenarios easier.

Basic Requirements of Emergency Planning

- Communicate the plan to all employees
  Through Induction Training, Visitors Induction and Sectional Training
- Review company operations and identify probable emergency scenarios.
  Through annual revilements, incidents, accidents and or change in legislation.
- Assign a probability of occurrence and a potential severity to the outcome.
  Through the Risk Management Programme.
- Assess the risk, (the product of the probability and severity mentioned above).
  Through consultation and workshops with the Risk Assessment Committee.
- Determine the regulations regarding planning for these incidents.
  Through workshops and meetings.
- Determine the regulations regarding response capabilities.
  Through consultations and applying Regulations
- Determine the local response time.
  Through Consultations.
- Prepare for response by dealing with the highest risks.
  Drafting and training all applicable persons as to the Procedures.
- Develop your plan.
  Through consultations and workshops.
- Select and train your response team(s).
  Workforce, Management and stakeholders.
- Conduct drills and exercise your plan and your team(s).
  By the Safety Department and Heads of Departments on a time schedule and or unprepared.
- Implement recovery and re-start operations
  Re-start plan and assessments through Consultations.
- Evaluate your effectiveness and improve your plan.
  Through workshops and skilled capable consultants.

Your incident history can provide insight into the frequency and severity of the type of emergencies likely to occur at your site. Industry experience, if available, can also provide valuable information.

General requirement

The company should assess the potential for emergency situations that impact on Safety Health and the Environment (SHE) and develop a procedure(s) for an effective response(s). This may be a stand-alone procedure(s) or be combined with other emergency response procedure(s). The company should periodically test its emergency preparedness and seek to improve the effectiveness of its response activities and procedure(s).

NOTE Where the procedure is combined with other emergency response procedure(s), the company needs to ensure that it addresses all potential SHE impacts and should not presume that the procedures relating to fire safety, or environmental emergencies, etc., will be sufficient.

IDENTIFICATION AND CLASSIFICATION OF HAZARDOUS WASTE

This section provides a brief overview of the South African system for identification and classification of hazardous waste. Management shall ensure that they familiarise themselves with this system and classification process as it will be critical during the operational phase.

WASTE MANAGEMENT SPECIFICATIONS

The Environmental Specification outlined in the sections that follow is specific to the management of general and hazardous waste on site.

WASTE MINIMISATION

- Minimizing waste generation by implementing stringent waste segregation

WASTE RECYCLING AND REUSE

Further to the above, Management must ensure that necessary steps are taken to recycle and reuse as much of the hazardous waste generated and reduce the amounts disposed at the disposal site.

- Evaluation of waste production processes and identification of potentially recyclable materials;
- Identification and recycling of products that can be reintroduced into the manufacturing process or industry activity at the site;
- Establishing recycling objectives and formal tracking of waste generation and recycling rates; and
- Providing training and incentives to employees in order to meet objectives

SPILLAGE AND RELEASE CONTROL MEASURES

Overfills, vehicle accidents, and tank and piping failures can lead to releases during waste storage and handling. Mitigation measures, including physical protection, overfill protection, tank integrity, and secondary containment (banded areas) for tanks are some of the general mitigation measures. Recommended measures include:

- Spill Kits and hazmat clean-up materials should always be available on site;
- Conduct regular training and exercises for site staff regarding emergency procedures;
- Provide sufficient fire extinguisher to control accidental fires

FIRE CONTROL MEASURES

- Firefighting equipment appropriate to the type of waste received at the site should be available;
- Minimize the storage of flammable liquids on site (e.g. fuel, flammable wastes);
- Endure all staff are appropriately trained for fire.

TEMPORARY STORAGE FACILITY DESIGN AND HOUSE KEEPING

In line with the Waste management regulations and good international practice:

- Storage of hazardous chemicals must be in a hazardous storage cage and monitored at all times;
- Traffic control measures must be in place;

POLLUTION CONTROL MEASURES

In line with the Environmental management regulations and good international practice measures to adequately mitigate release of emissions and escape of pollutants into the environment, Surface waste, groundwater, soil and air must be put in place and implemented. Such recommended measures include:

AIR POLLUTION CONTROL MEASURES

Although it is not anticipated that this proposed mining will have significant potential for air emission release, the following measures should be considered and assessed:

1. Appropriate engineering controls (Best Available Technologies) must be in place;
2. Complaints of potential air quality risks and concerns must be recorded and investigated.

WATER POLLUTION CONTROL MEASURES

Although it is not anticipated that this proposed mining will not have significant potential for water pollution risks, the following measures should be considered and assessed for possible implementation:

- No drilling must be undertaken 500m from a wetland area;
- Hydrocarbon spillages must be recorded and cleaned immediately;
- Should spillage be over a large area, event should be reported to the department of Minerals;

SOIL CONTAMINATION CONTROL MEASURES

Although it is not anticipated that this mining will have significant potential for soil contamination risks, the following measures should be considered and assessed:

- Measures to avoid leakages and Spillages on to bare ground and leakages must be undertaken;
- Hydrocarbon spillages must be cleaned immediately;
- No servicing of equipment must be undertaken on mining area;
- Refuelling must be undertaken using spill tray;

Training

- Documented training and competency assessment is required for personnel involved in the management of hazardous material wastes.
- Training records shall be maintained;
- Training includes proper management of the waste streams, labeling, containers,
- Emergency procedures outlined;
- Hazardous waste handlers and their supervisors / managers must complete training or on-the-job instruction relevant to their duties to include hazardous waste management procedures and contingency plan implementation;
- Training of all personnel must be completed before duties are assigned and training in terms of handling of hazardous waste must be repeated annually and as and when required.

EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Sections 1, 2 and 3 of this document have provided a comprehensive background pertaining to the applicable legislation pertaining to the management of a waste disposal site and the applicable procedures for characterising and classifying waste.

The provision of an emergency response plan requires a good understanding of the waste legislation and thorough handling and management of the waste on site. An EP & RP has been provided in order to curb and control the risks that may emanate during the operational phase of the site.

PURPOSE OF THE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

An emergency is an unplanned event when a project operation loses control, or could lose control, of a situation that may result in risks to human health, property, or the environment, either within the waste disposal site or in the local community. Emergencies do not normally include safe work practices for frequent upsets or events that are covered by occupational health and safety. Proper emergency planning and response are important elements of the site Environmental, Health and Safety Plan of a Hazardous Waste Handling, Storage and Disposal facility, and that help minimize employee exposure and injury.

There are a number of regulations, guidelines, standards which requires that the employer develop and implement a written emergency response plan to handle possible emergencies before performing hazardous waste site operations. The permit Holder for the waste disposal site in this case, the company Health and Safety officer must, develop an emergency preparedness and response or action plan complying to ensure the safe evacuation of personnel.

CONTENT OF THE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

The Emergency Preparedness and Response Plan must be commensurate with the risks of the mining and at the minimum include the following elements:

- Administration
- Pre-emergency planning,
- Emergency recognition and prevention,
- Emergency medical and first-aid treatment,
- Methods or procedures for alerting on-site employees,
- Safe distances and places of refuge,
- Site security and control,
- Personal protective and emergency equipment,
- Evacuation routes and procedures. and Training and Awareness

In addition to the above requirements, the plan must include site topography, layout, prevailing weather conditions, and procedures for reporting incidents to local authorities, the South Africa Police Services (SAPS), and regulating agent i.e. DEA and Department of Labour etc.

USE OF THE EMERGENCY PREPAREDNESS AND RESPONSE PLAN

The procedures must be compatible with and integrated into the operational management plan of the site. The plan requirements also must be rehearsed regularly, reviewed periodically, and amended, as necessary, to keep them current with new or changing site conditions or information.

29. Administration of the EP&RP

Policy

The emergency response plan should be implemented in line with the company's Safety, Health and Environment Policy.

Distribution

This Plan and procedures contemplated in this plan must be distributed to all personnel working on the site.

Definitions

The procedures must be compatible with and integrated into the operational management plan of the site. The plan requirements also must be rehearsed regularly, reviewed periodically, and amended, as necessary, to keep them current with new or changing site conditions or information.

Organogram

The organogram described in the EMP shall apply to the emergency response plan.

Personnel roles and responsibilities

The Roles and Responsibilities described in the EMP shall apply to the emergency response plan.

Communication procedures

The communication lines established in the EMP shall apply to the emergency response plan.

First-Aid Calls

The company's Safety Health and Environment officers must ascertain that all emergency contact numbers (first aid officers, ambulances, fire brigade, police, hospital etc) are conveniently posted at several site notice boards in order to assist in the event of an emergency.

Training and Awareness

- Before implementing the EP&RP, the SHE Coordinator and project Managers/Supervisors shall designate and train a sufficient number of persons to assist in the safe and orderly emergency evacuation of employees.
- The EP&RP must be reviewed with all employees at the following times:
- Initially when the plan is developed,
- Whenever the employee's responsibilities or designated action under the plan change, and whenever the plan is changed.
- All training must be documented in writing and copies sent to Safety and Health department of the company.

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30. Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The closure objectives and rehabilitation measures include the following:

- Facilities: Will be either left for future users or sold for removal. Soil will be decontaminated and the site rehabilitated. This will be done on a case by case basis in consultation with stakeholders and the area will be restored to as much of the natural condition as it was before the construction phase ;
- Ensure that all areas are stable and there is no risk of erosion;
- Haul roads will be ripped and rehabilitated to grasslands;
- Return the topography and vegetation of the area to an acceptable condition;
- Ensure that no soil compaction remains on site;
- Prevent the alien plant invasion on site until the area is in a stable condition;
- Ensure that no contaminated material remains on site;
- Ensure that the areas is free draining and non-polluting;

- Ensure that no degradation in land capability remains; and
- Ensure that vegetation re-establishment is successful

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31. Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The Landowner, Interested and Affected Parties have been consulted on the closure objectives and rehabilitation during the consultation period.

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32. Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

- The retrenchment processes will be followed as per requirements of the applicable legal process
- Ensure that all roads rehabilitated and or left behind is safe in good working condition, ensuring public safety and access to site and monitoring points
- Any degradation to roads will be repaired with consultation of the roads department
- Rehabilitated profiles must ensure free drainage of water and should be contoured to fit in with the catchment dynamics
- Removal of waste and their appropriate disposal
- Facilitation of the re-establishment of the land use and land capability to an acceptable condition as it was before the construction phase
- Ensure land is rehabilitated to, as far as is practicable, its natural state, or to a predetermined and agreed standard or land use which conforms with the concept of sustainable development
- Areas will be fenced off once seeded to prevent surface disturbance to the site and allow for vegetation to establish and stabilize

(Refer to **Appendix 5** for the Rehabilitation Plans attached)

33. Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

The closure plan will assist company to achieve the following objectives:

- Ensure shareholder value is preserved;
- Ensure that stakeholders' needs, concerns and aspirations are taken into account when considering closure;
- Comply with relevant or applicable legislative requirements;
- Limit or mitigate adverse environmental effects to an extent that it is acceptable by all parties;
- Ensure land is rehabilitated to, as far as is practicable, it's natural state, or to a predetermined and agreed standard or land use which conforms to the concept of sustainable development.

34. Confirm that the financial provision will be provided as determined.

The financial provision will be provided as determined.
Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including Environmental monitoring programme.

35. General Monitoring and Reporting

- The environmentalist/consultant/mine manager will ensure that the integrity of the lining of all dirty water management facilities is tested at least quarterly.
- The environmentalist/consultant/mine 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 groundwater flow dynamics will be calibrated every two years with updated monitoring data. This will assist with management and long term risk prediction and management.
- The environmentalist/consultant/mine manager will be responsible for inspection of sites and keeping records of all monitoring activities.
- All incidences and issues will be recorded, as will the actions taken to address issues.

36. Action Required

Should significant changes in qualities or levels be observed then:

- All medium risk facilities will be inspected to ensure no severe problems occur in these areas.
- Any issues observed will be reported to the environmental site manager and respective site manager.
- All leaks identified will be repaired.
- Silt build-up in water management facilities / dams will be cleared and deposited in soil stockpiles if clean or in residue deposits if dirty.

37. Indicate the frequency of the submission of the performance assessment/ environmental audit report.

The environmental performance assessment report will be submitted to the DMRE.

38. Environmental Awareness Plan

38.1 Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

The successful implementation of the EMP is dependent on training and awareness of all personnel working on the drilling site. The environmental awareness plan aims at:

- Promoting general environmental awareness amongst all employees;
- Informing all personnel of environmental policies, procedures and programmes applicable to the mining activities;
- Providing general training on the implementation of environmental management actions; and,
- Providing job specific environmental training to ensure the protection of the environment.

The environmental awareness training programme will include:

- Environmental induction of new employees;
- Code of conduct signed by all inducted employees;
- Identification of environmental risks associated with each job and job specific training on addressing these risks; and
- Training on the implementation of emergency procedures where necessary.

38.2 OBJECTIVES

- Inform employees and contractors of any environmental risks which may result from their work, and
- Inform employees and contractors of the manner in which the identified possible risks must be dealt with in order to prevent degradation of the environment.
- In general, the purpose of implementing an Environmental Awareness Plan is to optimize the awareness of those partaking in the mining and related activities which have the potential to impact negatively on the environment (e.g. spillages form dirty water dams), and in doing so, promote the global goal of sustainable development.

38.3 RESPONSIBILITY FOR IMPLEMENTING THE EMP

The environmental management plan will ensure environmental commitments are adhered to and will be used to evaluate the effectiveness of mitigation measures.

Environmental principles will be communicated effectively to newly appointed employees, employees returning from annual leave, as well as to contractors and visitors upon entering the mining area.
The following measures should be undertaken:
The appointed ECO will form part of the inspection team during certain phases of mining activities to ensure that the appropriate measures are implemented. In the event of an environmental emergency, site supervisor will inform the contractor to stop work on the offending activity. The matter must also be reported to the ECO who will report further and then a decision will be made. Environmental Control Officer will oversee each phase of the mining activities (establishment, operation and rehabilitation). The ECO will be responsible for all environmental inspection matters. Regarding environmental issues, an ECO will:

- Ensure that project- related activities are in compliance with the Environmental Management Programme, contingency plans, tender specifications and approval conditions, contract provisions or specifications during mining works,
- Be responsible for all environmental field work, programme, and monitoring,
- In case of an environmental emergency, a site supervisor must report it to an ECO and then a decision will be made to not have the authority to stop a project.
- Ensure that any mitigation and environmental management measures required to protect the environment during work stoppage follows these environmental regulations,
- Be responsible for addressing on-site environmental issues as they emerge.
- Record instance of non-compliance, contingency response and work stoppage relating to environmental issues.
- Maintain records of all communication

The overall responsibility of ensuring compliance with the Environmental Management Programme is with the applicant and all other people associated with the applicant (contractors included). The applicant shall ensure that all staff members, sub-contractors and suppliers understand and adhere to the Environmental Management Programme. The applicant shall ensure that all contractors, sub-contractors and suppliers are contractually bound to adhere to the Environmental Management Programme. All contractors, sub-contractors and

suppliers have to give assurance that they understand the Environmental Management Programme and that they undertake to comply with its conditions.

38.4 AWARENESS CONTEXT

The workforce, contractors are not informed about the environment and need to be informed of key elements that the EMP strives to manage:

- Description of the environment and sensitive features;
- Explain simple key concepts;
- Introduce the environment of proposed works area and adequate management

Thereof;

- Provide examples of environmental degradation and pollution sources
- Explain the roles and responsibilities of the contractors, employees in managing the environment;
- Devise basic principles to manage the environment
- Indicate laws applicable to the management and protection of the environment;
- Indicate day to day preventative measures to assist elimination of pollution and degradation (presentation is better than cure)

38.5 SENIOR AND SUPERVISORY PERSONNEL

All senior and supervisory staff members shall familiarize themselves with the full contents of the EMP. They shall understand and know how to implement the control measures of the EMP and shall be able to assist other staff members in matters relating to the EMP. Senior and Supervisory personnel are to be identified and presented to the workforce, contractors during training.

38.6 REPORTING NON-COMPLIANCE WITH THE EMP IMPLEMENTATION

The applicant will as soon as possible, but within 48 hours, report to the Environmental Consultant on:

- Difficulties encountered with carrying out the EMP control measures
- Areas of non-compliance, or amendments that may be required to any of the EMP control measures

38.7 REPORTING PROCEDURE

Within 24 hours of becoming aware of any environmentally related problems (such as spillages and an environmental complaint or claim; an incident of non-compliant the

environmentally related incident), the project manager/geologist should be notified and the following documented:

- Nature and cause of the problem
- Parties responsible for causing the problem
- Immediate actions taken to stop/reduce/contain the causes of the problem. It should be emphasized that the ECO/geologist/project manager shall be given the responsibility to inventory all the environmental aspects of the mining activities. These shall include the following:
- Documentation for specific environment-related activities, such as lists of spill response, incidence reporting.
- Ensure that project-related activities are in compliance with contingency plans, regulatory permits and approval conditions, contract provision or specifications.
- Be responsible for providing environmental information for staff, and for making sure that all personnel and contractors understand the terms and conditions in all regulatory permits and approvals and the environmental management programme and also incident contingency plans before commencement of the work.
- Be responsible for addressing on-site environmental issues, as they emerge
- Maintain required records for environmental monitoring programs.
- Maintain a photographic record of prior to, and during, construction activities that have the potential to adversely affect resources of other environmental features.

38.8 CONCLUSION

The awareness training of employees, supervisors, sub-contractors, contractors and visitors will ensure that co-operation in terms of environmental management will occur. This will contribute to the success of the Environmental Management Programme.

39. Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

Please refer to the impact assessment above (Also attached to this report).

40. Specific information required by the competent authority

(Among others, confirm that the financial provision will be reviewed annually).
Specific information requirements have not been stated by the competent authority to date and the financial provision will be reviewed annually.

41. UNDERTAKING

The EAP herewith confirms

- The correctness of the information provided in the reports
- The inclusion of the comments and inputs from stakeholders and I&Aps
- The inclusion of input and recommendations from the specialist report where relevant, and
- That the information provided by the EAP to the interested and affected parties and any responses by the EAP to comments or input made by interested and affected parties are correctly reflected herein

Signature of the environmental assessment practitioner

P.M

Name of company

Malac Waste and Environmental Management

Date:

18/08/2022

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42. APPENDIXES

- Appendix 1- CV of the EAP
- Appendix 2- Site Plans
- Appendix 3-Site Photographs
- Appendix 4- Proof of Public Participation
- Appendix 5- Specialist Reports
- Appendix 6- Screening Tool Report
- Appendix 7- Financial Provision
- Appendix 8 - Other Information